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Compartimento della viabilità per il Lazio

STRADA STATALE 4 "VIA SALARIA"
Adeguamento della piattaforma stradale e messa in sicurezza dal km 56+000 al km 64+000

PROGETTO DEFINITIVO COD. **RM180**

PROGETTAZIONE: R.T.I.: PROGIN S.p.A. (capogruppo mandataria)

CREW Cremonesi Workshop S.r.l - TECNOSISTEM S.p.A

ART Risorse Ambiente Territorio S.r.l - ECOPLAME S.r.l.

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06.12.2022 18:42:19
GMT+01:00

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RESPONSABILE STUDIO DI IMPATTO AMBIENTALE:

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PROTOCOLLO

DATA ______ 202_

CAPOGRUPPO MANDATARIA:

PROGETTAZIONE GRANDI INFRASTRUTTURE PROGIN S.p.A.

Direttore Tecnico:
Dott. Ing. Lorenzo INFANTE

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IDROLOGIA ED IDRAULICA
IDRAULICA DEI CORSI D'ACQUA
Relazione idraulica

CODICE PROGETTO	NOME FILE	REVISIONE	SCALA:
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REV.	DESCRIZIONE	DATA	REDATTO	VERIFICATO	APPROVATO
B	Emissione a seguito istruttoria ANAS	Maggio 2022	R. Malcotti	R. Malcotti	L. Infante
A	Prima emissione	Agosto 2021	F. Benassi	R. Malcotti	L. Infante

Sommario

1 PREMESSA

Il presente documento illustra lo studio idraulico dei corsi d’acqua redatto nell’ambito della progettazione definitiva dei lavori di adeguamento della piattaforma stradale e messa in sicurezza dal km 56+000 al km 64+000 della Statale 14 “via Salaria”, 1° lotto.

L’inquadramento normativo connesso alle attività idrologiche ed idrauliche consente di poter delimitare i vincoli attorno ai quali costruire/inserire il progetto. Nel quadro complessivo, si pone particolare attenzione alle norme definite dal Distretto Idrografico regionale (PAI e Direttiva Alluvioni), nonché alle norme tecniche delle costruzioni NTC2018.

Dalla consultazione del Piano di Gestione del Rischio Alluvioni dell’Autorità di Bacino Distrettuale dell’Appennino Centrale non risultano, lungo il tracciato del presente stralcio, aree di pericolosità idraulica mappata nel piano.

Il principale corso d’acqua che si incontra lungo il tratto della SS 14 in oggetto d’intervento è costituito dal fosso dei Cerri (o fosso Secco nel tratto iniziale di monte), affluente in sponda destra del torrente Farfa ed appartenenti all’alto bacino del Tevere. Il fosso dei Cerri defluisce in uno stretto corridoio vallivo, affianca il tracciato stradale lungo tutto lo sviluppo del lotto 1 e lo attraversa in diversi punti. Ulteriori interferenze idrografiche, secondarie, sono costituite dagli impluvi che affluiscono al fosso dei Cerri.

Dal punto di vista dell’analisi idraulica dei corsi d’acqua, le verifiche si sono distinte tra i corsi d’acqua demaniali (presenti in catasto, codifica B nella tabella di bacino) e quelli NON demaniali (denominati compluvi, codifica C nella tabella di bacino).

I corsi d’acqua demaniali sono stati tutti analizzati mediante modellistica numerica monodimensionale in scenari ANTE e POST OPERAM, mentre i compluvi sono stati approcciati mediante metodologia Inlet/Outlet control.

Le geometrie utilizzate per i modelli numerici derivano tutte dal rilievo celerimetrico/aerofotogrammetrico appositamente realizzato e dai sopralluoghi effettuati.

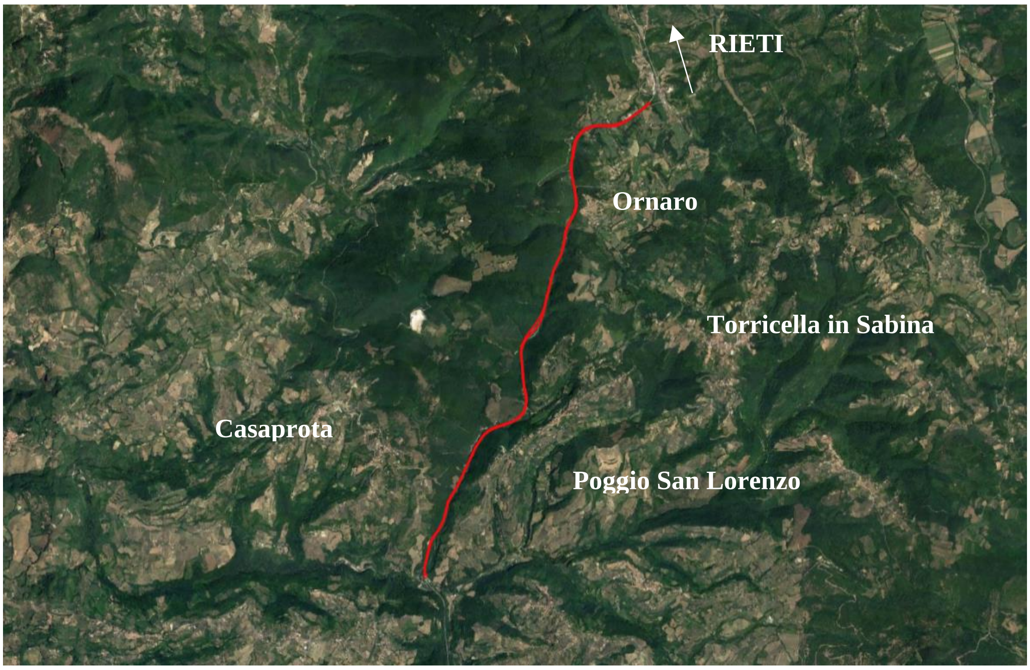


Figura 1: Inquadramento territoriale degli interventi in progetto.

2 RIFERIMENTI NORMATIVI

Le analisi sono state svolte nel rispetto della seguente normativa regionale e nazionale:

- R.D. n. 523 del 1904 e ss.mm.ii.
- D.Lgs. n. 152 del 2006
- D.M. 11.03.1988 e Circolare 9.1.1996 n.218/24/3 del Ministero LL.PP.
- Decreto del Presidente della Repubblica n. 380 del 06/06/2001 - "Testo unico delle disposizioni legislative e regolamentari in materia edilizia"
- D.M. 14.01.2018 - Norme Tecniche per le Costruzioni e successive circolari

Per quanto riguarda la pianificazione di settore vigente, i riferimenti sono costituiti da:

- Piano di Assetto Idrogeologico dell’Autorità di bacino del Fiume Tevere (approvato il 10 novembre 2006)
- Piano di Assetto Idrogeologico dell’Autorità di bacino del Fiume Tevere – Primo Aggiornamento PAI bis (approvato con DPCM il 10 aprile 2013)
- Piano di Gestione Rischio di Alluvioni del Distretto idrografico Appennino Centrale PGRA DAC (adottato il 17 dicembre 2015 con deliberazione n. 6 dal Comitato Istituzionale dell’Autorità di Bacino del Fiume Tevere, e approvato con Delibera n°9 del Comitato Istituzionale Integrato del 3 marzo 2016)
- II ciclo Piano di Gestione Rischio Alluvioni. Primo aggiornamento. (Adottato con delibera n. 24 del 29 dicembre 2020, ai sensi degli artt. 65 e 66 del D. Lgs. 152 del 2006).

2.1 Il Piano di Stralcio per l’assetto Idrogeologico (PSAI)

Il territorio in cui ricade il progetto in esame è collocato nel bacino idrografico competente all’ex Autorità di Bacino del fiume Tevere, che ha redatto la prima elaborazione del Piano di Bacino, adottato dal Comitato istituzionale con Delibera n. 80 del 28/9/1999.

Lo strumento pianificatore del Piano di Bacino viene introdotto nel nostro ordinamento con la legge n. 183/89 e costituisce il primo strumento conoscitivo, normativo e tecnico-operativo mediante il quale sono pianificate e programmate le azioni e le norme d’uso finalizzate alla conservazione, alla difesa ed alla valorizzazione del suolo, alla prevenzione del rischio idrogeologico, sulla base delle caratteristiche fisiche ed ambientali del territorio interessato.

Il PAI si configura come lo strumento di pianificazione territoriale attraverso il quale l’Autorità di Bacino si propone di determinare un assetto territoriale che assicuri condizioni di equilibrio e compatibilità tra le dinamiche idrogeologiche e la crescente antropizzazione del territorio, e di ottenere la messa in sicurezza degli insediamenti ed infrastrutture esistenti e lo sviluppo compatibile delle attività future.

Costituendo una premessa alle scelte di pianificazione territoriale, il Piano individua i meccanismi di azione, l'intensità, la localizzazione dei fenomeni estremi e la loro interazione con il territorio classificati in livelli di pericolosità e di rischio.

Il PAI persegue il miglioramento dell’assetto idrogeologico del bacino attraverso interventi strutturali (a carattere preventivo e per la riduzione del rischio) e disposizioni normative per la corretta gestione del territorio, la prevenzione di nuove situazioni di rischio, l’applicazione di misure di salvaguardia in casi di rischio accertato. Ciò secondo tre linee di attività:

- il rischio idraulico (aree inondabili delle piane alluvionali),

- il rischio geologico (dissesti di versante e movimenti gravitativi),
- l’efficienza dei bacini montani in termini di difesa idrogeologica.

La pianificazione di bacino, inizialmente svolta dalle ex Autorità di Bacino, con l’avvento della Direttiva 2007/60/CE è stata ripresa ed integrata dall’Autorità di Distretto. Pertanto, le azioni intraprese per la stesura delle “mappe di pericolosità e rischio” in fase di PGRA sono state finalizzate all’aggiornamento, omogeneizzazione e valorizzazione dei PAI vigenti (parte alluvioni) al fine di raggiungere un primo livello comune in ambito nazionale.

2.2 Il Piano di Gestione Rischio Alluvioni

Il territorio interessato dal progetto ricade all’interno del perimetro di competenza dell’Autorità di Bacino Distrettuale dell’Appennino Centrale.
Le Autorità di Bacino Distrettuali, dalla data di entrata in vigore del D.M. n. 294/2016, a seguito della soppressione delle Autorità di Bacino Nazionali, Interregionali e Regionali, esercitano le funzioni e i compiti in materia di difesa del suolo, tutela delle acque e gestione delle risorse idriche previsti in capo alle stesse dalla normativa vigente.
L’Autorità di Bacino Distrettuale dell'Appennino Centrale, in base alle nuove norme, ha fatto proprie le attività di pianificazione e programmazione a scala di Bacino e di Distretto idrografico.
Attraverso il Piano di Gestione Rischio Alluvioni (di seguito PGRA), adottato il 17 dicembre 2015 ai sensi dell’art. 4 c. 3 del D. Lgs 219/2010, sono stati recepiti gli indirizzi operativi per l’attuazione della Direttiva 2007/60/CE, relativi appunto alla valutazione ed alla gestione dei rischi da alluvioni.
La Direttiva Alluvioni stabilisce che le mappe di pericolosità mostrino l’area geografica che può essere inondata in corrispondenza di tre diversi scenari di probabilità:

a) scarsa probabilità o scenari di eventi estremi;
b) media probabilità di alluvioni (tempo di ritorno ≥ 100 anni);
c) elevata probabilità di alluvioni.

In corrispondenza di ciascuno scenario, gli stati membri devono fornire le informazioni sull’estensione delle alluvioni e sulla profondità o livello delle acque e dove opportuno sulle velocità del flusso o sulle portate.
Agli stati membri è, dunque, consentita una flessibilità nell’assegnazione dei valori di probabilità d’inondazione ai diversi scenari. A tale proposito il D.Lgs. 49/2010, attuativo della Direttiva Alluvioni, stabilisce che siano da considerarsi scenari di elevata probabilità o alluvioni frequenti quelli corrispondenti a tempi di ritorno fra 20 e 50 anni, mentre sono da considerarsi scenari di probabilità media o alluvioni poco frequenti quelli corrispondenti a tempi di ritorno fra 100 e 200 anni. Ne consegue che siano da considerarsi scenari di scarsa probabilità o scenari di eventi estremi, quelli corrispondenti a tempi di ritorno superiori a 200 anni.

Tabella 1: Definizione degli scenari alluvionali secondo il D.Lgs. 49/2010.

	T (anni)	PROBABILITÀ ACCADIMENTO	ALLUVIONI
P3	20-50	elevata	frequenti
P2	100-200	media	poco frequenti
P1	200-500	bassa	rare

In corrispondenza dei tratti in cui il reticolo presenta pericolosità, sono quindi stati definiti gli elementi soggetti a rischio (E) di essere colpiti da eventi calamitosi; tali elementi sono stati suddivisi in coerenza con la normativa vigente, secondo le seguenti classi:

Tabella 2: PGRA classi elementi a rischio (E).

Classe	Descrizione
E1	Case sparse - Impianti sportivi e ricreativi - Cimiteri - Insediamenti agricoli a bassa tecnologia - Insediamenti zootecnici.
E2	Reti e infrastrutture tecnologiche di secondaria importanza e/o a servizio di ambiti territoriali ristretti (acquedotti, fognature, reti elettriche, telefoniche, depuratori,…) - Viabilità secondaria (strade provinciali e comunali che non rappresentino vie di fuga) - Insediamenti agricoli ad alta tecnologia - Aree naturali protette, aree sottoposte a vincolo ai sensi del D. L.vo 490/99.
E3	Nuclei abitati - Ferrovie - Viabilità primaria e vie di fuga – Aree di protezione civile (attesa, ricovero e ammassamento) - Reti e infrastrutture tecnologiche di primaria importanza (reti elettriche e gasdotti) - Beni culturali, architettonici e archeologici sottoposti a vincolo - Insediamenti industriali e artigianali - Impianti D.P.R. 175/88.
E4	Centri abitati - Edifici pubblici di rilevante importanza (es. scuole, chiese, ospedali, ecc.).

In questo modo, posta cautelativamente la Vulnerabilità al massimo valore pari a 1, è stato possibile definire le diverse classi di rischio secondo l'usuale formula di Varnes:

$$R_i = P_i \cdot E \cdot V = P \cdot D_p$$

Dove:

- P (pericolosità): probabilità di accadimento, all'interno di una certa area e in un certo intervallo di tempo, di un fenomeno naturale di assegnata intensità;
- E (elementi esposti): persone e/o beni (abitazioni, strutture, infrastrutture, ecc.) e/o attività (economiche, sociali, ecc.) esposte ad un evento naturale;
- V (vulnerabilità): grado di capacità (o incapacità) di un sistema/elemento a resistere all'evento naturale;
- D_p (danno potenziale): grado di perdita prevedibile a seguito di un fenomeno naturale di data intensità, funzione sia del valore che della vulnerabilità dell'elemento esposto;
- R (rischio): numero atteso di vittime, persone ferite, danni a proprietà, beni culturali e ambientali, distruzione o interruzione di attività economiche, in conseguenza di un fenomeno naturale di assegnata intensità.

Le classi di rischio adottate nel PGRA conformi alla normativa in materia sono descritte nella seguente Tabella 3.

Tabella 3: PAI classi di rischio idraulico (Ri).

R1	**RISCHIO MODERATO**: per il quale i danni sociali, economici e al patrimonio ambientale sono marginali.
R2	**RISCHIO MEDIO**: per il quale sono possibili danni minori agli edifici, alle infrastrutture a al patrimonio ambientale che non pregiudicano l'incolumità del personale, l'agibilità degli edifici e la funzionalità delle attività economiche.
R3	**RISCHIO ELEVATO:** per il quale sono possibili problemi per l'incolumità delle persone, danni funzionali agli edifici e alle infrastrutture con conseguente inagibilità degli stessi,la interruzione di funzionalità delle attività socio-economiche e danni rilevanti al patrimonio ambientale.
R4	**RISCHIO MOLTO ELEVATO**: per il quale sono possibili la perdita di vite umane e lesioni gravi alle persone, danni gravi agli edifici, alle infrastrutture e al patrimonio ambientale, la distruzione di attività socio-economiche.

La redazione delle mappe di pericolosità del I ciclo di pianificazione (2011-2016) si è basata, essenzialmente, su quanto precedentemente svolto dall’Autorità di Bacino del fiume Tevere, aggiornando, integrando e omogenizzando i contenuti del Piano di Assetto Idrogeologico e nei suoi aggiornamenti.
Le fasce fluviali determinate dal PAI e dagli studi di aggiornamento sono state convertite, per raggiungere una rappresentazione coerente con quanto previsto nell’art. 6 del D.Lgs. 49/2010, attraverso il seguente criterio:

- fascia A - P3 (pericolosità elevata);
- fascia B -P2 (pericolosità media);
- fascia C - P1 (pericolosità bassa).

2.3 Piano di Gestione del Rischio di Alluvioni -II ciclo 2016-2021

In data 29 dicembre 2020 è stato adottato il “progetto del primo aggiornamento del Piano di Gestione del Rischio di Alluvioni dell’Autorità di bacino distrettuale dell’Appennino Centrale – II ciclo (2016-2021)”, di cui all’art. 7 della Direttiva 2007/60/CE e all’art. 7 del D.Lgs. 49/2010 del distretto idrografico, predisposto al fine degli adempimenti previsti dal comma 3 dell’art. 14, della Direttiva medesima.
In questa fase sono state definite nuove aree a potenziale rischio significativo sulla base degli esiti della precedente Valutazione Preliminare. Sono state quindi raccolte informazioni sulla localizzazione e sulle conseguenze avverse di eventi del passato, intercorsi a partire da dicembre 2011, e sono state integrate le informazioni già disponibili sugli scenari di eventi futuri, con quanto fornito da più recenti studi e analisi realizzati e/o acquisiti nel periodo successivo alla pubblicazione delle mappe di pericolosità del I ciclo di gestione.
Ai fini della mappatura di questo secondo ciclo di gestione sono state prese in considerazione le seguenti aree a potenziale rischio di alluvione:

1. Inviluppo delle aree a rischio idraulico derivanti dal primo ciclo di gestione;
2. Aree interessate da *past* o *future flood* qualora non ricomprese nelle aree di cui al punto 1;
3. Aree interessate da *past* o *future flood* che seppure ricomprese nelle aree di cui al punto 1 sono associate a scenari di evento di particolare interesse;
4. Aree coincidenti con bacini che mostrano una propensione al verificarsi di eventi alluvionali intensi ed improvvisi (*flash flood*);

5. Aree costiere.

Partendo dalle indicazioni fornite dal D.lgs. 49/2010, nel Bacino del fiume Tevere per le alluvioni di origine fluviale, i tempi di ritorno attribuiti agli scenari di probabilità variano tra 50 anni e 100 anni per P3, tra 100 anni e 200 anni per P2 e tra 200 anni e 500 anni per P1.
Le mappe di inondazione sono elaborate in scala 1:10.000 e contengono il limite che raggiungerebbero le acque dei fiumi in corrispondenza dei diversi tempi di ritorno.

Dalla consultazione degli elaborati cartografici del Piano, si nota che nella zona d'intervento, non sono state individuate aree di pericolosità idraulica. Le perimetrazioni più prossime sono quelle riguardanti il fiume Velino, che scorre a nord rispetto le opere in progetto attraversando Rieti.
La seguente riporta il quadro di unione delle mappe di pericolosità e rischio idraulico definite dall'Autorità di Bacino Distrettuale dell'Appennino Centrale per l'intero territorio di competenza: nella zona d'interesse, evidenziata in rosso, non sono presenti cartografie.

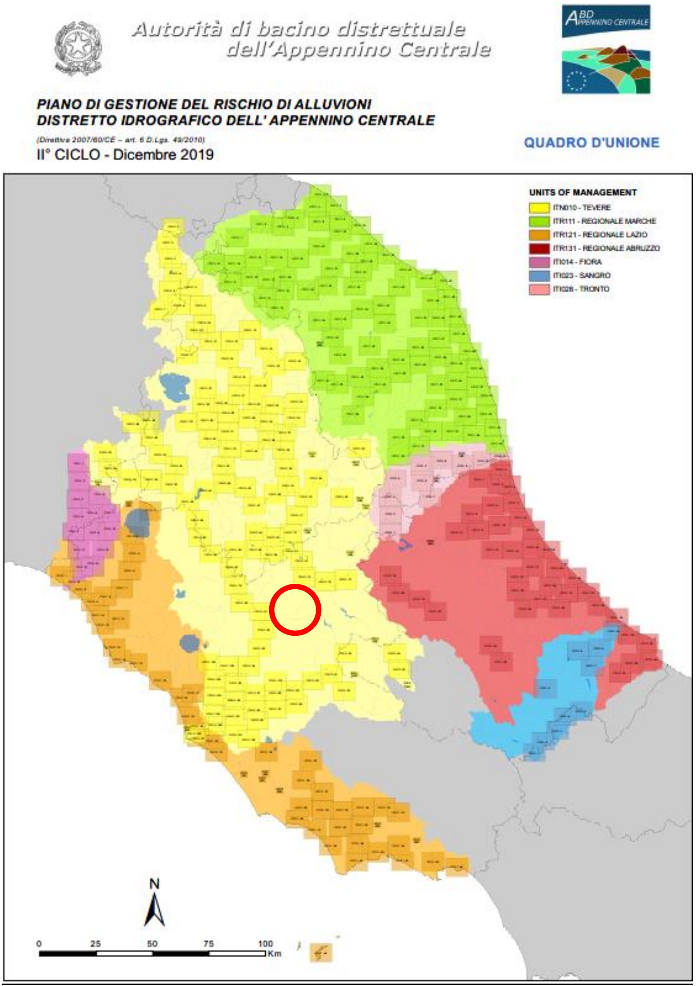


Figura 2: Quadro d'unione delle mappe di pericolosità idraulica PGRA II ciclo; in rosso è evidenziata l'ubicazione degli interventi progettuali.

2.4 D.M. 17.01.2018 “Aggiornamento delle norme tecniche per le costruzioni” e circolare 21.01.2019, n. 7 – “Istruzioni per l’applicazione dell’Aggiornamento delle norme tecniche per le costruzioni di cui al D.M. 17.01.2018”

Per quanto concerne la progettazione di attraversamenti fluviali, i riferimenti normativi italiani sono costituiti dal Decreto Ministeriale del 17 gennaio 2018 “Norme Tecniche per le Costruzioni” e dalla successiva circolare esplicativa n. 7 del 21 gennaio 2019.

Le norme prescrivono di assumere come piena di progetto quella caratterizzata da un tempo di ritorno pari a 200 anni, per la quale dovrà essere garantito un franco idraulico, definito come la distanza fra la quota liquida di progetto immediatamente a monte del ponte e l’intradosso delle strutture, non inferiore a 1,50 m. Il franco idraulico necessario non può essere ottenuto con il sollevamento del ponte durante la piena.

Nello studio idraulico, inoltre è richiesta la valutazione dell’influenza dello scavo localizzato che si realizza in corrispondenza delle pile e delle spalle, sulla stabilità di argini e sponde, oltre che delle fondazioni di altri manufatti presenti nelle vicinanze.

Queste disposizioni non si applicano per i tombini idraulici, intendendosi per tombino un manufatto totalmente rivestito in sezione, eventualmente suddiviso in più canne, in grado di condurre complessivamente portate fino a 50 m^3/s. In questo caso l’evento di progetto da assumere alla base delle verifiche ha comunque tempo di ritorno uguale a quello da assumere per i ponti (200 anni). Inoltre, la normativa prescrive che:

- è da sconsigliare il frazionamento della portata fra più canne, tranne nei casi in cui questo sia fatto per facilitare le procedure di manutenzione, predisponendo allo scopo luci panconabili all’imbocco e allo sbocco e accessi per i mezzi d’opera;
- sono da evitare andamenti planimetrici non rettilinei e disallineamenti altimetrici del fondo rispetto alla pendenza naturale del corso d’acqua.
- per sezioni di area maggiore a 1,5 m^2 è da garantire la praticabilità del manufatto;
- il tombino può funzionare sia in pressione che a superficie libera, evitando in ogni caso il funzionamento intermittente fra i due regimi: nel caso in una o più sezioni il funzionamento sia in pressione, la massima velocità che si realizza all’interno dello stesso tombino non dovrà superare 1,5 m/s;
- nel caso di funzionamento a superficie libera, il tirante idrico non dovrà superare i 2/3 dell’altezza della sezione, garantendo comunque un franco minimo di 0,50 m;
- il calcolo idraulico è da sviluppare prendendo in considerazione le condizioni che si realizzano nel tratto del corso d’acqua a valle del tombino;
- i tratti del corso d'acqua immediatamente prospicienti l'imbocco e lo sbocco del manufatto devono essere protetti da fenomeni di scalzamento e/o erosione, e opportune soluzioni tecniche sono da adottare per evitare i fenomeni di sifonamento.

3 SCELTE PROGETTUALI

L’ubicazione e il dimensionamento delle opere idrauliche correlate alla generica realizzazione delle infrastrutture di trasporto è certamente una delle principali problematiche che si affronta nella progettazione di tali opere: non vi è dubbio che i vincoli idraulici debbano influenzare le primarie scelte sia del tracciato stradale che delle opere strutturali.

Un’infrastruttura di trasporto, infatti, per sua natura, altera il regime delle acque superficiali del territorio che attraversa; il progetto ha la funzione di minimizzare tale impatto e, allo stesso tempo, proteggere il corpo stradale.

Il corretto dimensionamento delle opere, che risulta di fondamentale importanza per l’infrastruttura e per il territorio circostante, non può che prescindere da iterative scelte progettuali tra le diverse discipline, supportate da accurate verifiche idrauliche.

Nel caso del Lotto in esame, oltre agli aspetti di carattere generale appena descritti, è necessario aggiungere le difficoltà realizzative tipiche degli ampliamenti stradali con traffico in esercizio: le fasi realizzative di cantiere devono pertanto tenere in conto non solo delle necessità idrauliche, ma anche delle necessità realizzative delle opere strutturali e delle necessità di mantenere in esercizio la viabilità al traffico veicolare.

Le opere idrauliche del Lotto 1 sono state pertanto progettate per tenere conto di tutti questi aspetti:

- vincolo delle aree allagabili per TR=200 anni;
- compatibilità idraulica (franchi e luci);
- opere antierosive di difesa idraulica, manufatti di imbocco e sbocco etc;
- fasi costruttive (in merito, la fase costruttive possono avere diversi livelli di suddivisione).

Va da sé come molti aspetti che hanno attinenza con l'idraulica siano rappresentati ed affrontati all'interno di elaborati contenuti in altre cartelle della documentazione progettuale (cantierizzazione, opere minori, viadotti, ecc.), a cui si continua a rimandare per gli approfondimenti specialistici. Tuttavia, al fine di semplificare la lettura delle scelte svolte, sono di seguito riportati gli interventi più articolati e/o meritevoli di particolari attenzioni.

3.1 Opera TO.18 - pk 2+425

La piena di progetto del fosso dei Cerri lambisce la strada in progetto tra la progressiva pk 2+430 e la progressiva pk 2+500: per questo motivo sono state aggiunte delle difese spondali al piede del muro di contenimento della strada.
Il tombino idraulico di progetto TO.18 è previsto in sostituzione all’esistente, ubicato parallelo ad esso, in stretta adiacenza. Apparentemente l’attraversamento (sia l’esistente che quello di progetto, ad esso parallelo) può apparire disallineato rispetto alla direzione di deflusso del corso d’acqua, ma in realtà l’opera è ubicata proprio tra due anse naturali del fondovalle. La larghezza dell’attuale tombino è di circa 7.5m, mentre l’opera in progetto raggiungerà 11 m: l’importante incremento di luce disponibile al deflusso, migliora significativamente l'efficienza idraulica dell'opera riducendone la possibilità di ostruzione della stessa ad opera del materiale solido e flottante trasportato dalla corrente.

3.2 Svincolo Poggio San Lorenzo – pk 2+800

Lo svincolo è da considerarsi come modifica e potenziamento dell’attuale accesso alla statale, che avviene appena dopo l’attuale attraversamento idraulico. Anche durante le fasi di cantiere è stato ricercato l’obiettivo di mantenere sempre in esercizio la fruizione d’accesso.
In progetto sono previsti due nuovi attraversamenti: uno in asse principale (TO.20) ed uno sul ramo di svincolo (VI.01).
L’intervento in progetto a doppia carreggiata è previsto completamente al di fuori dell’attuale carreggiata, pertanto, al fine di garantire continuità di deflusso idraulico e traffico veicolare sia lungo la statale che per gli attuali utilizzatori dello svincolo, l’attraversamento TO.20 è previsto con sbocco corrispondente ed allineato con l’attuale attraversamento.
L’attraversamento/carreggiata esistente verrà pertanto utilizzato anche durante le fasi transitorie stradali: le rampe provvisorie saranno deviate sull’attuale carreggiata, senza la necessità di aggiungere nuovi attraversamenti temporanei.
Una volta spostato il traffico sulle nuove carreggiate e realizzato l’opera VI.01, l’attraversamento esistente dovrà essere demolito e la sezione di deflusso resa uniforme col nuovo intervento: si prevede un rimodellamento delle sponde (con arretramento del rilevato esistente) e la realizzazione di una scogliera spondale in massi.

3.3 Opera TO.25 - pk 3+591

Il tombino TO.25 è un tombino di nuova realizzazione che non sostituisce o modifica un tombino esistente. Con la costruzione della carreggiata ovest, e in ragione di vincoli orografici, viene infatti meno la possibilità di intercettare le acque del bacino B.112 attraverso un fosso per far confluire tali deflussi verso il vicino Fosso dei Cerri.
Durante le fasi costruttive di cantiere le modalità di gestione e regimazione dei deflussi provenienti dal bacino B.112 sono così previste:

1. fosso mantenuto nell’attuale posizione planimetrica, ma contestuale sbancamento/scavo e arretramento della scarpata/versante retrostante sino alla configurazione di progetto (il flusso rimane su fosso esistente);
2. spostamento temporaneo dell’attuale fosso in corrispondenza della nuova zona di banchina (il flusso viene spostato sul fosso temporaneo posto al piede della scarpata);
3. realizzazione di 1° tratto di tombino sottostante l’allargamento di progetto (flusso ancora su fosso temporaneo);
4. temporaneo spostamento del transito veicolare dalla carreggiata esistente al di sopra del nuovo tratto di tombino (flusso ancora su fosso temporaneo);
5. realizzazione del tratto di valle del nuovo tombino (flusso ancora su fosso temporaneo) e inalveazione a recapito;
6. realizzazione del nuovo imbocco del tombino: spostamento del flusso in sede definitiva;
7. prosecuzione delle fasi di cantiere.

Le fasistiche idrauliche sopra descritte descrivono la fattibilità dell’intervento e saranno dettagliatamente approfondite nelle specifiche discipline nel quadro di fasi e sottofasi costruttive del Progetto Esecutivo.

3.4 Svincolo di Ornaro Alto - pk 6+380

L'intervento si pone nella parte alta del bacino del Fosso Cerri, avente bacino sotteso di circa 3 kmq.
L'assetto geometrico dello Svincolo di Ornaro Alto è stato oggetto di numerose valutazioni, sia di carattere trasportistico che strutturale ed idraulico. L'attuale configurazione è certamente, per alcuni aspetti, "sartoriale" nel rispettare i vincoli normativi, non solo idraulici.
Molte rampe dello svincolo sono state infatti calibrate per minimizzare l'interferenza idraulica col Fosso dei Cerri, andando a realizzare lunghi tratti di viadotti al posto di rilevati.
Sia il Viadotto VI02 che il VI03 sono opere che hanno lunghi tratti di affiancamento al corso d'acqua: le pile sono ubicate al piede del rilevato esistente in adiacenza ad area potenzialmente allagabile.
In corrispondenza dell'attraversamento del VI03 sul corso d'acqua, l'intervento è certamente complicato dalla presenza del raccordo stradale: le conseguenti necessità strutturali portano a realizzare una fondazione di collegamento trasversale alle pile, cosicché plinto e pali di fondazione interessano l'alveo e l'area invasa dalla piena di progetto del fosso dei Cerri, ma non lo sono invece le pile di elevazione che rimangono invece esterne. Ad intervento completato, la fondazione rimarrà altimetricamente posizionata al di sotto del fondo alveo e della scogliera in massi opportunamente prevista, mentre le pile saranno al di fuori dell'area di deflusso.

In merito alla Rampa 4 Ingresso Sud, rispetto alla prima emissione la stessa è stata accorciata e avvicinata al corpo stradale principale. Nelle zone di adiacenza al deflusso sono state inserite scogliere in massi a protezione delle fondazioni dei muri di sostegno del rilevato.

3.5 Interferenza rilevato stradale/area di esondazione - pk 7+000

Nella zona è stato allungato il muro di progetto per evitare che il rilevato interferisca con il fondovalle.

3.6 Viadotti VI04, VI05 e VI06

Il bacino interessato dalle opere è il B.127, avente superficie di circa 0.2 kmq.
Al fine di mantenere l'allineamento delle pile dei 3 viadotti in progetto, è necessario prevedere un modesto intervento di inalveazione del piccolo compluvio, di cui è stato prodotta una tavola dedicata.

4 ANALISI IDRAULICHE MONODIMENSIONALI

Dal punto di vista dell'analisi idraulica dei corsi d'acqua, le verifiche si sono distinte in base all'ordine gerarchico stabilito per le interferenze:

- Modellazione numerica monodimensionale: utilizzata per le interferenze demaniali con codifica di bacino B (corso d'acqua presente sia in cartografia IGM che CTR e di pertinenza demaniale essendo presente come particella in catasto "acque"), in moto permanente per scenari ANTE e POST OPERAM.
- Metodologia Inlet/Outlet Control: nel caso di interferenze con codifica di compluvio C (corso d'acqua non rappresentato in cartografia IGM/CTR e in ogni caso non di pertinenza demaniale).

Lungo il tratto stradale oggetto d'intervento sono numerose le interferenze idrografiche che si incontrano. Il Fosso dei Cerri (o fosso Secco nel tratto iniziale di monte), interferisce col tracciato esistente e di progetto n.10 volte, mentre i restanti rii demaniali circa altrettante 9 volte: in tutti questi casi sono stati implementati dei modelli numerici monodimensionali di moto permanente in scenari ANTE e POST OPERAM.
Gli attraversamenti di progetto sui corsi d'acqua demaniali sono così riassunti:

Tabella 4: Attraversamenti di progetto sviluppati con modellazione idraulica monodimensionale.

ID Interferenza idraulica	Corso d'acqua	Progr. Asse stradale	WBS opera	Geometria	
				B	H
				(m)	(m)
B.101	Fosso dei Cerri	0+060	TO.01	10	8
B.103		1+267	TO.09	2	2
B.104	Fosso dei Cerri	1+346	TO.10	10	6,5
B.105	Fosso dei Cerri	1+420	TO.11	10	6,5
B.107		1+632	TO.13	4	2
B.108	Fosso dei Cerri	1+716	TO.14	10	6,5
B.109	Fosso dei Cerri	2+425	TO.18	10	6,5
B.110	Fosso dei Cerri	Svincolo	VI.01 Sv. San Lorenzo	50	14,5
B.110	Fosso dei Cerri	2+856	TO.20	10	6
B.111		3+525	TO.24	10	6
B.112		3+591	TO.25	2	2
B.114		4+370	TO.28	2	2
B.115		4+625	TO.29	4	2
B.117		5+525	TO.34	4	3
B.119	Fosso dei Cerri	5+735	TO.35	10	3,5
B.120		6+125	TO.37	4	3
B.121	Fosso dei Cerri	6+300	TO.39	5	3,5
B.122		6+386	TO.40	4	3
B.126	Fosso dei Cerri	7+110	TO.45	5	3
B.127		7+475	VI.05-VI.06	130	13,5

4.1 Modello di calcolo e approccio metodologico

Le analisi idrauliche monodimensionali sono state condotte utilizzando il modello numerico HEC-RAS ver. 5.0.7 che consente il calcolo dell'andamento dei profili di corrente in moto permanente gradualmente variato od in moto vario in alvei naturali o canali artificiali includendo anche la valutazione degli effetti sulla corrente dovuti all'interazione con ponti, tombinature, briglie, stramazzi, aree golenali ecc..
Nello specifico, per gli attraversamenti demaniali analizzati, il codice di calcolo HEC-RAS è stato utilizzato in condizioni di moto permanente in riferimento ai valori di portata al colmo di piena duecentennale di progetto, definiti nell'ambito dell'analisi idrologica.
Le geometrie del tratto, in termini di sezioni trasversali e caratteristiche delle strutture, sono state definite principalmente sulla base dei rilievi celerimetrico e aerofotogrammetrico appositamente realizzati, e dalle osservazioni dei sopralluoghi effettuati.

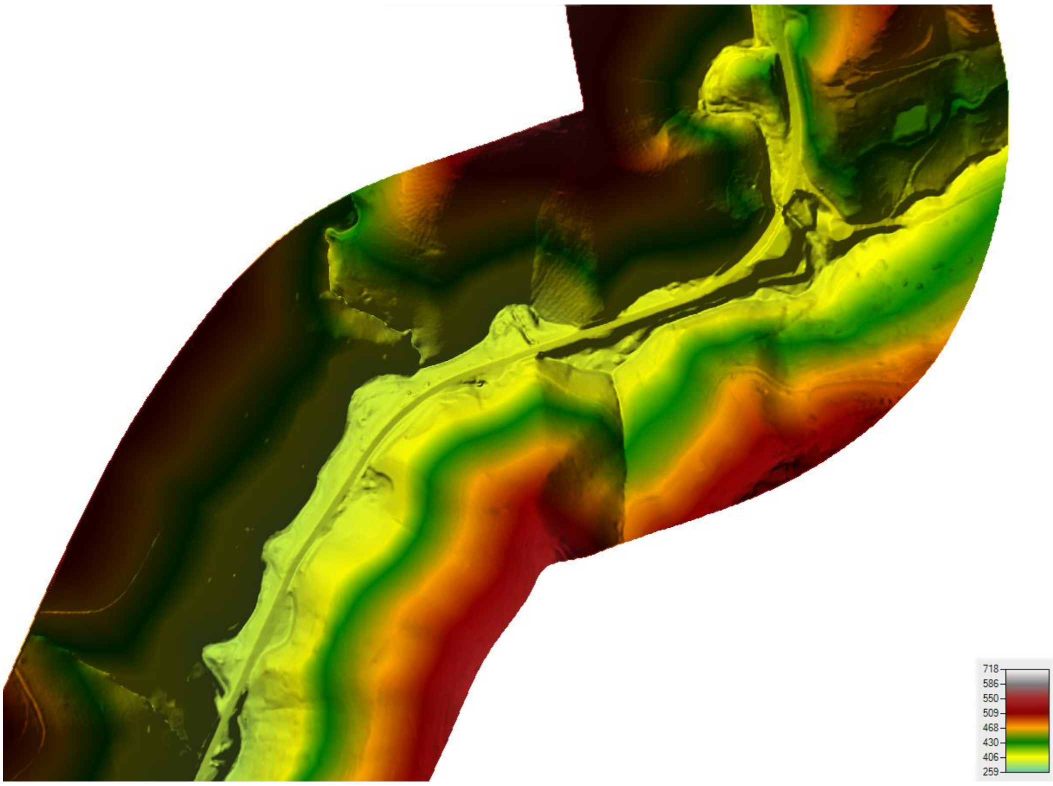


Figura 3. Stralcio del modello digitale del terreno definito dai rilievi aerofotogrammetrici.

4.2 Costruzione del modello numerico

4.2.1 Schematizzazione geometrica

Il tratto analizzato del corso d'acqua principale fosso dei Cerri, si sviluppa per una lunghezza complessiva dell'asta di circa 10 km, schematizzata attraverso circa 160 sezioni trasversali.
I valori dei coefficienti di contrazione ed espansione richiesti dal modello numerico sono stati assunti rispettivamente pari a 0,1 e 0,3, come suggerito dal manuale tecnico in presenza di variazioni graduali.

In secondo luogo, attraverso l’elemento *junction* del codice di calcolo, sono stati inseriti gli ulteriori corsi d’acqua demaniali, afferenti al fosso dei Cerri. Ognuno di questi è stato a sua volta schematizzato con un numero di sezioni trasversali per un’adeguata rappresentazione geometrica.

La localizzazione delle sezioni di calcolo, di cui si riporta un estratto cartografico in Figura 4, è restituita in forma grafica nell’elaborato dedicato agli allagamenti ed in forma numerica negli Allegati alla presente relazione.

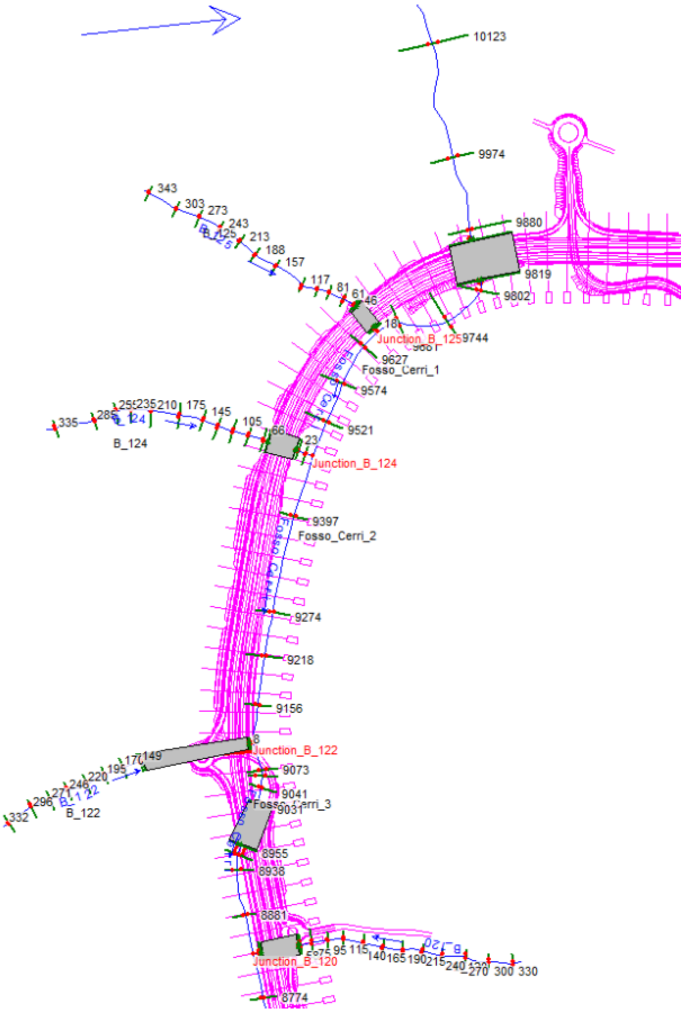


Figura 4. Stralcio planimetrico dei modelli monodimensionali, tratto di monte.

4.2.2 Attraversamenti e strutture

Come anticipato, sono numerose le interferenze idrografiche che si incontrano lungo il tracciato stradale. Allo stato di fatto, gli attraversamenti del fosso dei Cerri sono costituiti da ponticelli ad arco, realizzati in calcestruzzo. Le geometrie di questi manufatti sono variabili con larghezze comprese tra 5 e 7 m e altezze in chiave tra 6 e 8 m. Per i corsi d’acqua che affluiscono lateralmente, invece i tipologici più frequenti sono costituiti ancora da ponticelli ad acro in calcestruzzo, di dimensioni inferiori rispetto ai precedenti (indicativamente 3x3 m), oppure tombini circolari DN1000 in calcestruzzo.

Figura 5: Attraversamento fosso dei Cerri B.111 allo stato di fatto.

Nel contesto degli interventi di progetto è previsto il rifacimento di queste opere di attraversamento realizzando tombini scatolari di dimensioni variabili, da un massimo di 10 x 8 m (attraversamento B.101) ad un minimo di 2 x2 nel caso di alcuni attraversamenti secondari. La tabella seguente riassume le caratteristiche geometriche delle strutture di attraversamento, sia per lo stato di fatto che di progetto.

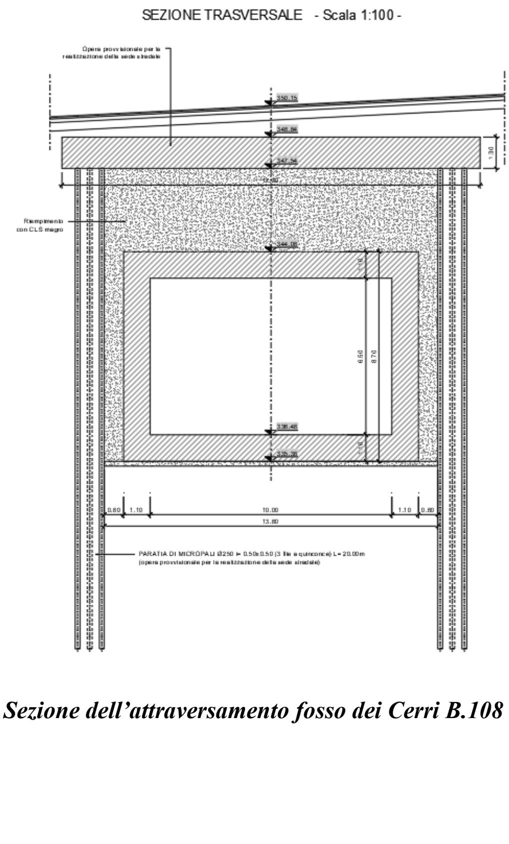


Figura 6: Sezione dell’attraversamento fosso dei Cerri B.108 in progetto.

Tabella 5: Geometrie degli attraversamenti presenti e in progetto.

ID Interferenza idraulica	Progr. Asse stradale	WBS opera	Geometria SDF		Geometria Progetto	
			B	H	B	H
			(m)	(m)	(m)	(m)
B.101	0+060	TO.01	8	7,5 in chiave	10	8
B.103	1+267	TO.09	DN1000		2	2
B.104	1+346	TO.10	6,5	6,9 in chiave	10	6,5
B.105	1+420	TO.11	6	6,5 in chiave	10	6,5
B.107	1+632	TO.13	DN 1000		4	2
B.108	1+716	TO.14	5,2	7 in chiave	10	6,5
B.109	2+425	TO.18	5,0	8,0	10	6,5
B.110	2+825	VI.01 Sv. San Lorenzo	Non presente		50	14,5
B.110	2+856	TO.20	5,3	7,3	10	6
B.111	3+525	TO.24	6,0	6,0	10	6
B.112	3+591	TO.25	Non presente		2	2
B.114	4+370	TO.28	DN 1000		2	2
B.115	4+625	TO.29	DN 1000		4	2
B.117	5+525	TO.34	2,5	4,5 in chiave	4	3
B.119	5+735	TO.35	2,5	4,5 in chiave	10	3,5
B.120	6+125	TO.37	3,0	3,0 in chiave	4	3
B.121	6+300	TO.39	3,0	3,8 in chiave	5	3,5
B.122	6+386	TO.40	3,0	3,0 in chiave	4	3
B.126	7+110	TO.45	3,0	3,9 in chiave	5	3
B.127	7+475	VI.05-VI.06	100	13,5	130	13,5

Nel modello di calcolo le strutture sono state inserite come *Bridge* o *Culvert* a seconda della tipologia e sono state schematizzate utilizzando 4 sezioni trasversali, due a monte e due a valle della struttura; la distanza tra le sezioni è stata definita in modo da rappresentare correttamente la larghezza della struttura e il restringimento geometrico indotto dalla stessa.

Per il calcolo del profilo di corrente in corrispondenza delle strutture, tra le diverse opzioni offerte dal codice di calcolo, sono state selezionate le equazioni di bilancio dell'energia ed il metodo dei momenti, tra le quali il programma seleziona in automatico la formulazione caratterizzata dalla maggiore dissipazione energetica, per il deflusso al di sotto dell'impalcato (*low flow*); viene invece assunta la schematizzazione con deflusso in pressione e stramazzo al di sopra dell'impalcato (*pressure and weir*) per le situazioni con livello della corrente tale da interessare l'intradosso del ponte (*high flow*). Le condizioni limite per il deflusso in pressione sono definite dal programma in base al livello di corrente a monte.

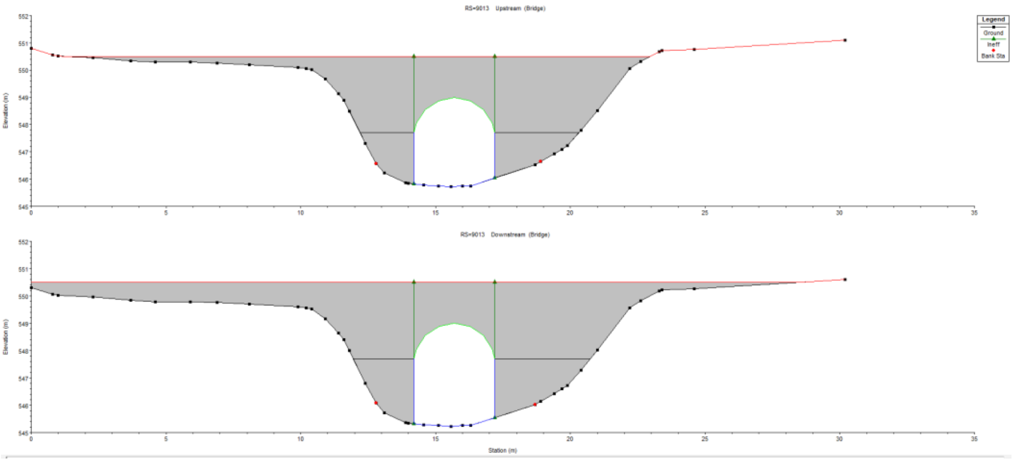


Figura 7: Rappresentazione nel modello idraulico dell'attraversamento B.111, nella configurazione di stato di fatto.

4.3 Assegnazione dei coefficienti di scabrezza

Per quanto concerne la scabrezza, la valutazione dei coefficienti da inserire in ciascun modello è stata basata su dati di letteratura, sull'esperienza acquisita nel campo della modellistica idraulica, sulle indicazioni rilevate durante i sopralluoghi e dalle carte del CN (Corine Land Cover).

Le aste analizzate presentano connotati di scabrezza mediamente omogeni. Trattandosi di corsi d'acqua montani, con alvei a forti pendenze e molto incisi, non è sono presenti aree golenali. Per i tronchi studiati è stato assunto un valore del coefficiente di Strickler pari a 20 $m^{1/3}/s$ uniforme, classificando di fatto i corsi d'acqua come torrenti naturali con presenza di vegetazione e sedimenti di media pezzatura.

Nella configurazione di progetto, dove in alcuni casi gli interventi richiedono la riprofilatura del fondo alveo e il rivestimento in calcestruzzo, la scabrezza in alveo è stata assunta pari a 60 $m^{1/3}/s$.

Figura 8: Fondo alveo del torrente fosso dei Cerri in corrispondenza dell'attraversaemenrto B.105.

Si riporta la tabella dei valori dell'indice di scabrezza di Strickler per i corsi d'acqua, secondo il riferimento "Handbook of Applied Hydrology", Ven Te Chow. da cui si evince la conferma dei parametri di scabrezza utilizzati nel modello.

2. Excavated or Dredged Channels			
a. Earth, Straight, and Uniform:			
1. Clean, recently completed	0.016	0.018	0.020
2. Clean, after weathering	0.018	0.022	0.025
3. Gravel, uniform section, clean	0.022	0.025	0.030
4. With short grass, few weeds	0.022	0.027	0.033
b. Earth Winding and Sluggish:			
1. No vegetation	0.023	0.025	0.030
2. Grass, some weeds	0.025	0.030	0.033
3. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. Earth bottom and rubble sides	0.028	0.030	0.035
5. Stony bottom and weedy banks	0.025	0.035	0.040
6. Cobble bottom and clean sides	0.030	0.040	0.050
c. Dragline-Excavated or Dredged:			
1. No vegetation	0.025	0.028	0.033
2. Light brush on banks	0.035	0.050	0.060
d. Rock Cuts:			
1. Smooth and uniform	0.025	0.035	0.040
2. Jagged and irregular	0.035	0.040	0.050
e. Channels not Maintained, Weeds and Brush Uncut:			
1. Dense weeds, high as flow depth	0.050	0.080	0.120
2. Clean bottom, brush on sides	0.040	0.050	0.080
3. Same as above, highest stage of flow	0.045	0.070	0.110
4. Dense brush, high stage	0.080	0.100	0.140
3. Main Channels			
a. Clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
b. Same as above, but more stones and weeds	0.030	0.035	0.040
c. Clean, winding, some pools and shoals	0.033	0.040	0.045
d. Same as above, but some weeds and stones	0.035	0.045	0.050
e. Same as above, lower stages, more ineffective	0.040	0.048	0.055
f. Same as (d) with more stones	0.045	0.050	0.060
g. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
h. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150
4. Mountain Streams, No Vegetation in Channel, Banks usually Steep, Trees and Brush along Banks Submerged at High Stages			
a. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
b. Bottom: cobbles with large boulders	0.040	0.050	0.070

Source:
(1) ASCE, (1982), Gravity Sanitary Sewer Design and Construction, ASCE Manual of Practice No. 60, New York, NY.
(2) Chow, V.T., (1959), Open Channel Hydraulics, McGraw-Hill, New York, NY.

Figura 9: Valori dell'indice di scabrezza di Strickler ($m^{1/3}/s$) (Ven Te Chow).

4.4 Condizioni al contorno e portate di progetto

Le simulazioni idrodinamiche sono state effettuate in moto permanente. Nello specifico per ciascun'asta del modello numerico è stata stabilita una condizione al contorno di monte imponendo la relativa portata di progetto duecentennale in ingresso. La condizione al contorno di monte è stata imposta in termini di livello in condizioni di moto uniforme, determinato automaticamente dal programma in base ai valori di portata assegnati, pendenza e scabrezza del tratto di fiume.

Come condizione al contorno di valle, per l'asta del fosso dei Cerri è stato imposto il deflusso in moto uniforme "Normal Depth", mentre per gli affluenti laterali una condizione di livello idrico in corrispondenza delle confluenze.

Lungo l'asta principale del fosso dei Cerri, in aggiunta alla portata in ingresso alla sezione di monte (n. 10123), sono stati introdotti ulteriori punti di variazione della portata in corrispondenza delle sezioni di calcolo idrologico. L'alveo è quindi stato suddiviso in tronchi idrologici omogenei, assumendo cautelativamente per ogni tratto il valore definito nell'ambito dello studio idrologico a valle dello stesso.

Tabella 6: Valori di portata idrologica TR=200 utilizzati nelle simulazioni idrauliche.

Interferenza	Sezione modello idraulico	Portata Ingresso TR=200
id	RS	m^3
B.103	340	2,6
B.107	356	7,7
B.112	411	3,4
B.113	370	1,7
B.114	364	3,3
B.115	330	5,0
B.116	330	1,9
B.117	412	10,5
B.120	330	6,9
B.122	332	7,2
B.124	335	2,2
B.125	343	2,6
Fosso Cerri 0	1012	14,6
Fosso Cerri 1	9627	21,2
Fosso Cerri 2	9397	21,2
Fosso Cerri 3	9073	25,6
Fosso Cerri 4	8774	31,3
Fosso Cerri 4	8214	60,0
Fosso Cerri 5	7886	60,0
Fosso Cerri 5.1	7266	60,0
Fosso Cerri 6	6951	60,0
Fosso Cerri 7	6681	85,0
Fosso Cerri 8	6063	85,0
Fosso Cerri 9	5762	85,0
Fosso Cerri 9	4657	94,8
Fosso Cerri 9	4018	98,7
Fosso Cerri 10	3246	101,7
Fosso Cerri 11	2812	102,4
B.127	882	5,0

4.5 Simulazioni idrauliche in moto permanente

Lo studio del funzionamento idraulico di ciascuna opera in progetto verte sulla verifica del franco idraulico e ubicazione spalle e pile secondo le modalità indicate dalle recenti NTC2018 nel capitolo dedicato alla compatibilità idraulica.

Secondo tale norma valgono i seguenti principali vincoli:

- la portata di verifica di progetto è quella caratterizzata da tempo di ritorno duecentennale;
- il franco calcolato sul livello della portata di progetto deve essere di 1.5 m per i viadotti e comunque per tutte le opere dimensionate per portata di progetto superiore a 50 m^3/s;
- il manufatto non deve interessare con rilevati, spalle e pile la sezione del corso d'acqua;
- qualora fosse necessario realizzare pile in alveo, la luce netta minima tra pile contigue, o fra pila e spalla del ponte, non deve essere inferiore a 40 m misurati ortogonalmente al filone principale della corrente;
- il franco idraulico per tombini dimensionati per portate inferiori a 50 m^3/s deve essere il massimo tra 0,5 m e 1/3 dell'altezza della sezione.

Nella seguente Tabella 7 si riportano i risultati delle simulazioni idrauliche effettuate per la verifica della compatibilità idraulica di ciascun'opera in progetto. Si evidenzia quindi il valore del franco idraulico calcolato come confronto tra l'altezza utile dell'opera e il tirante idrico registrato nelle sezioni idrauliche immediatamente a monte e immediatamente a valle del manufatto indagato.

I calcoli numerici, sotto forma di profili, tabelle e sezioni trasversali, sono consultabili negli Allegati alla presente relazione, mentre nella documentazione grafica del progetto vengono riportate le planimetrie di allagamento delle varie aste per ciascuna configurazione modellata.

Tabella 7: Risultati delle simulazioni idrauliche con modello monodimensionale (evento TR 200 anni).

Configurazione	ID Interferenza idraulica	Progr. Asse stradale	Tipologico verificato	Geometria		TR=200								
				B	H	Portata Q	Tirante h media	Tirante h max	Velocità V	Carico Totale	Livello idrico	Intradosso minimo attraversam.	Fr (Normativa)	Fr (calcolato)
				(m)	(m)	(m^3/s)	(m)	(m)	(m/s)	(m s.l.m.)	(m s.l.m.)	(m s.l.m.)	(m)	(m)
SDF	B.101	0+060	Arco – Monte	8	7.5	102.4	3.1	3.43	4.36	272.95	272.02	275.5	1.50	**3.48**
SDF	B.101	0+060	Arco - Valle	8	7.5	102.4	3.1	3.43	4.36	272.95	272.02	275.5	1.50	**3.48**
PROG	B.101	0+060	TO.01 - Monte	10	8	102.4	2.31	2.31	4.43	272.08	271.08	276.8	1.50	**5.69**
PROG	B.101	0+060	TO.01 - Valle	10	8	102.4	2.19	2.19	4.67	271.59	270.49	276.3	1.50	**5.80**
SDF	B.103	1+267	DN 1000 – Monte	1	1	2.6	0.39	1.86	0.79	333.77	333.75	332.9	0.50	**-0.85**
SDF	B.103	1+267	DN 1000 – Valle	1	1	2.6	0.39	1.86	0.79	333.77	333.75	332.6	0.50	**-1.15**
PROG	B.103	1+267	TO.09 – Monte	2	2	2.6	0.09	0.09	14.52	340.59	329.85	331.8	0.67	**1.91**
PROG	B.103	1+267	TO.09 – Valle	2	2	2.6	0.3	0.3	4.35	330.7	329.74	331.4	0.67	**1.70**
SDF	B.104	1+346	Arco – Monte	6.5	6.9	101.7	3.54	4.16	4.77	329.28	328.19	331.0	1.50	**2.81**
SDF	B.104	1+346	Arco – Valle	6.5	6.9	101.7	3.54	4.16	4.77	329.28	328.19	331.0	1.50	**2.81**
PROG	B.104	1+346	TO.10 – Monte	10	6.5	101.7	3.34	3.39	3.04	327.96	327.49	330.6	1.50	**3.11**
PROG	B.104	1+346	TO.10 – Valle	10	6.5	101.7	4.16	4.16	2.45	327.89	327.59	329.9	1.50	**2.34**
SDF	B.105	1+420	Arco – Monte	6	6.5	101.7	3.56	3.71	4.77	332.32	331.17	335.7	1.50	**4.53**
SDF	B.105	1+420	Arco – Valle	6	6.5	101.7	3.56	3.71	4.77	332.32	331.17	334.5	1.50	**3.33**
PROG	B.105	1+420	TO.11 – Monte	10	6.5	101.7	1.18	1.18	8.63	332.61	328.81	334.1	1.50	**5.32**
PROG	B.105	1+420	TO.11 – Valle	10	6.5	101.7	1.21	1.21	8.38	331.51	327.92	333.2	1.50	**5.28**
SDF	B.107	1+632	DN 1000 – Monte	1	1	7.7	0.84	0.85	9.16	349.53	345.25	345.4	0.50	**0.15**
SDF	B.107	1+632	DN 1000 – Vaòòe	1	1	7.7	0.84	0.85	9.16	349.53	345.25	344.8	0.50	**-0.45**
PROG	B.107	1+632	TO.13 – Monte	4	2	7.7	0.14	0.14	13.32	351.3	342.24	344.1	0.67	**1.86**
PROG	B.107	1+632	TO.13 – Valle	4	2	7.7	0.29	0.29	6.75	344.47	342.15	343.9	0.67	**1.71**

Configurazione	ID Interferenza idraulica	Progr. Asse stradale	Tipologico verificato	Geometria		TR=200								
				B	H	Portata Q	Tirante h media	Tirante h max	Velocità V	Carico Totale	Livello idrico	Intradosso minimo attraversam.	Fr (Normativa)	Fr (calcolato)
				(m)	(m)	(m^3/s)	(m)	(m)	(m/s)	(m s.l.m.)	(m s.l.m.)	(m s.l.m.)	(m)	(m)
SDF	B.108	1+716	Arco – Monte	5.2	7	98.7	4.35	4.39	4.37	342.09	341.12	343.4	1.50	**2.28**
SDF	B.108	1+716	Arco - Valle	5.2	7	98.7	4.35	4.39	4.37	342.09	341.12	342.9	1.50	**1.78**
PROG	B.108	1+716	TO.14 - Monte	10	6.5	98.7	1.3	1.3	7.59	341.23	338.29	343.5	1.50	**5.20**
PROG	B.108	1+716	TO.14 - Valle	10	6.5	98.7	3.59	3.59	2.75	339.98	339.59	342.5	1.50	**2.91**
SDF	B.109	2+425	Tombino – Monte	5	8	94.8	4.84	5.75	4.16	378.51	377.71	381.3	1.50	**3.59**
SDF	B.109	2+425	Tombino - Valle	5	8	94.8	4.84	5.75	4.16	378.51	377.71	381.1	1.50	**3.39**
PROG	B.109	2+425	TO.18 - Monte	10	6.5	94.8	0.97	0.97	9.75	377.59	372.74	378.3	1.50	**5.53**
PROG	B.109	2+425	TO.18 - Valle	10	6.5	94.8	1.61	1.61	5.9	374.34	372.57	377.5	1.50	**4.89**
SDF	B.110	2+856	Tombino – Monte	5.3	7.3	85	3.97	4.03	4.04	398.02	397.19	401.0	1.50	**3.81**
SDF	B.110	2+856	Tombino - Valle	5.3	7.3	85	3.97	4.03	4.04	398.02	397.19	401.0	1.50	**3.81**
PROG	B.110	2+856	TO.20 - Monte	10	6	85	1.39	1.39	6.1	398.29	396.39	401.5	1.50	**5.11**
PROG	B.110	2+856	TO.20 - Valle	10	6	85	3.65	3.65	2.33	396.93	396.65	399.5	1.50	**2.85**
PROG	B.110	2+825	VI.01 - Rampa sud - Monte	50	14.5	85	1.73	2.53	6.81	395.87	393.69	400.5	1.50	**6.81**
PROG	B.110	2+825	VI.01 - Rampa sud - Valle	50	14.5	85	0.94	1.43	7.66	391.28	388.43	401.5	1.50	**13.07**
SDF	B.111	3+525	Arco – Monte	6	6	85	3.38	3.53	4.2	423.12	422.22	424.7	1.50	**2.48**
SDF	B.111	3+525	Arco - Valle	6	6	85	3.38	3.53	4.2	423.12	422.22	424.7	1.50	**2.48**
PROG	B.111	3+525	TO.24 - Monte	10	6	85	1.36	1.36	6.23	422.12	420.14	424.8	1.50	**4.64**
PROG	B.111	3+525	TO.24 - Valle	10	6	85	1.26	1.26	6.76	421.65	419.32	424.1	1.50	**4.74**
SDF	B.112	3+591	Non interferente in SDF											
SDF	B.112	3+591	Non interferente in SDF											
PROG	B.112	3+591	TO.25 - Monte	2	2	3.4	0.13	0.13	13.57	440.19	430.81	432.7	0.67	**1.87**
PROG	B.112	3+591	TO.25 - Valle	2	2	3.4	0.35	0.35	4.87	431.91	430.7	432.4	0.67	**1.65**

Configurazione	ID Interferenza idraulica	Progr. Asse stradale	Tipologico verificato	Geometria		TR=200								
				B	H	Portata Q	Tirante h media	Tirante h max	Velocità V	Carico Totale	Livello idrico	Intradosso minimo attraversam.	Fr (Normativa)	Fr (calcolato)
				(m)	(m)	(m^3/s)	(m)	(m)	(m/s)	(m s.l.m.)	(m s.l.m.)	(m s.l.m.)	(m)	(m)
SDF	B.114	4+370	DN 1000 – Monte	1	1	3.3	3.27	3.28	1.01	452.2	452.15	449.9	0.50	**-2.28**
SDF	B.114	4+370	DN 1000 – Valle	1	1	3.3	3.27	3.28	1.01	452.2	452.15	449.8	0.50	**-2.34**
PROG	B.114	4+370	TO.28 - Monte	2	2	3.3	0.21	0.21	7.82	469.43	466.31	468.1	0.67	**1.79**
PROG	B.114	4+370	TO.28 - Valle	2	2	3.3	0.41	0.41	4.01	467.04	466.22	467.8	0.67	**1.59**
SDF	B.115	4+625	DN 1000 – Monte	1	1	5	5.89	5.91	0.85	475.99	475.96	471.1	0.50	**-4.91**
SDF	B.115	4+625	DN 1000 – Valle	1	1	5	5.89	5.91	0.85	475.99	475.96	471.1	0.50	**-4.91**
PROG	B.115	4+625	TO.29 - Monte	4	2	5	0.28	0.28	4.45	475.23	474.22	475.9	0.67	**1.72**
PROG	B.115	4+625	TO.29 - Valle	4	2	5	0.4	0.4	3.11	474.51	474.01	475.6	0.67	**1.60**
SDF	B.117	5+525	Arco – Monte	2.5	4.5	10.5	1.48	1.5	2.83	509.01	508.6	511.6	1.50	**3.00**
SDF	B.117	5+525	Arco - Valle	2.5	4.5	10.5	1.48	1.5	2.83	509.01	508.6	511.6	1.50	**3.00**
PROG	B.117	5+525	TO.34 - Monte	4	3	10.5	0.51	0.51	5.19	509.88	508.51	511.0	1.00	**2.49**
PROG	B.117	5+525	TO.34 - Valle	4	3	10.5	0.46	0.46	5.68	508.44	506.79	509.3	1.00	**2.54**
SDF	B.119	5+735	Arco – Monte	2.5	4.5	31.3	3.14	3.32	3.98	528.25	527.44	528.4	1.50	**0.96**
SDF	B.119	5+735	Arco - Valle	2.5	4.5	31.3	3.14	3.32	3.98	528.25	527.44	528.0	1.50	**0.56**
PROG	B.119	5+735	TO.35 - Monte	10	3.5	31.3	0.44	0.44	7.04	525.85	523.32	526.4	1.17	**3.06**
PROG	B.119	5+735	TO.35 - Valle	10	3.5	31.3	1.77	1.77	1.77	524.44	524.28	526.0	1.17	**1.73**
SDF	B.120	6+125	Arco – Monte	3	3	6.9	0.98	1.02	2.35	540.31	540.02	541.3	1.00	**1.28**
SDF	B.120	6+125	Arco - Valle	3	3	6.9	0.98	1.02	2.35	540.31	540.02	541.3	1.00	**1.28**
PROG	B.120	6+125	TO.37 - Monte	4	3	6.9	0.2	0.2	8.79	542.09	538.16	541.0	1.00	**2.80**
PROG	B.120	6+125	TO.37 - Valle	4	3	6.9	0.42	0.42	4.09	538.78	537.93	540.5	1.00	**2.58**

Configurazione	ID Interferenza idraulica	Progr. Asse stradale	Tipologico verificato	Geometria		TR=200								
				B	H	Portata Q	Tirante h media	Tirante h max	Velocità V	Carico Totale	Livello idrico	Intradosso minimo attraversam.	Fr (Normativa)	Fr (calcolato)
				(m)	(m)	(m^3/s)	(m)	(m)	(m/s)	(m s.l.m.)	(m s.l.m.)	(m s.l.m.)	(m)	(m)
SDF	B.121	6+300	Arco – Monte	3	3.8	25.6	2.62	2.69	3.26	548.96	548.42	549.0	1.27	**0.58**
SDF	B.121	6+300	Arco - Valle	3	3.8	25.6	2.62	2.69	3.26	548.96	548.42	548.4	1.27	**-0.02**
PROG	B.121	6+300	TO.39 - Monte	5	3.5	25.6	0.81	0.81	6.32	547.14	545.1	547.8	1.17	**2.69**
PROG	B.121	6+300	TO.39 - Valle	5	3.5	25.6	0.84	0.84	6.11	545.96	544.06	546.7	1.17	**2.66**
SDF	B.122	6+386	Arco – Monte	3	3	7.2	0.5	0.58	4.96	552.52	551.3	553.8	1.00	**2.50**
SDF	B.122	6+386	Arco - Valle	3	3	7.2	0.5	0.58	4.96	552.52	551.3	553.8	1.00	**2.50**
PROG	B.122	6+386	TO.40 - Monte	4	3	7.2	0.17	0.17	10.53	559.45	553.8	556.6	1.00	**2.83**
PROG	B.122	6+386	TO.40 - Valle	4	3	7.2	0.46	0.46	3.89	550.09	549.32	551.9	1.00	**2.54**
SDF	B.126	7+110	Arco – Monte	3	3.9	14.6	1.69	1.78	2.88	582.02	581.6	583.8	1.30	**2.20**
SDF	B.126	7+110	Arco - Valle	3	3.9	14.6	1.69	1.78	2.88	582.02	581.6	583.8	1.30	**2.20**
PROG	B.126	7+110	TO.45 – Monte	5	3	14.6	0.45	0.45	6.44	581.62	579.5	582.1	1.00	**2.55**
PROG	B.126	7+110	TO.45 – Valle	5	3	14.6	0.5	0.5	5.88	579.86	578.1	580.6	1.00	**2.50**
SDF	B.127	7+475	Viadotto – Monte	100	13.5	5	0.47	0.82	1.27	575.64	575.56	588.1	1.50	**12.54**
SDF	B.127	7+475	Viadotto – Valle	100	13.5	5	0.47	0.82	1.27	575.64	575.56	588.1	1.50	**12.54**
PROG	B.127	7+475	VI.05-VI.06 - Monte	130	13.5	5	0.53	0.62	1.37	575.17	575.08	588.1	1.50	**13.02**
PROG	B.127	7+475	VI.05-VI.06 - Valle	130	13.5	5	0.39	0.46	1.97	571.21	571.01	588.1	1.50	**17.09**

5 METODOLOGIA DI VERIFICA INLET/OUTLET CONTROL

La verifica delle opere di attraversamento classificate come compluvi nella gerarchia idrologica in quanto non appartenenti al reticolo demaniale, è stata condotta mediante l'applicazione del metodo della Federal Highway Administration (FHWA) denominato "Inlet/Outlet Control".

Le leggi che regolano il deflusso di una corrente attraverso un tombino si rifanno all'idraulica dei canali a pelo libero sino a quando la corrente non è a sezione piena. In letteratura sono disponibili numerosi studi effettuati da diversi autori (Marnell, Nagler, Woodward, Mavis, Straub, Morris, Anderson, Bowers, Shoemaker, Clayton) che hanno investigato casi particolari.

Un'indagine sperimentale completa sul comportamento idraulico delle più comuni tipologie di tombini è stata eseguita dal U.S. Bureau of Standard come riportato da French in più pubblicazioni.

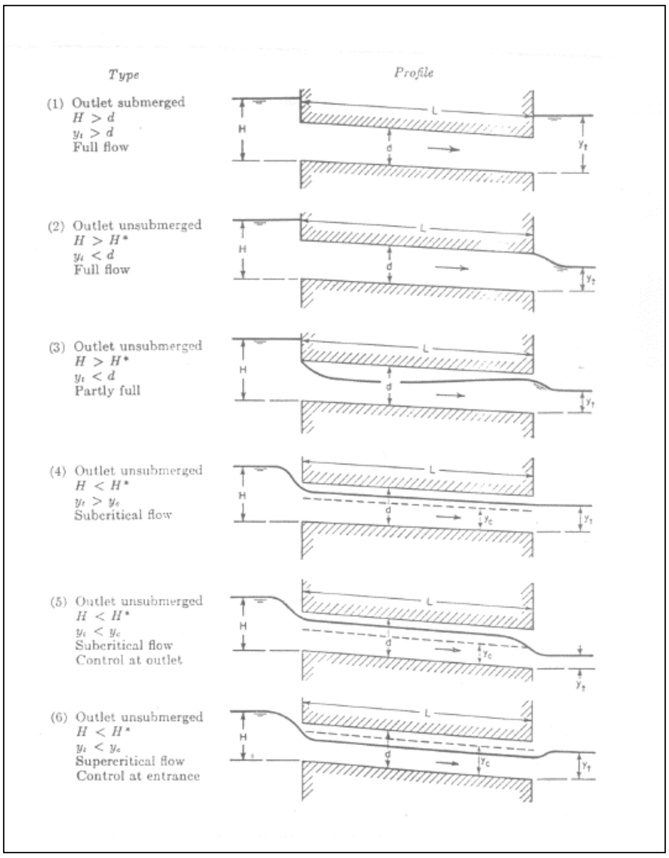


Figura 10: Situazioni di deflusso attraverso un tombino

Sulla base di queste esperienze è stato verificato che l'imbocco di un tombino risulta libero qualora il carico idraulico a monte sia inferiore ad un valore critico definito in funzione delle caratteristiche geometriche dell'imbocco del tombino stesso. Nelle applicazioni in oggetto si è considerato un valore critico del carico di monte pari a quello ottenibile rispetto al piano campagna locale, quello cioè che determina l'esondazione incipiente per rigurgito del manufatto.

Si sono individuati sei differenti tipi di comportamento (Figura 10), schematizzabili nel modo seguente:

A. sbocco sommerso: **Tipo 1**
B. sbocco a pelo libero:
    a. carico maggiore del carico critico
        i. tombino idraulicamente lungo: **Tipo 2**
        ii. tombino idraulicamente corto: **Tipo 3**
    b. carico inferiore al carico critico
        i. altezza d'acqua di valle maggiore della y_c: **Tipo 4**
        ii. altezza d'acqua di valle minore della y_c:
            1. pendenza < i_c: **Tipo 5**
            2. pendenza > i_c: **Tipo 6**

La soluzione di tali tipologie può essere ottenuta utilizzando i cartogrammi messi a punto dal U.S. Geological Survey (Figura 11).

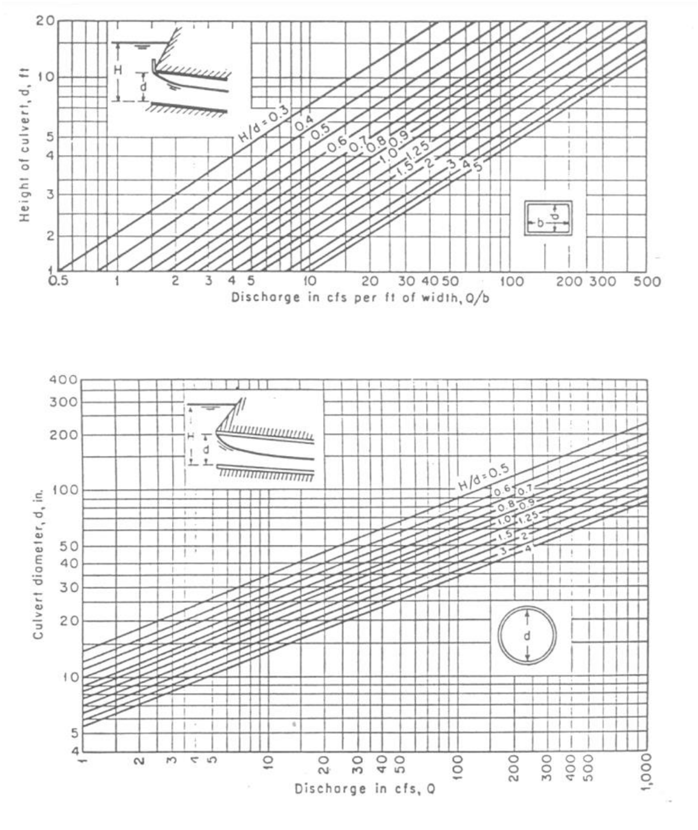


Figura 11: Cartogrammi per la stima delle portate defluibili a pelo libero attraverso tombini scatolari o circolari con imbocco non raccordato.

Tali grafici, aventi gli assi a scala logaritmica, esprimono il legame tra la portata espressa in cfs (piedi cubi al secondo) ed il carico idraulico a monte espresso in ft (piedi) in funzione delle dimensioni geometriche di tombini a sezione rettangolare o circolare, configurazione questa che risulta rappresentativa di tutte le situazioni riscontrate.

Quindi note le dimensioni del manufatto e valutato il carico idraulico a monte, attraverso l’utilizzo delle relazioni matematiche esplicitate graficamente nei diagrammi sopra riportati, è possibile determinare la portata che può defluire attraverso un tombino a sezione scatolare o circolare.

La tipologia progettuale degli attraversamenti sui corsi d’acqua secondari è normalizzata allo scatolare 2x2 m, per favorire e agevolare operazioni di manutenzione e allo stesso tempo garantire il dimensionamento rispetto a fenomeni di sedimentazione e ostruzione. In attraversamento alle viabilità di svincolo, in alcuni casi è stata prevista la tipologia circolare con diametro 1000 mm.

In virtù della sezione corrente stradale di mezzacosta, le opere idrauliche hanno spesso un tipologico di imbocco a pozzo, necessario per vincere il dislivello altimetrico dello scavo di versante.

Nelle Tabelle sottostanti sono riportati i dati di verifica dei tombini calcolati col metodo descritto. Si ricorda che la normativa nazionale intende i tombini idraulici come manufatti totalmente rivestiti in sezione, eventualmente suddivisi in più canne, in grado di condurre complessivamente portate fino a 50 m^3/s.

Ai fini delle verifiche idrauliche l’evento di progetto deve avere tempo di ritorno uguale a quello da assumere per i ponti, ovvero 200 anni ed è necessario garantire, in caso di funzionamento a superficie libera, un tirante idrico inferiore ai 2/3 dell’altezza della sezione, garantendo comunque un franco minimo di 0.50 m. Per i canali a sezione aperta il franco idraulico rispettato ai fini delle verifiche è pari ad 1/3 dell’altezza della sezione.

Tabella 8: Risultati del dimensionamento dei tombini idraulici (Parte 1).

			Caratteristiche tombino						
Interferenza	**Attraversam.**	**Pk**	**Larghezza**	**Altezza**	**Lunghezza**	**Scabrezza**	**Quota ingresso**	**Quota sbocco**	**Pendenza**
id	**pk**		**b**	**h1**	**L**	**k_s**	**Z_{in}**	**Z_{out}**	**i**
			(m)	**(m)**	**(m)**	**($m^{1/3}/s$)**	**(m s.m)**	**(m s.m)**	**(-)**
C.101.1	TO.02	0+100	DN1000	1.00	10.00	60	281.15	281.03	0.01
C.101.2	TO.03	0+270	2.00	2.00	34.80	60	288.09	287.68	0.01
C.101.3	TO.04	0+346	2.00	2.00	36.10	60	291.62	291.24	0.01
C.101.4	TO.05	0+400	DN1000	1.00	7.00	60	302.3	302.22	0.01
C.101.5	TO.06	0+597	2.00	2.00	24.50	60	302.9	302.66	0.01
C.102	TO.07	0+969	2.00	2.00	29.90	60	319.7	319.4	0.01
C.102.1	TO.08	1+070	2.00	2.00	27.50	60	323.42	323.15	0.01
C.106	TO.12	1+531	2.00	2.00	24.00	60	338.22	337.98	0.01
C.108.1	TO.15	1+825	2.00	2.00	25.70	60	351.00	350.74	0.01
C.108.2	TO.16	2+000	2.00	2.00	23.50	60	359.03	358.8	0.01
C.108.3	TO.17	2+325	2.00	2.00	32.90	60	373.45	373.12	0.01
C.109.1	TO.19	2+610	2.00	2.00	45.80	60	385.2	384.74	0.01
C.110.1	TO.21	Rampa (2+920)	DN1000	1.00	11.00	60	405.2	405.15	0.01
C.110.2	TO.22	3+100	2.00	2.00	36.50	60	410.46	410.1	0.01
C.110.3	TO.23	3+190	2.00	2.00	28.50	60	413.79	413.5	0.01
C.113b	TO.26	3+695	2.00	2.00	30.00	60	435	434.7	0.01
C.113.1	TO.27	4+173	DN1000	1.00	15.50	60	459.45	459.27	0.01
C.115.1	TO.30	4+860	2.00	2.00	29.90	60	488.63	488.31	0.01
C.116	TO.31	4+950	2.00	2.00	25.00	60	492.51	492.26	0.01
C.116.1	TO.32	5+125	2.00	2.00	24.50	60	500.49	500.24	0.01
C.116.2	TO.33	5+317	2.00	2.00	24.60	60	509.23	508.98	0.01
C.119.1	TO.36	5+915	2.00	2.00	37.10	60	531.68	531.31	0.01
C.120.1	TO.38	Rampa (6+140)	DN1000	1.00	15.50	60	548.6	548.48	0.01
C.123.1	TO.41	6+530	2.00	2.00	43.70	60	556.91	556.47	0.01
C.124	TO.42	6+760	2.00	2.00	34.50	60	566.48	566.14	0.01

			Caratteristiche tombino						
Interferenza	**Attraversam.**	**Pk**	**Larghezza**	**Altezza**	**Lunghezza**	**Scabrezza**	**Quota ingresso**	**Quota sbocco**	**Pendenza**
id	**pk**		**b**	**h1**	**L**	**k_s**	**Z_{in}**	**Z_{out}**	**i**
			(m)	**(m)**	**(m)**	**($m^{1/3}/s$)**	**(m s.m)**	**(m s.m)**	**(-)**
C.124.1	TO.43	6+850	2.00	2.00	34.50	60	570.8	570.46	0.01
C.125	TO.44	6+960	2.00	2.00	33.20	60	572.32	571.99	0.01
C.126.1	TO.46	Rampa (7+225)	DN1000	1.00	28.00	60	595.7	595.42	0.01

Tabella 9: Risultati del dimensionamento dei tombini idraulici (Parte 2).

			Parametri idrodinamici					Franchi idraulici	
Interferenza	**Attraversam.**	**Portata TR=200**	**Altezza di moto uniforme**	**Altezza critica**	**Velocità di moto uniforme**	**Carico totale**	**Carico parziale**	**Franco NTC2018**	**Franco calcolato**
id	**pk**	**Q_{200}**	**h**	**y_c**	**V**	**$H_T=h+V^2/2g$**	**$H_{0.5}=h+0.5*V^2/2g$**	**F(min)**	**F(h)**
		(m^3/s)	**(m)**	**(m)**	**(m/s)**	**(m)**	**(m)**	**(m)**	**(m)**
C.101.1	TO.02	0.77	0.43	0.50	2.3	0.71	0.57	0.50	0.57
C.101.2	TO.03	0.41	0.14	0.16	1.5	0.25	0.19	0.67	1.86
C.101.3	TO.04	1.83	0.37	0.44	2.5	0.69	0.53	0.67	1.64
C.101.4	TO.05	0.83	0.46	0.52	2.3	0.73	0.59	0.50	0.55
C.101.5	TO.06	1.93	0.39	0.46	2.5	0.70	0.54	0.67	1.61
C.102	TO.07	2.29	0.43	0.51	2.7	0.79	0.61	0.67	1.57
C.102.1	TO.08	0.51	0.16	0.19	1.6	0.29	0.22	0.67	1.84
C.106	TO.12	0.28	0.11	0.13	1.3	0.19	0.15	0.67	1.89
C.108.1	TO.15	0.57	0.17	0.20	1.7	0.31	0.24	0.67	1.83
C.108.2	TO.16	1.06	0.26	0.31	2.0	0.47	0.37	0.67	1.74
C.108.3	TO.17	0.42	0.14	0.17	1.5	0.25	0.20	0.67	1.86
C.109.1	TO.19	0.39	0.14	0.16	1.5	0.24	0.19	0.67	1.86
C.110.1	TO.21	0.17	0.25	0.23	1.3	0.33	0.29	0.50	0.75
C.110.2	TO.22	0.33	0.12	0.14	1.4	0.22	0.17	0.67	1.88

			Parametri idrodinamici					Franchi idraulici	
Interferenza	**Attraversam.**	**Portata TR=200**	**Altezza di moto uniforme**	**Altezza critica**	**Velocità di moto uniforme**	**Carico totale**	**Carico parziale**	**Franco NTC2018**	**Franco calcolato**
id	**pk**	Q_{200}	**h**	y_c	**V**	$H_T=h+V^2/2g$	$H_{0.5}=h+0.5*V^2/2g$	**F(min)**	**F(h)**
		(m³/s)	**(m)**	**(m)**	**(m/s)**	**(m)**	**(m)**	**(m)**	**(m)**
C.110.3	TO.23	0.45	0.15	0.17	1.5	0.27	0.21	0.67	1.85
C.113b	TO.26	2.76	0.49	0.58	2.8	0.89	0.69	0.67	1.51
C.113.1	TO.27	0.62	0.39	0.45	2.2	0.63	0.51	0.50	0.61
C.115.1	TO.30	0.49	0.29	0.18	1.3	0.38	0.33	0.67	1.72
C.116	TO.31	1.86	0.37	0.45	2.5	0.68	0.53	0.67	1.63
C.116.1	TO.32	1.04	0.25	0.30	2.1	0.47	0.36	0.67	1.75
C.116.2	TO.33	0.47	0.15	0.18	1.5	0.27	0.21	0.67	1.85
C.119.1	TO.36	0.86	0.23	0.27	1.9	0.41	0.32	0.67	1.78
C.120.1	TO.38	0.09	0.16	0.17	1.1	0.22	0.19	0.50	0.84
C.123.1	TO.41	0.68	0.19	0.23	1.8	0.35	0.27	0.67	1.81
C.124	TO.42	2.21	0.42	0.50	2.6	0.77	0.60	0.67	1.58
C.124.1	TO.43	0.39	0.14	0.16	1.4	0.24	0.19	0.67	1.86
C.125	TO.44	2.6	0.47	0.56	2.8	0.86	0.67	0.67	1.53
C.126.1	TO.46	0.27	0.26	0.29	1.7	0.40	0.33	0.50	0.74

6 ANALISI DELL'INTERAZIONE CORRENTE–STRUTTURA: FENOMENI DI SCALZAMENTO E TRASCINAMENTO

6.1 Fenomeni di scalzamento

I fenomeni di scalzamento sulle fondazioni dei ponti e/o opere in alveo sono la conseguenza dell'azione erosiva della corrente, che scava e trasporta a valle il materiale che costituisce il fondo dell'alveo in prossimità dell'opera.
La dimensione del fenomeno dipende dalla capacità erosiva della corrente, della resistenza all'erosione del materiale d'alveo e dal bilancio del trasporto solido entrante e uscente nella sezione del ponte.
Lo scalzamento totale atteso è riconducibile alla combinazione delle seguenti tre componenti:

- abbassamento generalizzato dell'alveo;
- scalzamento da presenza pile in alveo;
- scalzamento da contrazione della sezione trasversale (posizione spalle rispetto all'ampiezza del deflusso).

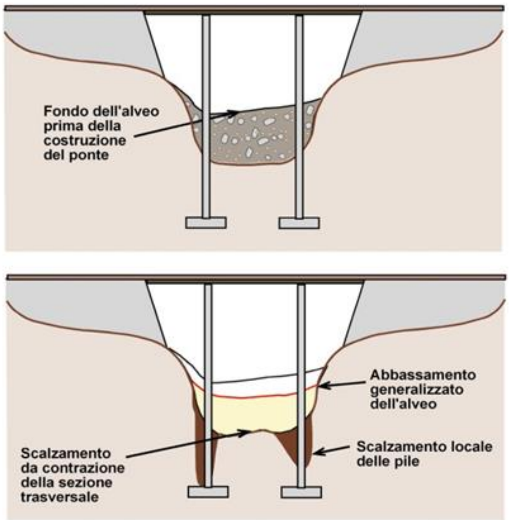


Figura 12: Componenti dello scalzamento nella sezione di un ponte generico

Le tre componenti devono essere sommate per ottenere il valore complessivo sulle fondazioni della struttura; questo equivale ad assumere che ciascuna componente si manifesti in modo indipendente rispetto alle altre e costituisce un criterio in qualche misura cautelativo.

6.1.1 Abbassamento generalizzato dell'alveo

L'abbassamento generalizzato è un fenomeno di lungo termine dovuto all'evoluzione naturale dell'alveo o indotto da interventi antropici sullo stesso. Tale fenomeno, assieme al fenomeno inverso di interrimento del fondo alveo, è caratterizzabile analiticamente solo dal confronto storico multi-temporale di rilievi topografici eseguiti lungo il corso d'acqua all'altezza delle stesse sezioni trasversali, oppure è caratterizzabile mediante analisi geomorfologica e ricognizione dedicata.

L’analisi analitica non è pertanto attuabile nel caso in esame, tuttavia sulla scorta dei sopralluoghi effettuati si riscontra una ridotta mobilitazione di materiale solido e un sostanziale equilibrio in termini di apporti e sottrazioni di materiale d’alveo. La relazione geologica conferma in effetti un quadro di dissesto geomorfologico molto contenuto: non sono presenti significativi movimenti franosi.

Inoltre, la presenza di numerosi attraversamenti stradali non sembra vere localmente alterato il regime naturale del corso d’acqua: non sono presenti ne particolari zone di erosione ne zone di accumulo. Anche in questo caso, la presenza di un substrato di conglomerati calcarei giustifica l’assenza di particolari fenomeni erosivi.

6.1.2 Erosione per contrazione della sezione di deflusso

Il fenomeno si manifesta quando il ponte/opera provoca una riduzione della larghezza della sezione trasversale dell’alveo di piena; ciò può comportare un aumento significativo della velocità media e dell’azione erosiva della corrente. Si ha quindi localmente un aumento del trasporto del materiale dal fondo che provoca un abbassamento del medesimo e un aumento dell’area della sezione fino al conseguimento di una condizione di equilibrio del bilancio del trasporto solido del tronco.

Il fenomeno è tipicamente ciclico, con il fondo alveo che si abbassa in fase crescente della piena e che si rialza parzialmente in fase decrescente. I fattori principali sono:

- il restringimento dell’alveo attivo del corso d’acqua;
- il restringimento dell’alveo per effetto delle pile;
- riduzione della porzione golenale dell’alveo di piena a causa dei rilevati di approccio al ponte.

Nel caso in esame non sono presenti alcuna di queste circostanze:

- non sono presenti pile in alveo, bensì poste ai margini delle aree di allagamento;
- i rilevati di accesso e le spalle non interferiscono con la sezione di deflusso;
- i muri di contenimento dei rilevati sono paralleli al deflusso e posti al limite delle aree di allagamento.

L’analisi degli elementi progettuali esclude pertanto fattori di contrazione della sezione di deflusso.

Tuttavia, la realizzazione delle opere di fondazione delle pile e dei muri di sostegno dei rilevati possono interferire con le aree di allagamento: in tal caso sono previste difese in massi ciclopici per evitare l’erosione del materiale di riporto. Analogamente le difese in massi sono previste anche in corrispondenza degli attraversamenti scatolari presso imbocco e sbocco opera, sempre con finalità anti-erosiva in sostituzione di materiale di riporto sciolto che risulterebbe facilmente dilavabile.

6.1.3 Erosione per presenza di pile

Non sono presenti in alveo, se non nelle zone marginali al deflusso.

Anche il caso dei viadotti VI04-VI06 è stato risolto mediante inalveazione.

L’effetto di scalzamento è pertanto da escludersi, tuttavia la realizzazione delle opere di fondazione delle pile possono interferire con le aree di allagamento: in tal caso sono previste difese in massi ciclopici per evitare l’erosione del materiale di riporto.

6.2 Azioni di trascinamento e verifica difese

I fenomeni di trascinamento ed erosione degli elementi che costituiscono le difese spondali possono essere impediti attraverso la scelta dell’opportuna pezzatura dei massi e dell’inclinazione con cui vengono posati.

L’analisi della stabilità del materiale utilizzato per il rivestimento della sponda nel tratto in corrispondenza dei nuovi attraversamenti è svolta secondo la procedura seguente:

- definizione dei parametri idraulici di interesse;
- caratterizzazione del materiale del rivestimento, di fondo e di sponda, e verifica della sua stabilità nella situazione attuale;
- individuazione del peso del masso in equilibrio limite per l’evento di piena progettuale.

6.2.1 Calcolo delle condizioni critiche di moto incipiente

Differenti formule di calcolo sono disponibili in letteratura per la valutazione della stabilità di materiali di assegnata granulometria soggetti all'azione di trascinamento della corrente.

Questi procedimenti si basano sulla determinazione dei valori critici (in generale desunti da dati sperimentali) delle velocità o delle tensioni tangenziali (intesi come valori che corrispondono alle condizioni di moto incipiente per il materiale considerato) e sul confronto con i valori reali di tali grandezze.

Le formule che si basano sul concetto di velocità critica, sebbene molto usate in passato, presentano evidenti limiti di applicabilità: infatti, non essendo generalmente disponibili informazioni sulla distribuzione delle velocità nelle sezioni d'alveo, si utilizza nei calcoli il valore della velocità media per il confronto con il valore di velocità critica, che porta ad una sovrastima della velocità allo strato limite, specialmente per alvei che hanno elevata scabrezza e che quindi non presentano uno strato limite laminare.

Per questo motivo appare preferibile l'utilizzo di formule basate sul confronto delle tensioni di trascinamento.

Tale criterio si basa sulla definizione dello sforzo tangenziale esercitato dalla corrente sul materiale solido in alveo, secondo la formula:

$$\tau_0 = \gamma \cdot R \cdot i \qquad \text{(kg/m}^2\text{)}$$

dove γ (kg/m^3) è il peso specifico dell’acqua, R (m) è il raggio idraulico della sezione e i (m/m) la pendenza di fondo.

La condizione di stabilità del materiale risulta quando:

$$\tau_{cr} > \tau_0$$

La seguente analisi di stabilità è riferita alla teoria della tensione tangenziale critica (Shields, 1936 - la cui formula base è stata ricavata da esperimenti su letti a granulometria uniforme di forte scabrezza), attraverso la valutazione della forza che determina il moto incipiente dei granuli, esprimibile in termini generali con la seguente relazione che esprime una condizione di equilibrio:

$$\frac{\tau_{cr}}{(\gamma_s - \gamma)d} = \emptyset(Re\,*)$$

dove τ_{cr} = tensione tangenziale critica (kg/m^2);

γ_s = peso specifico materiale d’alveo (kg/m^3);

γ = peso specifico dell’acqua (kg/m^3);

d = diametro del granulo (m);

Ø = parametro adimensionale, dipendente dalle caratteristiche dei granuli e del letto fluviale e dal numero di Reynolds (Re*) relativo alla velocità di attrito ($u^*=\tau_{cr}/\rho$).

Per la traduzione della condizione di equilibrio suddetta in termini applicativi sono state proposte varie formulazioni, derivanti da osservazioni sperimentali, ciascuna caratterizzata da limiti e campi di applicabilità specifici che ne condizionano l’utilizzo alla preventiva definizione della tipologia dei substrati naturali o artificiali e del comportamento idraulico dell’alveo.
In particolare, alcuni autori hanno individuato valori empirici specifici del parametro di Shields:

- Ø = 0,047 nella espressione di Meyer-Peter, che considera nullo il termine relativo al trasporto solido;
- Ø = 0,058 - 0,060 nella espressione originale di Shields per Re* > 400;
- Ø = 0,116 nella espressione di Kalinske, che considera un fattore di compattezza del materiale rappresentante l'effetto di mutuo incastro delle particelle (massi).

Per le verifiche di stabilità dei massi costituenti le opere in esame verrà fatto riferimento, nel caso specifico, all’espressione di Shields nella formulazione di Kalinske.
Una volta determinate le grandezze caratteristiche con riferimento al fondo alveo, per quanto riguarda le verifiche di stabilità del paramento inclinato, la condizione di moto incipiente va espressa considerando le componenti attive del peso e della spinta idrodinamica in relazione alla pendenza (α) della sponda rispetto all'orizzontale.
Viene normalmente utilizzata la seguente espressione (E. Lane, 1953):

$$\tau_{cr}(\alpha) = \tau_{cr}(0)\left[\cos\alpha\sqrt{1-\frac{tg^2\alpha}{tg^2\phi}}\right]$$

con:

τ_{cr} (0) = tensione critica sul fondo;

φ = angolo d’attrito interno del materiale.

Dal confronto fra le tensioni tangenziali esercitate dalla corrente sul fondo e la corrispondente tensione tangenziale critica legata alla pezzatura del materiale utilizzato per il rivestimento, è possibile verificarne la stabilità in alveo valutando l’adeguatezza delle dimensioni dei massi impiegati attraverso il diametro medio di calcolo D50.
Inoltre, volendo esprimere l’ordine di grandezza dei massi tramite il loro peso, si consideri che, in generale, il volume di questi elementi è compreso tra il volume di una sfera e quello di un cubo, aventi rispettivamente diametro e lato pari al D50 medio. Il volume caratteristico dei massi viene usualmente determinato attraverso la relazione:

$$V = 0.8\ D_{50}$$

6.2.2 Verifica delle difese

I parametri idraulici della tensione tangenziale utilizzati nei calcoli sono desunti dalle modellazioni HEC-RAS nello scenario di progetto con tempo di ritorno 200 anni.
Scorrendo le tabelle dei risultati si evince come la condizione più gravosa appartenga al corso d’acqua principale, il Fosso dei Cerri, per il quale i valori massimi di tensione tangenziale non solo nelle sezioni degli attraversamenti ma in generale

lungo l'intera tratta analizzata (strada spesso in affiancamento) si attestano sul valore di circa 1300 N/m^2 (localmente superiori in caso di salti naturali assimilabili a cascatelle), ridotto a 1000 N/m^2 sulle sponde.

È chiaro che l'effetto di mutuo incastro dei massi è elemento rilevante nel dimensionamento dei massi, così come la pendenza di posa degli stessi che è variabile tra fondo alveo e sponde.
Secondo queste condizioni si è proceduto al dimensionamento, adottando un peso specifico minimo dei massi pari a 2400 kg/m^3. L'angolo della scarpata è stato assunto pari a 45° (inclinazione 1/1), mentre il valore dell'angolo di attrito interno del materiale pari a 75°, considerando il rilevante effetto di mutuo incastro dovuto all'elevata pezzatura dei massi.
Applicando la formulazione di Shields nell'espressione di Kalinske precedentemente descritta, risultano necessari massi con diametro caratteristico D50 = 1,0 m e peso di circa 2000 kg considerando il volume caratteristico di 0,8 m^3. Questi massi determinano valori di tensione tangenziale critica pari a 1700 N/m^2 al fondo.

7 TRASPORTO SOLIDO

In merito al trasporto solido, si ritiene opportuno, prima ancora di applicare formulazioni empiriche, inquadrare l'area dal punto di vista geomorfologico, riportando a seguire alcune sintesi della Relazione Geologica.

<u>Estratto dal capitolo di analisi geomorfologica della Relazione Geologica – Rev.B</u>
Tutte le forme del paesaggio sono condizionate in modo imprescindibile dalla tipologia degli affioramenti rocciosi e conservano le tracce sia degli eventi geologici e tettonici che hanno modellato nel corso del tempo la crosta, lasciando segni dell'energia erosiva esplicata dagli agenti esogeni sulla crosta stessa, energia strettamente correlata alle caratteristiche climatiche locali.

Dal punto di vista litologico si tratta di calcari detritici e micritici in strati e banchi fessurati.

La natura rocciosa dell'affioramento caratterizzata da infiltrazione efficace molto elevata a causa dell'elevatissima permeabilità secondaria per fessurazione delle rocce carbonatiche, non consente che si possa sviluppare un reticolo idrografico vero e proprio. Le scarse acque di corrivazione talora incidono i versanti in fossi dai fianchi ripidi e profondi. Questi fossi, o incisioni, risultano sempre asciutti e si riattivano solo in occasione di precipitazioni intense o di lunga durata.

Dal punto di vista della stabilità dei pendii, il territorio investigato non appare soggetto a fenomeni di dissesto particolarmente rilevanti. I terreni del ciclo post-orogenico (conglomerati sabbiosi più o meno cementati) appaiono quelli potenzialmente più instabili e che possono presentare dissesti per effetto della scarsa cementazione e quindi della facile erodibilità. Studi specifici (Menotti et alii, 1996; Autorità di Bacino del Tevere, 1999) segnalano la presenza di fenomeni complessi, scorrimenti e nelle facies più cementate anche crolli. Le formazioni carbonatiche della serie sabina sono invece essenzialmente soggette a fenomeni di crollo.

Nella carta geomorfologica realizzata per il presente progetto, sono state riporte le informazioni ricavate dal Piano di Assetto Idrogeologico (PAI) e dell’Inventario dei Fenomeni Franosi in Italia (IFFI) riguardo tutti i movimenti gravitati presenti nell’area. Quest’ultimo segnala la presenza di un unico movimento franoso per colamento lento, possibilmente riconducibile alla coltre di alterazione superficiale, non interferente con l’asse in progetto. Nel PAI sono altresì individuate aree di attenzione (presumibilmente legate allo stesso tipo di movimento) in cui non si è riscontrata nessuna interferenza col tracciato in progetto. Dalle indagini di campo non è stato individuato nessuna morfologia riconducibile ad un deposito di frana.

Nei riguardi delle condizioni di stabilità per fenomeni di erosione delle principali aste torrentizie, non sono stati rilevati fenomeni particolarmente attivi. In linea generale la zona non sembra essere interessata da una generale tendenza all’approfondimento dei fossi; questi sono in gran parte costituiti da aste fluviali incassate nelle piane di fondovalle e con una scarsa tendenza alla divagazione.

L’assenza di movimenti franosi giustifica sia l’assenza isole di deposito inerte, sia di materiale vegetale morto (tronchi) in alveo.

Per i motivi suddetti, il contributo relativo alla portata solida è da considerarsi trascurabile, così come il rischio di ostruzione.
In merito al rischio di ostruzione, si noti come i franchi progettuali abbiano sempre ampi coefficienti di sicurezza rispetto al minimo valore normativo.

ALLEGATI

Indice

3.1.19. C.116 - Progr.4+950

3.1.20. C.116.1 - Progr.5+125

3.1.21. C.116.2 - Progr.5+317

3.1.22. C.119.1 - Progr.5+915

3.1.23. C.120.1 - Progr.Rampa (6+140)

3.1.24. C.123.1 - Progr.6+530

3.1.25. C.124 - Progr.6+760

3.1.26. C.124.1 - Progr.6+850

3.1.27. C.125 - Progr.6+960

3.1.28. C.126.1 - Progr.Rampa (7+225)

1 ALLEGATO I - DESCRIZIONE DEL CODICE DI CALCOLO HEC-RAS

1. DESCRIZIONE DEL CODICE DI CALCOLO

Il modello di simulazione implementato da HEC-RAS (River Analysis System) presso l'Hydrologic Engineering Center dell'United States Army Corps of Engineers, consente il calcolo dei profili idraulici di moto permanente gradualmente vario in reti di canali naturali o artificiali.

Con tale modello possono essere simulate condizioni di moto subcritico, supercritico e misto e possono essere valutati gli effetti di immissioni o emissioni laterali di portata, opere in alveo, ostacoli al flusso e costruzioni presenti lungo le sponde.

Come noto, le equazioni utilizzate per valutare le perdite di carico e quindi il profilo di rigurgito di una corrente variano a seconda del tipo di corrente. Per correnti che si mantengono o sempre lente o sempre veloci in un determinato tratto, si è utilizzata l'equazione della conservazione dell'energia totale.

1.1 CONSERVAZIONE DELL'ENERGIA TOTALE

Isolando un tratto di corrente e indicando con 1 e 2 le sezioni a monte e a valle del tratto, si è definita l'equazione dell'energia, in riferimento alla Figura 1, nel modo seguente:

$$Y_2 + Z_2 + \frac{\alpha_2 V_2^2}{2g} = Y_1 + Z_1 + \frac{\alpha_1 V_1^2}{2g} + h_e \qquad (1)$$

dove

h_e, perdite di energia;

V_i , velocità media nella sezione, pari al rapporto tra portata totale ed area totale;

a_i , coefficienti legati alla distribuzione della velocità nella sezione

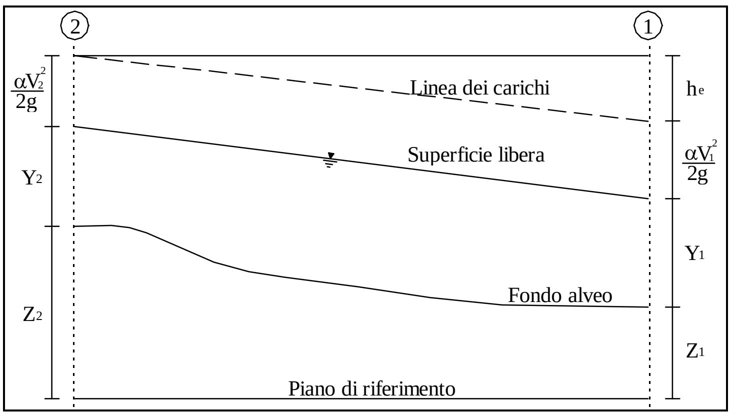


Figura 1 Schema di calcolo

La perdita di carico h_e presente tra due sezioni è causata prevalentemente dalla perdita per attrito o per le variazioni di velocità intrinseche nelle zone di espansione o contrazione della corrente. Indicando con J la cadente piezometrica e con C un coefficiente che tiene conto del fenomeno dell'espansione o contrazione, le perdite di pressione sono state pertanto calcolate nel modo seguente:

$$h_e = LJ + C\left|\frac{\alpha_2 V_2^2}{2g} - \frac{\alpha_1 V_1^2}{2g}\right| \tag{2}$$

Il coefficiente C di espansione o contrazione è stato valutato, in funzione del tipo di transizione che si determina, in accordo alla seguente tabella.

Tabella 1 - Coefficiente di contrazione o espansione

C	Contrazione	Espansione
Nessuna transizione	0,0	0,0
Transizione graduale	0,1	0,3
Sezione tipica di un ponte	0,3	0,5
Rapida transizione	0,6	0,8

La presenza di una espansione o di una contrazione è valutata confrontando la velocità a monte e a valle della sezione considerata. In particolare, se la velocità a monte risulta maggiore della velocità a valle, nella sezione si attesta un'espansione del canale; viceversa una contrazione.

La cadente piezometrica J e il coefficiente di ragguaglio dell'energia cinetica adimensionale □$_i$, che compaiono nelle equazioni (1) e (2), vengono espresse in funzione delle caratteristiche idrodinamiche della corrente nel seguente modo.

La pendenza d'attrito J viene calcolata come rapporto tra la portata media Q ed il coefficiente medio di resistenza K.

$$J = \left(\frac{Q}{K}\right)^2 \text{ con } K = \frac{1.486}{n} AR^{2/3} \tag{3}$$

dove

n, coefficiente di scabrezza di Manning;

A, area della sezione;

R, raggio idraulico.

Per portare adeguatamente in conto la frequente circostanza di sezione caratterizzata da zone a differente scabrezza (tipica in particolare degli alvei a banchina e savanella), i valori della conveyance per ciascuna area golenale sono ottenuti come somma dei rispettivi valori parziali (Figura 2). Il canale principale è invece trattato come un unico elemento dotato di un solo valore di conveyance. Il valore finale ragguagliato di K per l'intera sezione è ottenuto come somma dei tre contributi parziali (sinistra, canale, destra).

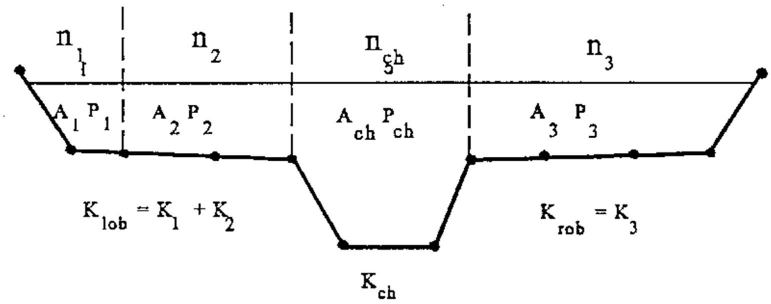


Figura 2 Procedura di calcolo della conveyance

Per ciò che concerne invece il coefficiente di ragguaglio □, poiché coerentemente con la citata ipotesi di corrente monodimensionale, ad ogni sezione resterà associata una sola superficie libera e di conseguenza una sola altezza cinetica. In particolare, per un dato valore del tirante idrico nella sezione, l'altezza cinetica viene calcolata come valor medio pesato alla portata fra quelli associati alle tre sottosezioni: golena sinistra, canale, golena destra. Una semplice schematizzazione del modello, nel caso di assenza di golena sinistra è riportato in Figura 3. In pratica l'altezza cinetica è calcolata mediante la relazione:

$$\alpha \cdot \frac{\bar{V}^2}{2g} = \frac{\sum_{i=1}^{n} Q_i \cdot \left(\frac{V_i^2}{2g}\right)}{Q_{tot}} \qquad (4)$$

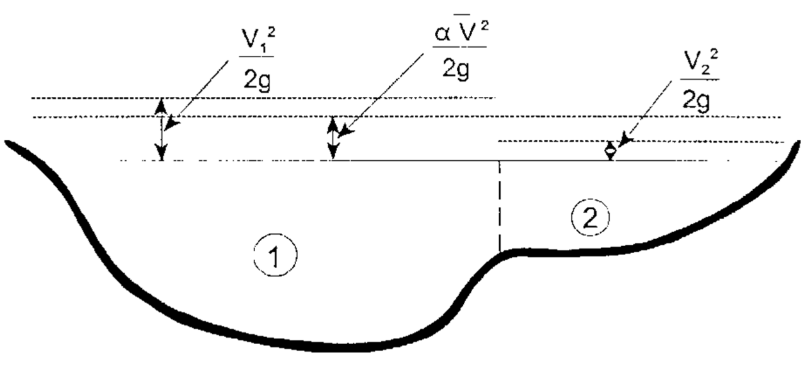


Figura 3 Suddivisione in sottozone con eguale velocità della corrente

Dalla precedente relazione pertanto il coefficiente di ragguaglio risulta quindi:

$$\alpha = \frac{\sum_{i=1}^{n} Q_i \cdot V_i^2}{Q \cdot \overline{V^2}} \tag{5}$$

L'incognita della (1) è la quota idrometrica (Y+Z), che il programma di calcolo determina con il metodo della secante applicato all'equazione del bilancio energetico.

La procedura risulta iterativa e si svolge attraverso i seguenti passi:

- Si assume una quota idrica $(Y+Z)^1_{ass.2}$ di primo tentativo per la sezione incognita, di monte nel caso di moto lento o di valle per corrente rapida;
- Basandosi sull'assunzione della quota idrica si determinano i corrispondenti termini cinetici;
- Valutata la pendenza J, si risolve l'equazione per calcolare le perdite h_e nel tratto;
- Dai valori ottenuti viene effettuato il calcolo della corrispondente quota idrica da confrontare con la quota assunta all'inizio del processo iterativo determinando l'errore commesso.

Il programma ripeterà i passaggi descritti fino al momento in cui l'errore risulterà minore della tolleranza, imposta di default come 0.003 m.

Le equazioni utilizzate per i primi due tentativi sono:

$$(Y+Z)^1_{calc.2} = E_1 + h_e - \left(\alpha \frac{V^2}{2g}\right)_2 \tag{6}$$

Equazione per la determinazione della quota calcolata:

$$err^1 = (Y+Z)^1_{ass.2} - (Y+Z)^1_{calc.2} = E_2 - (E_1 + h_e) \tag{7}$$

Errore della prima iterazione:

$$(Y+Z)^2_{ass.2} = (Y+Z)^1_{ass.2} - 0.70 \cdot err^1 \tag{8}$$

Valore assunto per la seconda iterazione:

$$err^2 = (Y+Z)^2_{ass.2} - (Y+Z)^2_{calc.2} = E_2 - (E_1 - h_e) \tag{9}$$

Errore della seconda iterazione.

Mentre per il calcolo dei tentativi successivi viene applicata la formula del metodo della secante, nella forma:

$$(Y+Z)^{I}_{ass.2} = (Y+Z)^{I-1}_{ass.2} - err^{I-1} \cdot \frac{(Y+Z)^{I-1}_{ass.2} - (Y+Z)^{I-2}_{ass.2}}{err^{I-1} - err^{I-2}} \qquad (10)$$

Nel caso in cui il numero delle iterazioni necessarie raggiunga il valore massimo impostato (20 di default) senza soddisfare la tolleranza, si confronterà con la quota $(Y+Z)_{crit}$, corrispondente alle condizioni critiche della sezione, il valore della quota al quale nelle varie iterazioni compiute corrisponde il valore minimo di errore, $(Y+Z)_{min\_err}$.

Se da tale confronto risulta un coretto posizionamento della quota rispetto la quota critica $(Y+Z)_{min\_err} > (Y+Z)_{crit}$ per profili in corrente lenta e $(Y+Z)_{min\_err} < (Y+Z)$ per profili in corrente veloce) e l'errore associato a $(Y+Z)_{min\_err}$ sia inferiore ad una seconda tolleranza impostata maggiore della precedente (0.1 di default), il valore $(Y+Z)_{min\_err}$ è assunto come soluzione; nel caso in cui, invece, l'errore corrispondente non soddisfi la seconda tolleranza oppure la posizione risulti non corretta rispetto alla quota critica, la soluzione assunta è l'altezza critica.

Si osserva dunque che indipendentemente dal tipo di condizione imposta per la risoluzione del moto del profilo, moto subcritico o moto supercritco, il profilo può risultare costituito da tratti validi con il pelo libero superiore alla quota critica, intervallati da altri tratti in cui il profilo coincide con quest'ultima.

1.2 EQUAZIONE DELLA CONSERVAZIONE DELLA QUANTITÀ DI MOTO

L'equazione della conservazione dell'energia totale (1) ha validità solo nel caso di correnti gradualmente variate all'interno del ramo in esame. In particolare viene applicata nel caso di corrente ovunque subcritiche o supercritiche. Qualora all'interno di un ramo si verificasse il passaggio da corrente veloce a lenta, con perdita della gradualità del movimento, è necessario impostare una risoluzione del codice di calcolo tramite un regime di corrente mista. Per tale metodo di calcolo è necessario assegnare due condizioni al contorno: una a monte ed una a valle. In tal caso la determinazione del profilo avviene secondo un procedimento nel quale si utilizza il teorema della quantità di moto per la localizzazione dell'eventuale risalto idraulico.

La grandezza che regola il regime di corrente mista è la spinta totale composta dalla spinta idrostatica (*Pi*) e idrodinamica della corrente ($Q\rho\Delta V$). .

$$S_{tot} = \gamma A\overline{Y}\cos\theta + Q\rho V_x \qquad (10)$$

Applicando l'equazione globale dell'equilibrio dinamico al volume di controllo compresso tra le sezioni 1-2, in cui la corrente si suppone gradualmente variata, (Figura 4) e proiettandola lungo l'asse x, si ottiene

$$P_2 - P_1 + W_x - F_f = Q\rho\Delta V_x \qquad (11)$$

dove si è indicato con

Pi , spinta idrostatica sulla sezione i;

Wx , componente della forza peso nella direzione del moto;

Ff , forza d'attrito lungo la superficie di contorno del volume di controllo;

Q , portata complessiva (supposta costante);

ρ , densità del fluido;

ΔVx , variazione della velocità tra le due sezioni.

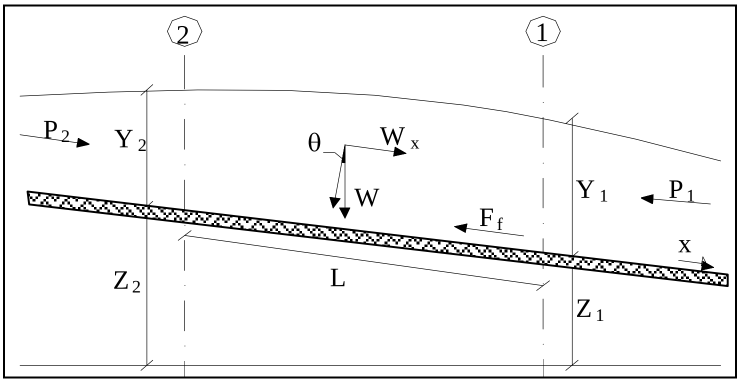


Figura 4 Schema di calcolo

I termini idrostatici per pendenze dell'ordine di 1 a 10 sono valutabili come

$$P = \gamma A\overline{Y}\cos\theta \cong \gamma A\overline{Y} \tag{12}$$

potendo porre, per le pendenze in esame, cosθ = 1.

Nella relazione (12) γ corrisponde al peso specifico del fluido, A l'area della sezione ed $\overline{Y}$ l'altezza del pelo libero nel baricentro della sezione.

La componente della forza peso, noto il peso specifico del fluido, la lunghezza L del tronco e l'area totale di fluido presente, è stata valutata nel modo seguente:

$$W = \gamma\left(\frac{A_1 + A_2}{2}\right)\cdot L \Rightarrow W_x = W\cdot \mathrm{sen}\theta \tag{13}$$

La forza d'attrito F_f è funzione delle caratteristiche del fluido come la densità dell'acqua, l'azione tangenziale che si esplica sul letto del fiume e la cadente piezometrica J.

In particolare:

$$\begin{aligned} &F_f = \tau PL \\ &\tau = \gamma RJ \Rightarrow F_f = \gamma\frac{A}{P}JPL = \gamma\left(\frac{A_1 + A_2}{2}\right)\cdot JL \end{aligned} \tag{14}$$

dove P ed R sono rispettivamente il perimetro bagnato ed il raggio idraulico della sezione.

La soluzione dell'equazione (10) avviene per iterazioni successive. Vengono quindi calcolati tutti i profili sia in regime di corrente subcritica, partendo dalla sezione di valle e procedendo a ritroso fino alla sezione di monte, sia in regime supercritico partendo dalla sezione di monte con la condizione imposta, determinando nel primo caso $S_{tot,sub}$ e nel secondo $S_{tot,super}$. Le sezioni in cui la soluzione è posta uguale alla quota critica $(Y+Z)_{crit}$ vengono salvate in memoria.

Successivamente si controlla che $S_{tot,super}$ sia maggiore della $S_{tot,sub}$. Se risulta $S_{tot,super} > S_{tot,sub}$ allora è valida la condizione supercritica ed inizia il calcolo del profilo di corrente veloce verso valle controllando che in ogni sezione permanga verificata la disuguaglianza.

Se invece nella sezione di monte è $S_{tot,super} < S_{tot,sub}$, è valida la soluzione subcritica, e il programma ricerca la prima sezione verso valle, conservata in memoria, in cui la soluzione in regime subcritico era stata posta uguale alla quota critica. Da qui ha inizio il calcolo di un profilo di corrente rapida verso valle che è valido finché non si arriva ad una sezione con una soluzione subcritica alla quale corrisponde una $S_{tot,super} < S_{tot,sub}$.

Si assume quindi che, fra questa sezione e quella precedente si verifichi un risalto idraulico, con transizione da corrente veloce a corrente lenta e si prosegue con lo stesso criterio fino ad arrivare alla sezione di valle.

Nella Figura 5 è rappresentata una parte del profilo dove si verifica il passaggio dal regime supercritico a quello subcritico, che può verificarsi in regime di corrente mista.

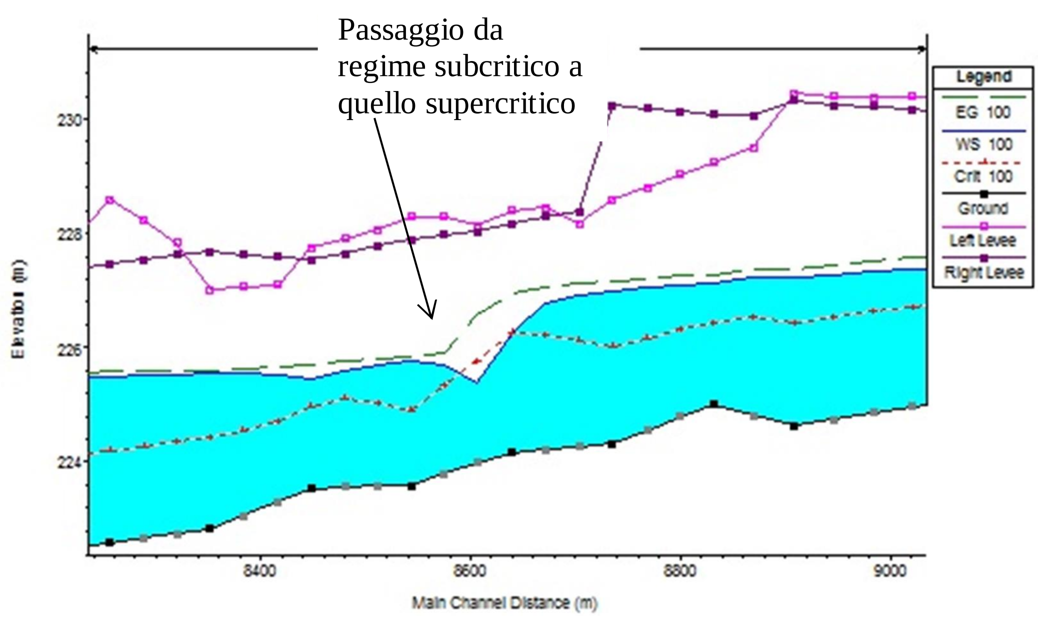


Figura 5 Profilo calcolato in regime di corrente mista

Le equazioni (1) e (11) sono state applicate anche alle sezioni caratterizzate dalla presenza di un ponte. E' stato sufficiente suddividere il tratto interessato in più sezioni e ripetere per la successione di esse l'analisi svolta per il tratto delimitato da sole due sezioni.

Prendendo un tratto caratterizzato dalla presenza di un ponte, Figura 4 e Figura 5, si evidenziano 3 zone:

- una zona di contrazione;
- una zona intermedia interessata dalla presenza del ponte;
- una zona di espansione.

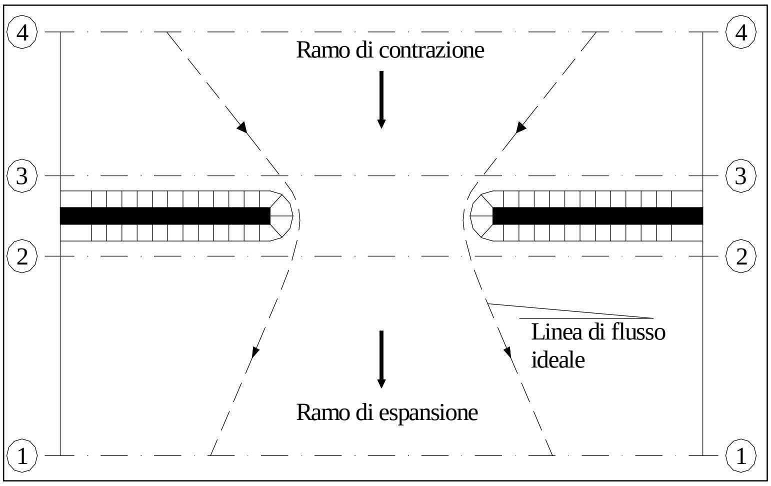


Figura 5 Pianta schematica di un attraversamento fluviale

L'applicazione dell'equazione della conservazione della quantità di moto tra le sezioni 1-2 e 3-4 è del tutto analoga alla situazione vista in precedenza mentre la presenza del ponte comporta termini nuovi nella valutazione dell'equilibrio tra le sezioni 2-BD (Step 1), BD-BU (Step 2) ed BU-3 (Step 3).

Step 1; definendo con Ap_i l'area ostruita ed con Yp_i la distanza verticale che intercorre tra il baricentro delle pile e la superficie libera nella zona di valle, l'espressione del bilancio è la seguente:

$$\frac{Q_{BD}^2 \beta_{BD}}{gA_{BD}} + A_{BD} Y_{BD} = \frac{Q_2^2 \beta_2}{gA_2} + A_2 Y_2 - A_{P_{BD}} Y_{P_{BD}} + F_f - W_x \qquad (15)$$

Step 2 ; equilibrio tra BU e BD:

$$\frac{Q_{BD}^{2}\beta_{BD}}{gA_{BD}} + A_{BD}Y_{BD} + F_{f} - W_{x} = \frac{Q_{BU}^{2}\beta_{BU}}{gA_{BU}} + A_{BU}Y_{BU} \tag{16}$$

Step 3 ; equilibrio tra BU e 3:

$$\frac{Q_{3}^{2}\beta_{3}}{gA_{3}} + A_{3}Y_{3} = \frac{Q_{BU}^{2}\beta_{BU}}{gA_{BU}} + A_{BU}Y_{BU} - A_{P_{BU}}Y_{P_{BU}} + F_{f} - W_{x} + \frac{1}{2}C_{D}\frac{A_{P_{BU}}Q_{3}^{2}}{gA_{3}^{2}} \tag{17}$$

con C_D coefficiente di resistenza idrodinamica intorno alla pila ricavabile dalla tab. 2 in funzione del tipo di pila presente.

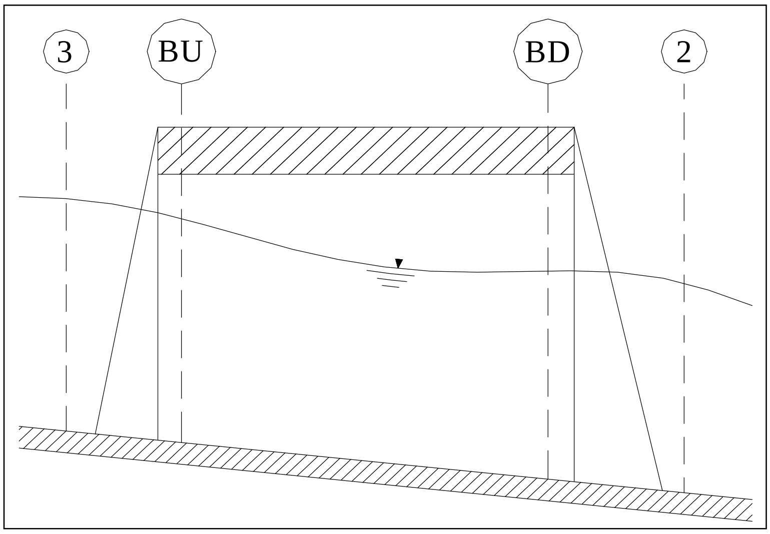


Figura 6 Sezione schematica di un attraversamento fluviale

Tabella 2 - Coefficiente di resistenza idrodinamico CD

TIPO DI PILA	**C_D**
Pila circolare	1.2
Pila allungata con punta semicircolare	1.33
Pila ellittica con rapporto assi 2 :1	0.6
Pila ellittica con rapporto assi 4 :1	0.32
Pila ellittica con rapporto assi 8 :1	0.29
Pila rettangolare	2.00
Pila triangolare con apertura α = 30°	1.00
Pila triangolare con apertura α = 60°	1.39
Pila triangolare con apertura α = 90°	1.60
Pila triangolare con apertura α = 120°	1.72

In alternativa all'equazione della conservazione della quantità di moto il software permette anche di utilizzare l'equazione di Yarnell (non utilizzata per i casi specifici) che permette di valutare le perdite di energia localizzate in corrispondenza di un ponte.

Con riferimento alle Figura 4 e Figura 5, le perdite di energia tra le sezioni 2 e 3 sono state valutate nel modo seguente:

$$H_{3-2} = 2K(K + 10\omega - 0.6)\cdot\left(\alpha + 15\alpha^4\right)\cdot\frac{V_2^2}{2g} \tag{18}$$

dove $H_{i\text{-}j}$ rappresenta appunto la perdita di energia nel passaggio della corrente attraverso la sezione ostruita e K, coefficiente di Yarnell, tiene conto delle differenti sagome di pila esistenti, tabella 3;

Tabella 3 - Coefficiente di Yarnell

TIPO DI PILA	**K**
Pila semicircolare in punta	0.9
Pila cilindrica doppia collegata con diaframma	0.95
Pila cilindrica doppia senza diaframma	1.05
Pila con punta triangolare α = 90°	1.05
Pile rettangolari	1.25
Dieci pile a cavalletto inclinate	2.5

ω rappresenta il rapporto tra l'altezza ed il tirante della sezione 2; α il rapporto tra l'area ostruita dalle pile e l'area totale ed infine V_2 la velocità a valle della sezione.

Il modello elaborato prevede una corrente con un'altezza idrica minore dell'altezza di intradosso del ponte. Nel caso di correnti con altezza idrica superiore o eguale alla quota di intradosso dell'attraversamento fluviale, la valutazione delle perdite di energia è effettuata attraverso il calcolo della portata che attraversa la sezione. In particolare, in riferimento ad un caso generico, Figura 6, la portata è calcolata nel modo seguente:

$$Q = C_d A_1 \left[2g\left(Y_1 - \frac{Z}{2} + \frac{\alpha_1 V_1^2}{2g}\right)\right]^{1/2} \tag{19}$$

dove

Cd, coefficiente di deflusso il cui andamento è riportato nel grafico di Figura 7, assumendo valori tra 0,27 e 0,5;

A1, area della luce nella sezione di monte;

Y1, altezza idrica della sezione di monte;

α , coefficiente correttivo cinetico;

V1,	velocità della corrente a monte.

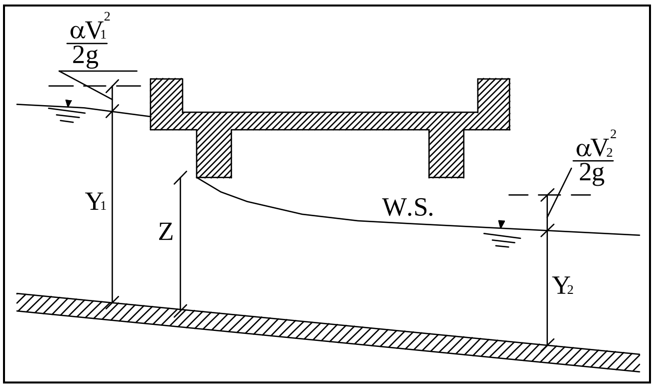


Figura 7 Sezione schematica di un ponte – Schema di calcolo

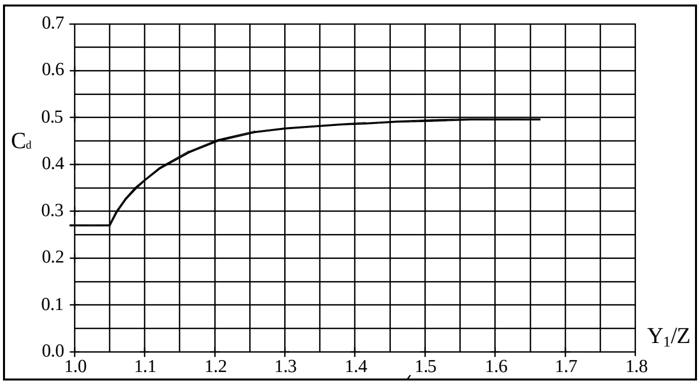


Figura 8 Diagramma per la stima del coefficiente di deflusso Cd

Se il ponte è in pressione sia a monte che a valle l'equazione (19) è corretta nel modo seguente:

$$Q = CA\sqrt{2gH} \tag{20}$$

dove C assume il valore di 0.8 ed H coincide con la perdita di energia totale tra la sezione di monte e di valle del ponte come indicato in Figura 9.

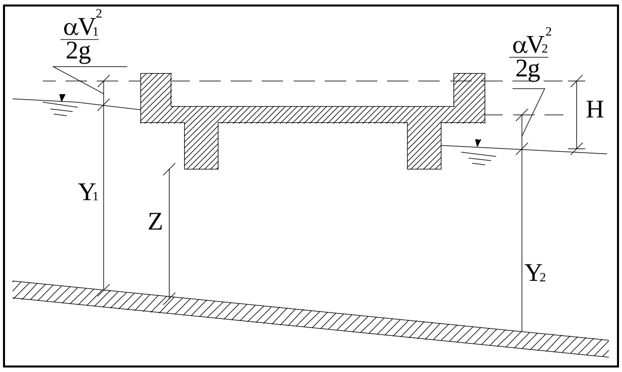


Figura 9 Sezione schematica di un ponte – Schema di calcolo

Infine se il ponte è superato dalla corrente di piena, Figura 10, la portata si calcola nel modo seguente:

$$Q = CLH^{2/3} \tag{21}$$

con C si indica un coefficiente correttivo della portata, L la lunghezza del ponte ed H la differenza di energia tra monte e valle.

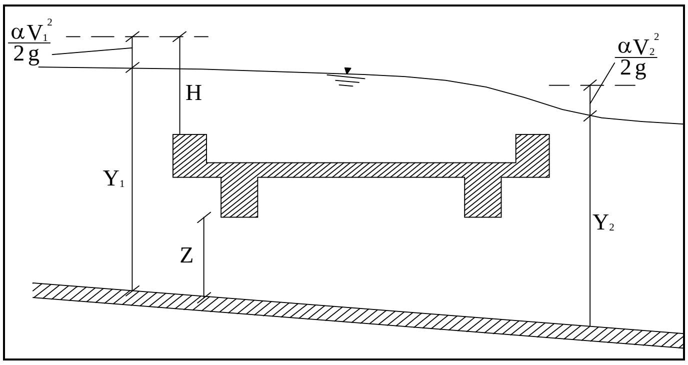
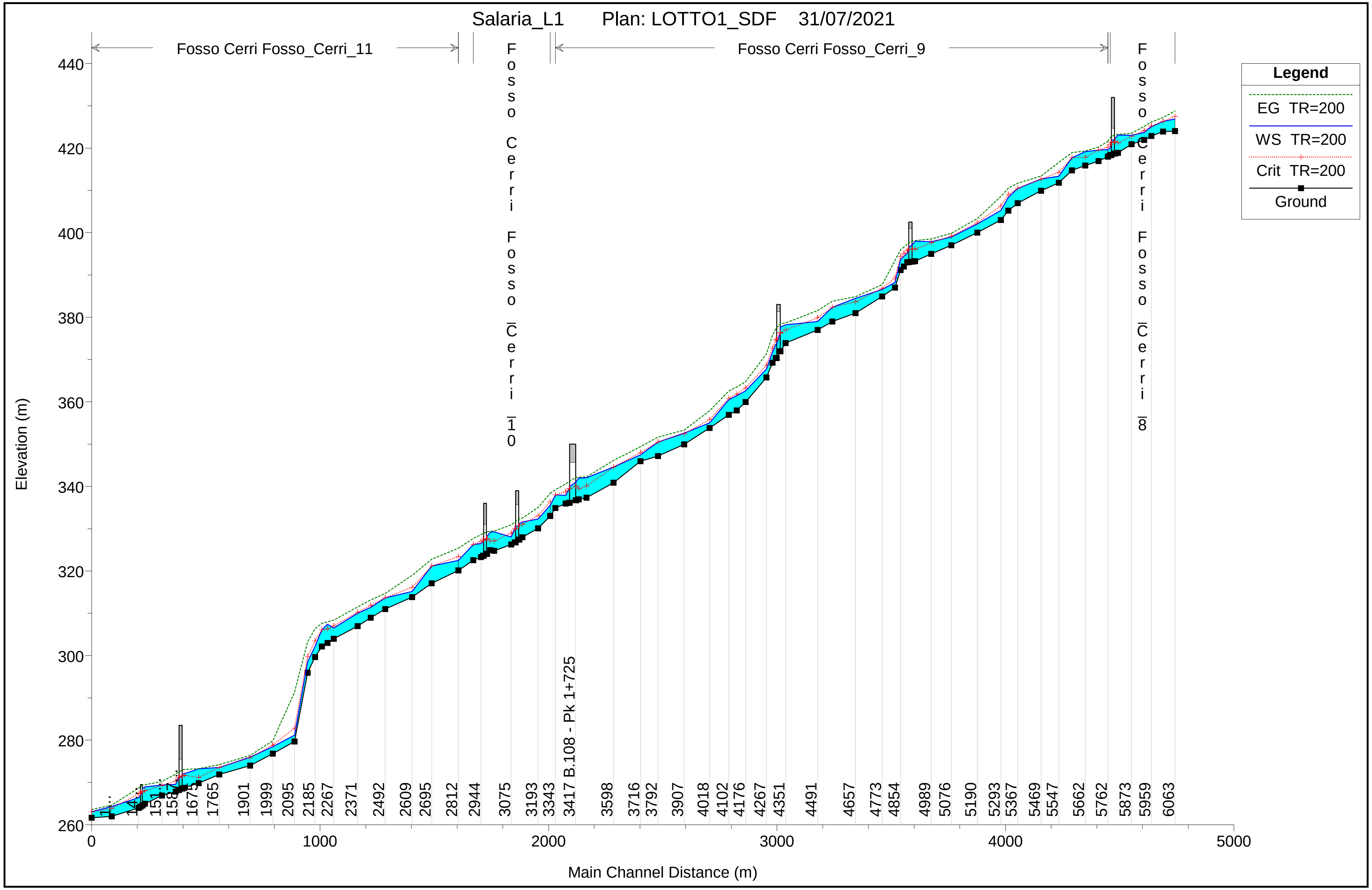


Figura 10 Sezione schematica di un ponte – Schema di calcolo

2 ALLEGATO II - RISULTATI SIMULAZIONI IDRODINAMICHE MONODIMENSIONALI

2.1 SCENARIO DI STATO DI FATTO TR200 MOTO PERMANENTE

2.1.1. STATO DI FATTO
Fosso dei Cerri


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
Fosso Cerri Fosso_Cerri_11
Fosso Cerri Fosso_Cerri_10
Fosso Cerri Fosso_Cerri_9
Fosso Cerri Fosso_Cerri_8
B.108 - Pk 1+725
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Elevation (m)
Main Channel Distance (m)
0
1000
2000
3000
4000
5000
260
280
300
320
340
360
380
400
420
440
1765
1901
1999
2095
2185
2267
2371
2492
2609
2695
2812
2944
3075
3193
3343
3417
3598
3716
3792
3907
4018
4102
4176
4267
4351
4491
4657
4773
4854
4989
5076
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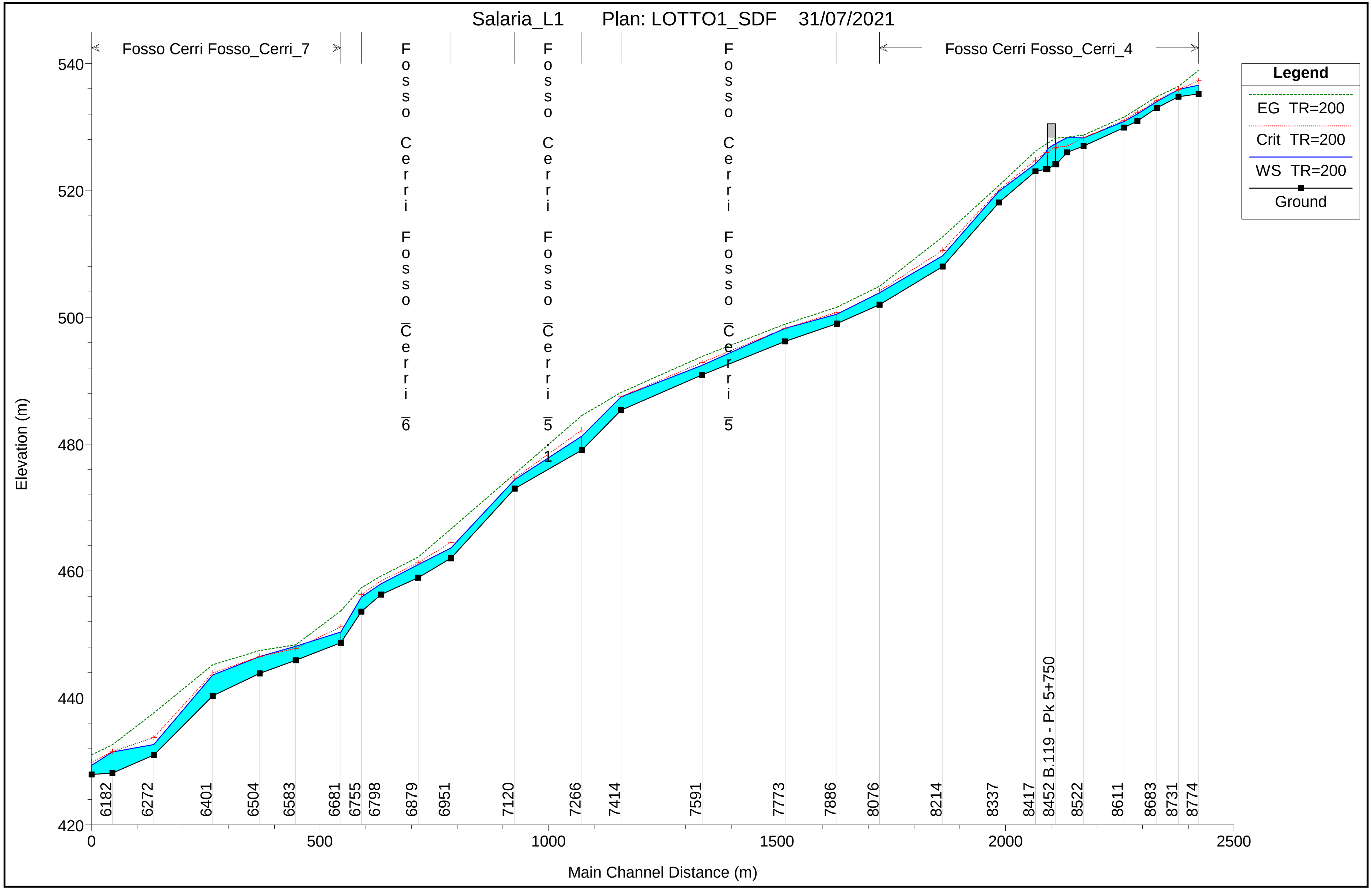
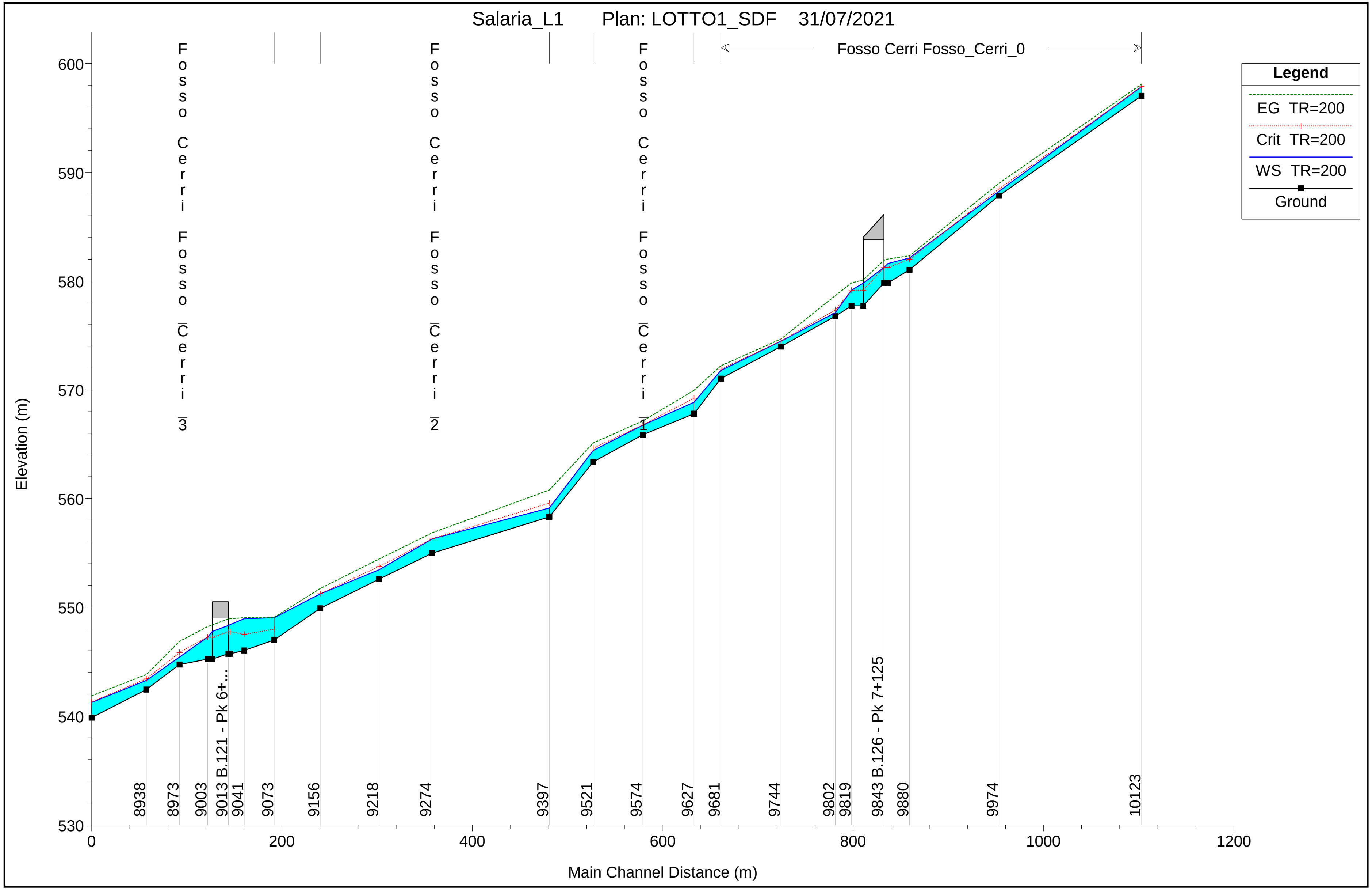
5762
5873
5959
6063


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
Fosso Cerri Fosso_Cerri_7
Fosso Cerri Fosso_Cerri_6
Fosso Cerri Fosso_Cerri_5 1
Fosso Cerri Fosso_Cerri_5
Fosso Cerri Fosso_Cerri_4
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
Main Channel Distance (m)
420
440
460
480
500
520
540
0
500
1000
1500
2000
2500
6182
6272
6401
6504
6583
6681
6755
6798
6879
6951
7120
7266
7414
7591
7773
7886
8076
8214
8337
8417
8452 B.119 - Pk 5+750
8522
8611
8683
8731
8774



Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
Fosso Cerri Fosso_Cerri_0
Fosso Cerri Fosso_Cerri_3
Fosso Cerri Fosso_Cerri_2
Fosso Cerri Fosso_Cerri_1
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
B.121 - Pk 6+...
B.126 - Pk 7+125
8938
8973
9003
9013
9041
9073
9156
9218
9274
9397
9521
9574
9627
9681
9744
9802
9819
9843
9880
9974
10123
Elevation (m)
530
540
550
560
570
580
590
600
Main Channel Distance (m)
0
200
400
600
800
1000
1200

HEC-RAS Plan: L1_SDF Profile: TR=200

Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
Fosso_Cerri_0	10123	TR=200	14.60	597.03	0.83	597.86	597.86	0.00	0.97	598.10	2.20	2.15	0.52	147.76	0.44
Fosso_Cerri_0	9974	TR=200	14.60	587.85	0.40	588.25	588.46	-0.21	2.28	588.98	3.80	3.78	0.28	540.45	0.26
Fosso_Cerri_0	9880	TR=200	14.60	581.02	1.10	582.11	581.98	0.13	0.72	582.31	2.02	1.86	0.79	108.58	0.55
Fosso_Cerri_0	9857	TR=200	14.60	579.82	1.78	581.60	581.24	0.36	0.71	582.02	2.88	2.88	1.68	170.90	1.69
Fosso_Cerri_0	9843		Bridge												
Fosso_Cerri_0	9819	TR=200	14.60	577.72	1.43	579.15	579.15	0.00	1.00	579.82	3.63	3.63	1.33	294.15	1.34
Fosso_Cerri_0	9802	TR=200	14.60	576.78	0.32	577.10	577.34	-0.24	4.25	578.67	6.39	5.08	0.23	1634.85	0.14
Fosso_Cerri_0	9744	TR=200	14.60	573.98	0.49	574.47	574.47	0.00	0.94	574.66	2.00	1.87	0.46	127.28	0.37
Fosso_Cerri_0	9681	TR=200	14.60	571.02	0.76	571.78	571.90	-0.12	1.33	572.20	2.89	2.79	0.48	261.59	0.39
Fosso_Cerri_1	9627	TR=200	21.20	567.79	1.05	568.84	569.24	-0.40	1.81	569.95	4.67	4.67	0.64	621.83	0.67
Fosso_Cerri_1	9574	TR=200	21.20	565.85	0.89	566.74	566.77	-0.03	1.03	567.13	2.79	2.70	0.75	210.46	0.66
Fosso_Cerri_1	9521	TR=200	21.20	563.37	1.06	564.43	564.63	-0.20	1.39	565.10	3.70	3.49	0.70	376.79	0.55
Fosso_Cerri_2	9397	TR=200	21.20	558.31	0.81	559.12	559.59	-0.47	2.44	560.79	5.73	5.68	0.55	984.72	0.52
Fosso_Cerri_2	9274	TR=200	21.20	554.97	1.32	556.29	556.29	0.00	0.97	556.84	3.29	3.21	1.04	261.67	1.02
Fosso_Cerri_2	9218	TR=200	21.20	552.60	0.86	553.46	553.75	-0.29	1.69	554.44	4.43	4.33	0.68	546.14	0.63
Fosso_Cerri_2	9156	TR=200	21.20	549.90	1.33	551.23	551.25	-0.02	0.98	551.73	3.16	3.04	1.00	244.76	0.89
Fosso_Cerri_3	9073	TR=200	25.60	546.99	2.05	549.04	547.99	1.05	0.24	549.08	1.03	0.90	1.91	20.91	1.47
Fosso_Cerri_3	9041	TR=200	25.60	546.02	2.94	548.96	547.50	1.46	0.26	549.04	1.32	1.16	2.50	31.60	2.10
Fosso_Cerri_3	9026	TR=200	25.60	545.73	2.69	548.42	547.74	0.68	0.64	548.96	3.26	3.26	2.57	190.29	2.62
Fosso_Cerri_3	9013		Bridge												
Fosso_Cerri_3	9003	TR=200	25.60	545.23	2.01	547.24	547.24	0.00	1.01	548.23	4.39	4.39	1.91	380.88	1.94
Fosso_Cerri_3	8973	TR=200	25.60	544.73	0.68	545.41	545.83	-0.42	2.34	546.86	5.34	5.30	0.52	866.24	0.50
Fosso_Cerri_3	8938	TR=200	25.60	542.42	0.85	543.28	543.42	-0.14	1.29	543.81	3.33	3.08	0.68	309.27	0.54
Fosso_Cerri_3	8881	TR=200	25.60	539.85	1.41	541.26	541.30	-0.04	1.02	541.85	3.44	3.31	1.10	281.09	0.99
Fosso_Cerri_4	8774	TR=200	31.30	535.19	1.38	536.57	537.25	-0.68	2.21	538.94	6.95	6.50	0.92	1218.27	0.76
Fosso_Cerri_4	8731	TR=200	31.30	534.77	1.13	535.90	535.90	0.00	0.99	536.37	3.07	3.01	0.97	233.69	0.91
Fosso_Cerri_4	8683	TR=200	31.30	533.01	0.98	533.99	534.18	-0.19	1.33	534.75	3.90	3.80	0.85	394.56	0.79
Fosso_Cerri_4	8640	TR=200	31.30	530.94	1.10	532.04	532.24	-0.20	1.28	532.83	4.00	3.83	0.96	397.72	0.85
Fosso_Cerri_4	8611	TR=200	31.30	529.89	0.98	530.86	531.04	-0.18	1.29	531.56	3.75	3.61	0.86	363.19	0.75
Fosso_Cerri_4	8522	TR=200	31.30	526.97	1.29	528.26	528.28	-0.02	0.97	528.70	3.05	2.83	0.98	229.26	0.80
Fosso_Cerri_4	8486	TR=200	31.30	526.00	2.32	528.32	526.98	1.34	0.21	528.37	1.00	0.90	2.24	18.76	1.84
Fosso_Cerri_4	8463	TR=200	31.30	524.12	3.32	527.44	526.80	0.64	0.72	528.25	3.98	3.98	2.94	271.59	3.14
Fosso_Cerri_4	8452		Bridge												
Fosso_Cerri_4	8440	TR=200	31.30	523.32	2.68	526.00	526.00	0.00	1.01	527.27	4.99	4.99	2.35	459.24	2.51
Fosso_Cerri_4	8417	TR=200	31.30	522.99	1.21	524.20	524.75	-0.55	2.42	526.18	6.24	6.23	0.65	1105.12	0.65
Fosso_Cerri_4	8337	TR=200	31.30	518.08	1.78	519.86	520.08	-0.22	1.18	520.78	4.46	3.94	1.38	438.95	1.08
Fosso_Cerri_4	8214	TR=200	60.00	507.99	1.69	509.68	510.55	-0.87	2.10	512.68	7.95	7.22	1.38	1391.87	1.13
Fosso_Cerri_4	8076	TR=200	60.00	501.98	1.89	503.87	504.15	-0.28	1.19	504.91	4.72	4.17	1.54	473.02	1.10
Fosso_Cerri_5	7886	TR=200	60.00	498.98	1.48	500.46	500.76	-0.30	1.32	501.56	4.78	4.43	1.29	513.91	1.05
Fosso_Cerri_5	7773	TR=200	60.00	496.19	2.07	498.26	498.26	0.00	0.92	498.92	3.76	3.35	1.68	292.38	1.24
Fosso_Cerri_5	7591	TR=200	60.00	490.90	1.54	492.44	492.86	-0.42	1.46	493.82	5.36	4.94	1.32	642.55	1.07
Fosso_Cerri_5	7414	TR=200	60.00	485.34	2.12	487.46	487.49	-0.03	0.97	488.14	3.79	3.49	1.48	308.76	1.23
Fosso_Cerri_5.1	7266	TR=200	60.00	479.04	2.21	481.25	482.23	-0.98	1.99	484.48	8.11	7.55	1.48	1416.50	1.38
Fosso_Cerri_5.1	7120	TR=200	60.00	472.98	1.40	474.38	474.62	-0.24	1.28	475.30	4.43	4.07	1.20	453.21	0.97

HEC-RAS Plan: L1_SDF Profile: TR=200 (Continued)

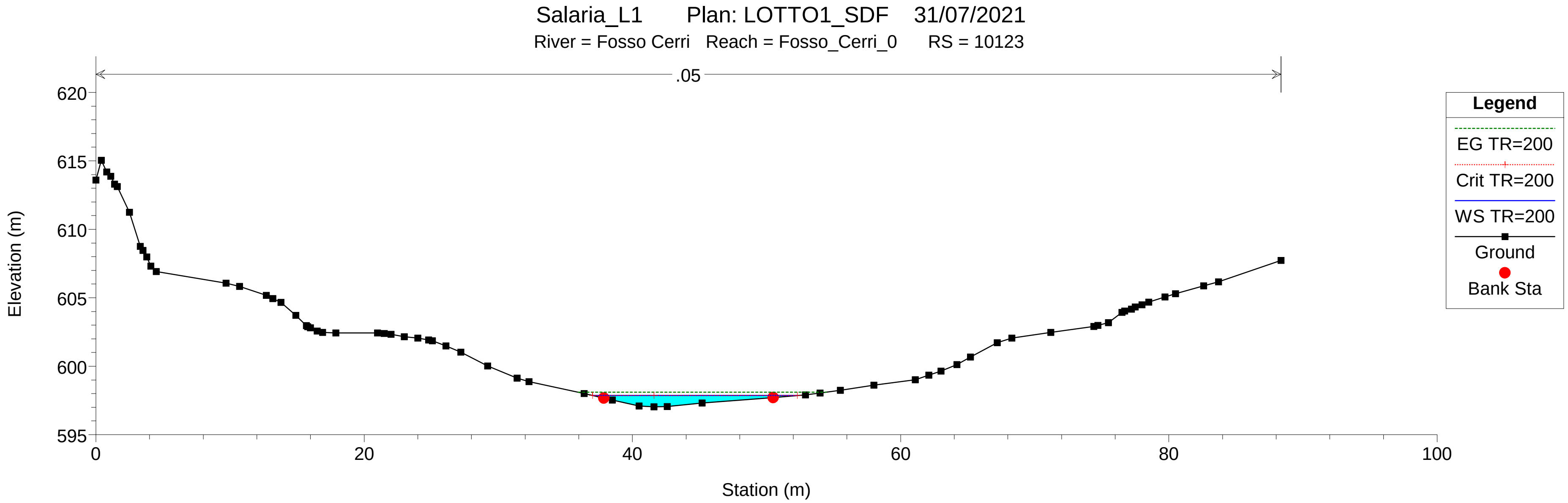
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
Fosso_Cerri_6	6951	TR=200	60.00	461.99	1.65	463.64	464.49	-0.85	2.15	466.60	8.00	7.15	1.32	1428.48	1.05
Fosso_Cerri_6	6879	TR=200	60.00	458.93	2.09	461.02	461.30	-0.28	1.21	462.21	5.03	4.51	1.69	521.44	1.34
Fosso_Cerri_6	6798	TR=200	60.00	456.30	1.70	458.00	458.43	-0.43	1.41	459.21	5.38	4.33	1.45	625.79	0.86
Fosso_Cerri_6	6755	TR=200	60.00	453.58	2.29	455.87	456.29	-0.42	1.31	457.37	5.76	5.06	1.72	679.04	1.41
Fosso_Cerri_7	6681	TR=200	85.00	448.70	1.68	450.38	451.20	-0.82	2.40	453.69	8.26	7.53	1.11	1611.70	0.76
Fosso_Cerri_7	6583	TR=200	85.00	445.94	2.21	448.15	447.80	0.35	0.57	448.37	2.45	1.95	1.84	119.60	1.26
Fosso_Cerri_7	6504	TR=200	85.00	443.85	2.68	446.53	446.53	0.00	0.93	447.48	4.59	3.97	2.34	389.70	1.77
Fosso_Cerri_7	6401	TR=200	85.00	440.32	3.28	443.60	443.95	-0.35	1.12	445.24	5.99	5.15	2.46	650.29	2.03
Fosso_Cerri_7	6272	TR=200	85.00	431.00	1.65	432.65	433.75	-1.10	2.83	437.64	10.70	8.98	1.39	2519.30	0.95
Fosso_Cerri_7	6182	TR=200	85.00	428.15	3.32	431.47	431.53	-0.06	0.96	432.60	5.01	4.30	2.49	454.24	1.96
Fosso_Cerri_7	6136	TR=200	85.00	427.92	1.43	429.35	429.87	-0.52	1.75	431.04	5.98	5.46	1.18	830.37	0.91
Fosso_Cerri_8	6063	TR=200	85.00	424.00	2.91	426.91	427.48	-0.57	1.32	428.77	6.61	5.45	2.23	819.67	1.66
Fosso_Cerri_8	6011	TR=200	85.00	423.92	2.36	426.28	426.29	-0.01	0.95	427.21	4.46	3.99	2.17	375.97	1.73
Fosso_Cerri_8	5959	TR=200	85.00	422.83	2.24	425.07	425.22	-0.15	1.08	426.15	4.79	4.34	1.97	448.91	1.61
Fosso_Cerri_8	5927	TR=200	85.00	421.92	1.77	423.69	424.11	-0.42	1.43	425.12	5.57	5.02	1.50	664.87	1.20
Fosso_Cerri_8	5873	TR=200	85.00	420.93	2.09	423.02	422.77	0.25	0.76	423.54	3.36	3.03	1.96	220.79	1.61
Fosso_Cerri_8	5813	TR=200	85.00	418.85	4.22	423.07	421.18	1.89	0.31	423.23	1.90	1.63	3.76	57.16	2.84
Fosso_Cerri_8	5801	TR=200	85.00	418.69	3.53	422.22	421.57	0.65	0.73	423.12	4.20	4.20	3.29	290.34	3.38
Fosso_Cerri_8	5791		Bridge												
Fosso_Cerri_8	5782	TR=200	85.00	418.39	2.88	421.27	421.27	0.00	1.01	422.65	5.20	5.20	2.65	478.94	2.72
Fosso_Cerri_8	5779	TR=200	85.00	418.30	1.75	420.05	420.80	-0.75	1.85	422.46	7.02	6.57	1.42	1075.44	1.19
Fosso_Cerri_9	5762	TR=200	85.00	417.96	1.70	419.66	420.26	-0.60	1.66	421.59	6.39	5.82	1.47	878.90	1.18
Fosso_Cerri_9	5721	TR=200	85.00	416.91	2.63	419.54	419.54	0.00	0.87	420.24	4.10	3.30	2.14	319.11	1.30
Fosso_Cerri_9	5662	TR=200	85.00	415.86	3.29	419.15	417.83	1.32	0.37	419.33	2.06	1.74	3.10	71.04	2.24
Fosso_Cerri_9	5604	TR=200	85.00	414.74	2.98	417.72	417.72	0.00	0.96	418.93	5.01	4.54	2.50	454.04	2.23
Fosso_Cerri_9	5547	TR=200	85.00	411.78	1.56	413.34	414.25	-0.91	2.24	416.58	8.38	7.49	1.39	1541.11	1.10
Fosso_Cerri_9	5469	TR=200	85.00	409.92	2.74	412.66	412.60	0.06	0.84	413.37	4.18	3.40	2.32	323.19	1.59
Fosso_Cerri_9	5367	TR=200	85.00	407.00	3.46	410.46	410.46	0.00	0.95	411.70	5.24	4.46	2.73	482.48	2.30
Fosso_Cerri_9	5326	TR=200	85.00	405.23	3.15	408.38	409.00	-0.62	1.34	410.53	6.92	5.91	2.26	894.92	1.90
Fosso_Cerri_9	5293	TR=200	85.00	403.00	2.28	405.28	406.30	-1.02	1.94	408.61	8.66	7.38	1.88	1487.68	1.46
Fosso_Cerri_9	5190	TR=200	85.00	399.98	2.06	402.04	402.33	-0.29	1.19	403.31	5.15	4.70	1.84	530.38	1.51
Fosso_Cerri_9	5076	TR=200	85.00	397.00	1.93	398.93	399.15	-0.22	1.17	399.84	4.55	3.90	1.49	444.55	1.03
Fosso_Cerri_9	4989	TR=200	85.00	395.00	2.82	397.82	397.64	0.18	0.80	398.53	4.02	3.43	2.44	294.48	1.80
Fosso_Cerri_9	4917	TR=200	85.00	393.25	4.68	397.93	396.05	1.88	0.33	398.12	2.14	1.66	4.15	69.82	2.64
Fosso_Cerri_9	4907	TR=200	85.00	393.16	4.03	397.19	396.18	1.01	0.65	398.02	4.04	4.04	3.86	254.98	3.97
Fosso_Cerri_9	4901		Bridge												
Fosso_Cerri_9	4888	TR=200	85.00	393.01	3.02	396.03	396.03	0.00	1.01	397.52	5.42	5.42	2.88	505.79	2.96
Fosso_Cerri_9	4882	TR=200	85.00	392.96	2.05	395.01	395.71	-0.70	1.57	397.28	6.80	6.38	1.78	936.17	1.64
Fosso_Cerri_9	4868	TR=200	85.00	391.96	2.47	394.43	395.05	-0.62	1.42	396.58	6.80	5.99	2.18	873.52	1.85
Fosso_Cerri_9	4854	TR=200	85.00	391.16	2.47	393.63	394.36	-0.73	1.52	395.96	7.05	6.25	2.05	959.20	1.70
Fosso_Cerri_9	4830	TR=200	85.00	387.00	1.20	388.20	389.26	-1.06	3.21	393.44	10.81	9.31	1.14	2741.58	0.78
Fosso_Cerri_9	4773	TR=200	85.00	384.90	1.64	386.54	386.85	-0.31	1.33	387.70	4.95	4.55	1.41	535.70	1.14
Fosso_Cerri_9	4657	TR=200	94.80	380.98	3.46	384.44	383.61	0.83	0.54	384.83	3.05	2.54	3.11	156.63	2.32
Fosso_Cerri_9	4555	TR=200	94.80	378.97	3.38	382.35	382.35	0.00	0.98	383.82	5.52	4.92	2.86	525.56	2.65

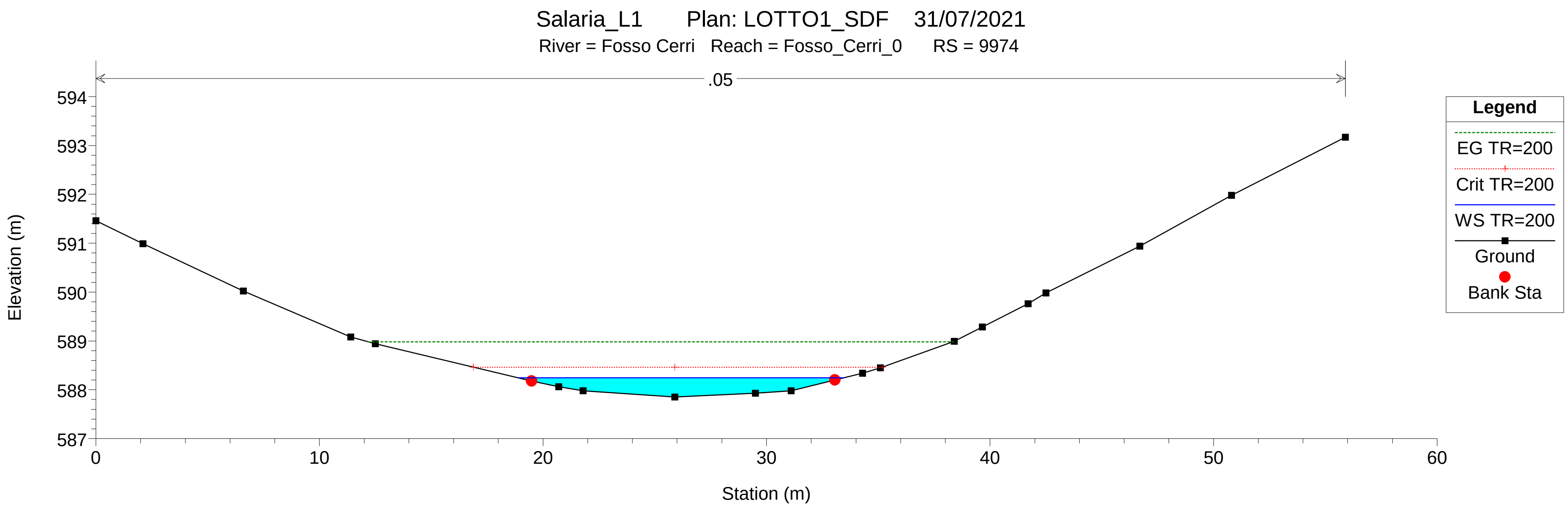
HEC-RAS Plan: L1_SDF Profile: TR=200 (Continued)

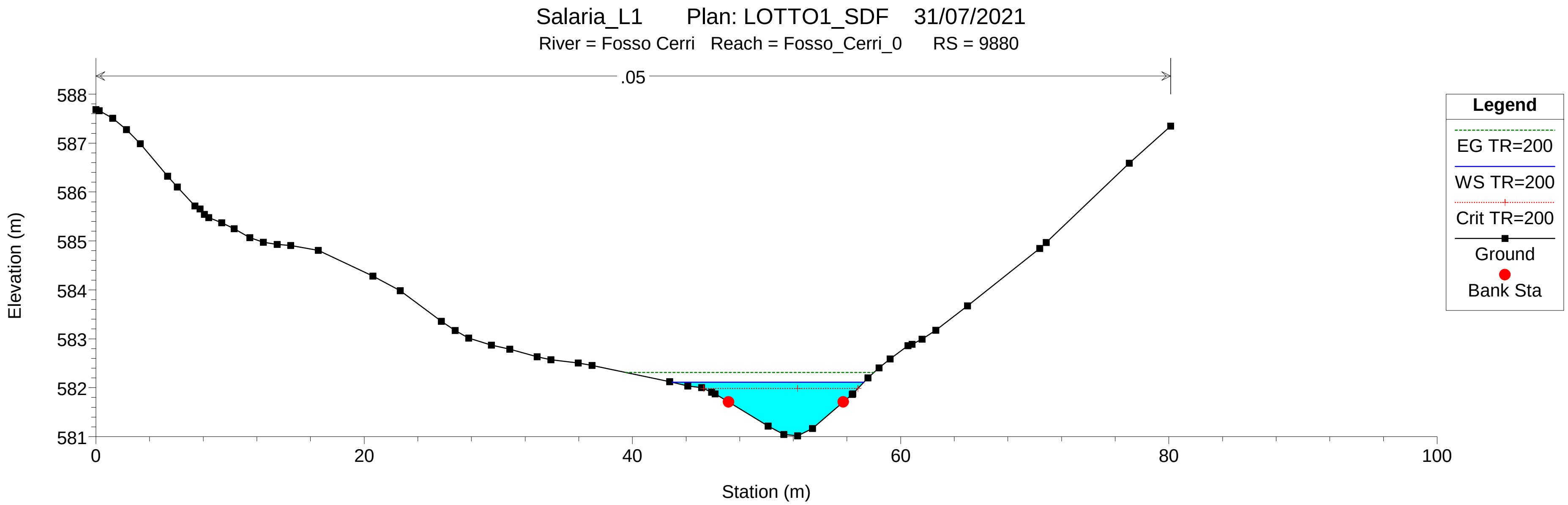
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
Fosso_Cerri_9	4491	TR=200	94.80	376.97	2.02	378.99	379.85	-0.86	1.82	381.60	7.56	6.64	1.68	1178.00	1.27
Fosso_Cerri_9	4351	TR=200	94.80	373.88	4.35	378.23	376.98	1.25	0.50	378.66	3.17	2.63	3.73	158.48	2.87
Fosso_Cerri_9	4329	TR=200	94.80	371.96	5.75	377.71	376.27	1.44	0.57	378.51	4.16	3.92	4.04	266.31	4.84
Fosso_Cerri_9	4322		Bridge												
Fosso_Cerri_9	4308	TR=200	94.80	370.36	3.26	373.62	374.66	-1.04	1.66	377.15	8.77	8.04	2.13	1465.91	2.36
Fosso_Cerri_9	4294	TR=200	94.80	369.26	2.49	371.75	372.66	-0.91	2.26	375.75	10.22	7.71	1.57	2202.56	0.95
Fosso_Cerri_9	4267	TR=200	94.80	365.79	1.98	367.77	368.66	-0.89	2.53	371.37	10.05	7.74	1.31	2265.89	0.86
Fosso_Cerri_9	4176	TR=200	94.80	359.94	2.69	362.63	363.26	-0.63	1.38	364.77	6.82	5.94	2.28	867.77	1.84
Fosso_Cerri_9	4137	TR=200	94.80	357.95	3.53	361.48	361.85	-0.37	1.15	363.49	6.55	5.64	2.83	742.77	2.60
Fosso_Cerri_9	4102	TR=200	94.80	356.89	3.64	360.53	360.84	-0.31	1.10	362.54	6.46	5.76	2.67	736.57	2.80
Fosso_Cerri_9	4018	TR=200	98.70	353.83	1.20	355.03	355.80	-0.77	2.37	357.91	7.70	7.24	1.07	1420.69	0.89
Fosso_Cerri_9	3907	TR=200	98.70	349.95	2.67	352.62	352.41	0.21	0.81	353.34	3.99	3.50	2.43	290.24	1.87
Fosso_Cerri_9	3792	TR=200	98.70	347.19	3.31	350.50	350.50	0.00	0.95	351.68	5.15	4.36	2.86	458.53	2.20
Fosso_Cerri_9	3716	TR=200	98.70	345.94	1.50	347.44	348.03	-0.59	1.73	349.37	6.31	5.92	1.34	886.09	1.13
Fosso_Cerri_9	3598	TR=200	98.70	340.88	3.68	344.56	344.56	0.00	0.98	346.14	5.77	4.98	3.13	558.18	2.84
Fosso_Cerri_9	3479	TR=200	98.70	337.31	4.72	342.03	340.08	1.95	0.36	342.26	2.34	1.94	4.23	82.82	3.34
Fosso_Cerri_9	3446	TR=200	98.70	336.93	5.06	341.99	339.45	2.54	0.30	342.20	2.09	1.82	4.70	63.95	3.87
Fosso_Cerri_9	3434	TR=200	98.70	336.73	4.39	341.12	340.09	1.03	0.67	342.09	4.37	4.37	4.32	287.23	4.35
Fosso_Cerri_9	3417		Bridge												
Fosso_Cerri_9	3403	TR=200	98.70	336.13	3.36	339.49	339.49	0.00	1.00	341.16	5.72	5.72	3.30	539.02	3.32
Fosso_Cerri_9	3388	TR=200	98.70	335.95	1.91	337.86	338.70	-0.84	1.77	340.61	7.44	7.05	1.70	1138.62	1.56
Fosso_Cerri_9	3343	TR=200	98.70	334.90	3.08	337.98	337.98	0.00	0.96	339.23	5.13	4.63	2.62	467.11	2.33
Fosso_Cerri_10	3246	TR=200	101.70	333.00	2.57	335.57	336.40	-0.83	1.60	338.39	7.53	7.09	2.01	1102.35	2.03
Fosso_Cerri_10	3193	TR=200	101.70	330.08	2.20	332.28	333.08	-0.80	1.85	334.99	8.07	6.70	1.87	1296.13	1.33
Fosso_Cerri_10	3125	TR=200	101.70	327.96	3.62	331.58	331.10	0.48	0.77	332.50	4.43	3.94	3.06	331.87	2.83
Fosso_Cerri_10	3111	TR=200	101.70	327.46	3.71	331.17	330.68	0.49	0.81	332.32	4.77	4.77	3.52	365.88	3.56
Fosso_Cerri_10	3100		Bridge												
Fosso_Cerri_10	3091	TR=200	101.70	326.76	3.22	329.98	329.98	0.00	1.01	331.53	5.52	5.52	3.04	515.35	3.07
Fosso_Cerri_10	3075	TR=200	101.70	326.26	1.80	328.06	328.91	-0.85	1.95	330.90	7.69	7.13	1.55	1251.43	1.33
Fosso_Cerri_10	3001	TR=200	101.70	324.80	4.46	329.26	327.11	2.15	0.31	329.44	1.98	1.73	4.11	59.81	3.23
Fosso_Cerri_10	2983	TR=200	101.70	324.94	4.28	329.22	327.07	2.15	0.31	329.41	2.02	1.78	4.16	62.48	3.38
Fosso_Cerri_10	2970	TR=200	101.70	324.03	4.16	328.19	327.67	0.52	0.78	329.28	4.77	4.42	3.42	369.86	3.54
Fosso_Cerri_10	2957		Bridge												
Fosso_Cerri_10	2952	TR=200	101.70	323.63	3.28	326.91	327.27	-0.36	1.18	328.85	6.33	5.88	2.63	711.83	2.66
Fosso_Cerri_10	2944	TR=200	101.70	323.28	3.21	326.49	327.00	-0.51	1.25	328.60	6.68	5.87	2.66	789.91	2.32
Fosso_Cerri_10	2909	TR=200	101.70	322.55	3.69	326.25	326.25	0.00	0.97	327.73	5.54	4.97	2.88	529.40	2.71
Fosso_Cerri_11	2812	TR=200	102.40	320.15	2.34	322.49	323.39	-0.90	1.83	325.41	7.88	7.11	1.73	1266.75	1.41
Fosso_Cerri_11	2695	TR=200	102.40	317.11	4.08	321.19	321.19	0.00	0.96	322.78	5.76	5.09	2.98	564.58	2.86
Fosso_Cerri_11	2609	TR=200	102.40	313.82	1.34	315.16	316.17	-1.01	2.52	318.96	8.82	8.34	1.23	1780.98	1.09
Fosso_Cerri_11	2492	TR=200	102.40	310.98	2.66	313.65	313.65	0.00	0.96	314.70	4.76	4.26	2.38	416.65	1.99
Fosso_Cerri_11	2428	TR=200	102.40	308.96	2.45	311.41	311.85	-0.44	1.28	313.15	6.12	5.43	2.26	700.59	1.84
Fosso_Cerri_11	2371	TR=200	102.40	306.98	3.03	310.01	310.28	-0.27	1.11	311.48	5.72	4.96	2.46	593.49	1.98
Fosso_Cerri_11	2267	TR=200	102.40	303.99	2.53	306.52	307.04	-0.52	1.32	308.43	6.40	5.67	2.27	764.46	1.87
Fosso_Cerri_11	2239	TR=200	102.40	303.00	4.38	307.38	306.32	1.06	0.57	307.94	3.59	2.96	3.78	203.35	2.89

HEC-RAS Plan: L1_SDF Profile: TR=200 (Continued)

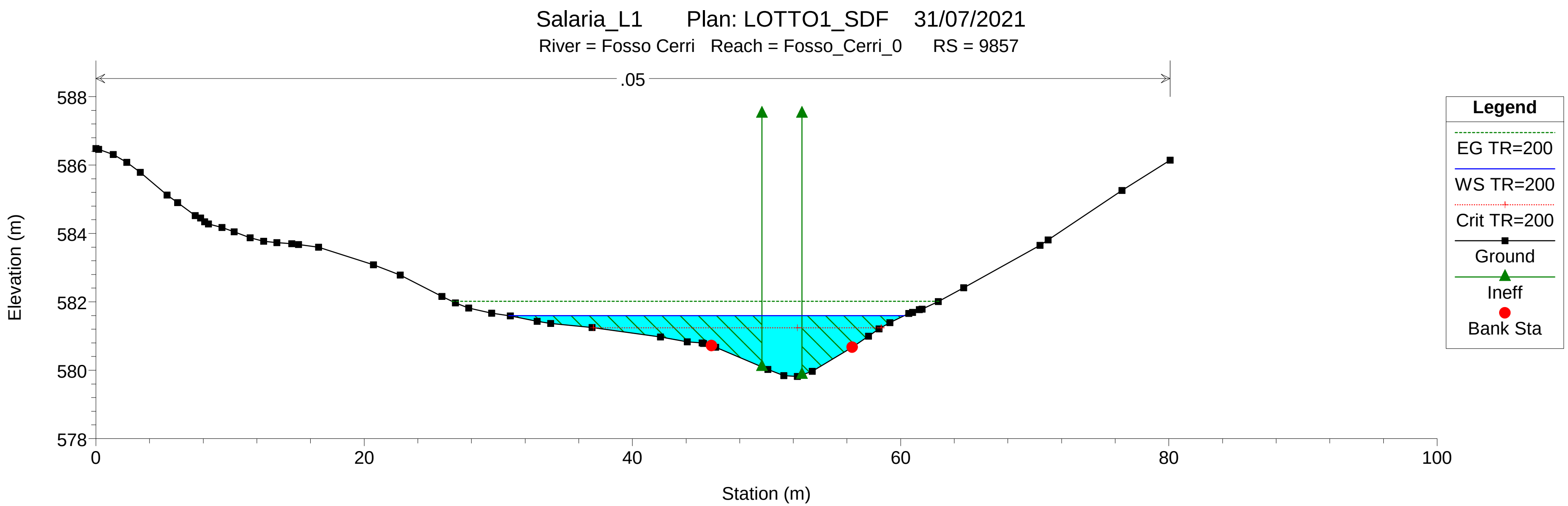
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
Fosso_Cerri_11	2214	TR=200	102.40	302.14	3.92	306.06	306.06	0.00	0.97	307.61	5.75	4.99	3.13	553.79	2.86
Fosso_Cerri_11	2185	TR=200	102.40	299.65	2.54	302.19	303.45	-1.26	1.97	306.38	9.53	8.25	2.21	1708.53	1.89
Fosso_Cerri_11	2152	TR=200	102.40	295.98	2.52	298.50	299.77	-1.27	2.25	303.23	10.41	8.74	1.88	2154.84	1.40
Fosso_Cerri_11	2095	TR=200	102.40	279.67	1.49	281.16	282.86	-1.70	4.15	291.39	15.15	13.10	1.33	5113.17	1.00
Fosso_Cerri_11	1999	TR=200	102.40	276.81	1.69	278.50	278.87	-0.37	1.37	279.83	5.31	4.89	1.51	603.06	1.23
Fosso_Cerri_11	1901	TR=200	102.40	274.00	2.00	276.00	275.82	0.18	0.75	276.35	2.95	2.51	1.54	184.87	1.15
Fosso_Cerri_11	1765	TR=200	102.40	271.90	1.65	273.55	273.55	0.00	0.96	274.23	3.80	3.49	1.59	304.20	1.32
Fosso_Cerri_11	1675	TR=200	102.40	269.84	3.37	273.22	271.17	2.05	0.18	273.26	1.01	0.83	3.23	16.84	2.31
Fosso_Cerri_11	1612	TR=200	102.40	268.74	3.34	272.08	271.71	0.37	0.81	273.06	4.52	4.09	2.94	350.19	2.70
Fosso_Cerri_11	1604	TR=200	102.40	268.59	3.43	272.02	271.53	0.49	0.77	272.95	4.36	4.13	3.00	323.87	3.10
Fosso_Cerri_11	1593		Bridge												
Fosso_Cerri_11	1587	TR=200	102.40	268.24	2.94	271.18	271.18	0.00	0.99	272.49	5.18	4.90	2.55	481.35	2.61
Fosso_Cerri_11	1575	TR=200	102.40	267.87	1.71	269.58	270.32	-0.74	1.74	272.01	7.01	6.64	1.61	1028.47	1.48
Fosso_Cerri_11	1515	TR=200	102.40	266.92	2.46	269.38	269.29	0.09	0.88	270.22	4.24	3.79	2.29	333.92	1.75
Fosso_Cerri_11	1440	TR=200	102.40	265.00	3.97	268.97	268.06	0.91	0.58	269.46	3.42	2.60	3.42	190.44	1.74
Fosso_Cerri_11	1429	TR=200	102.40	264.59	4.04	268.63	267.82	0.81	0.65	269.37	4.00	3.71	3.56	256.41	3.45
Fosso_Cerri_11	1424		Bridge												
Fosso_Cerri_11	1418	TR=200	102.40	264.24	2.69	266.93	267.45	-0.52	1.35	268.97	6.63	6.11	2.28	819.41	2.10
Fosso_Cerri_11	1412	TR=200	102.40	263.99	2.41	266.40	267.37	-0.97	1.58	268.68	7.31	5.90	2.03	1035.10	1.26
Fosso_Cerri_11	1295	TR=200	102.40	262.01	2.32	264.33	263.88	0.45	0.62	264.67	2.68	2.47	1.91	142.38	1.50
Fosso_Cerri_11	1206	TR=200	102.40	261.66	1.42	263.08	263.03	0.05	0.94	263.62	3.33	3.19	1.28	250.64	1.13


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 10123
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

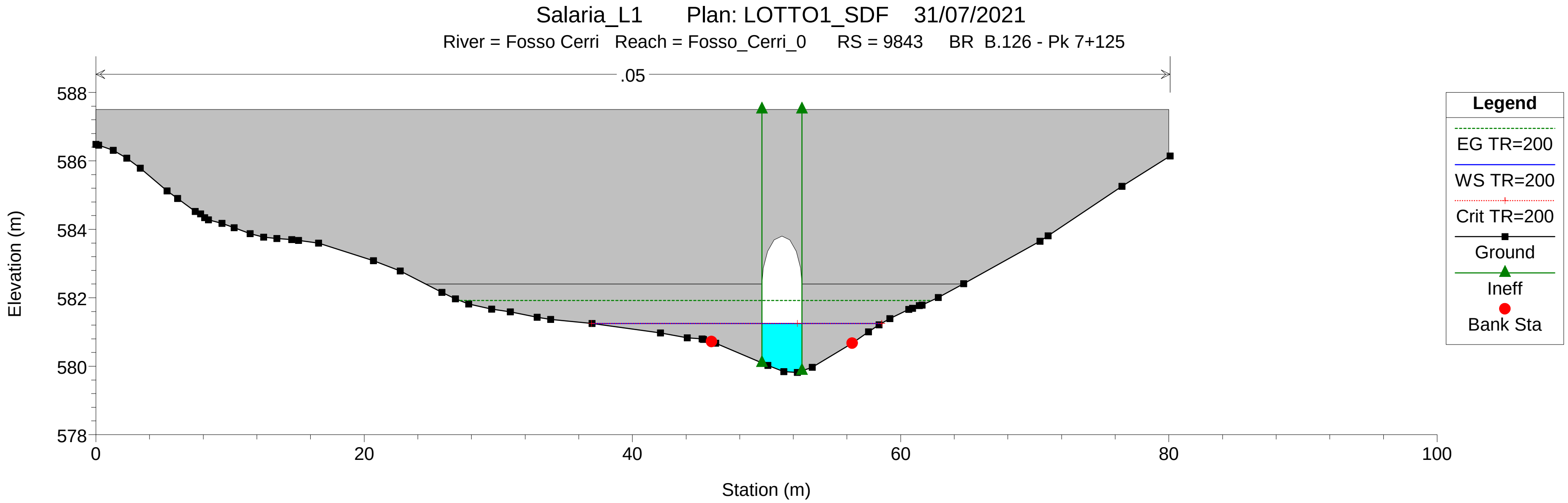

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9974
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

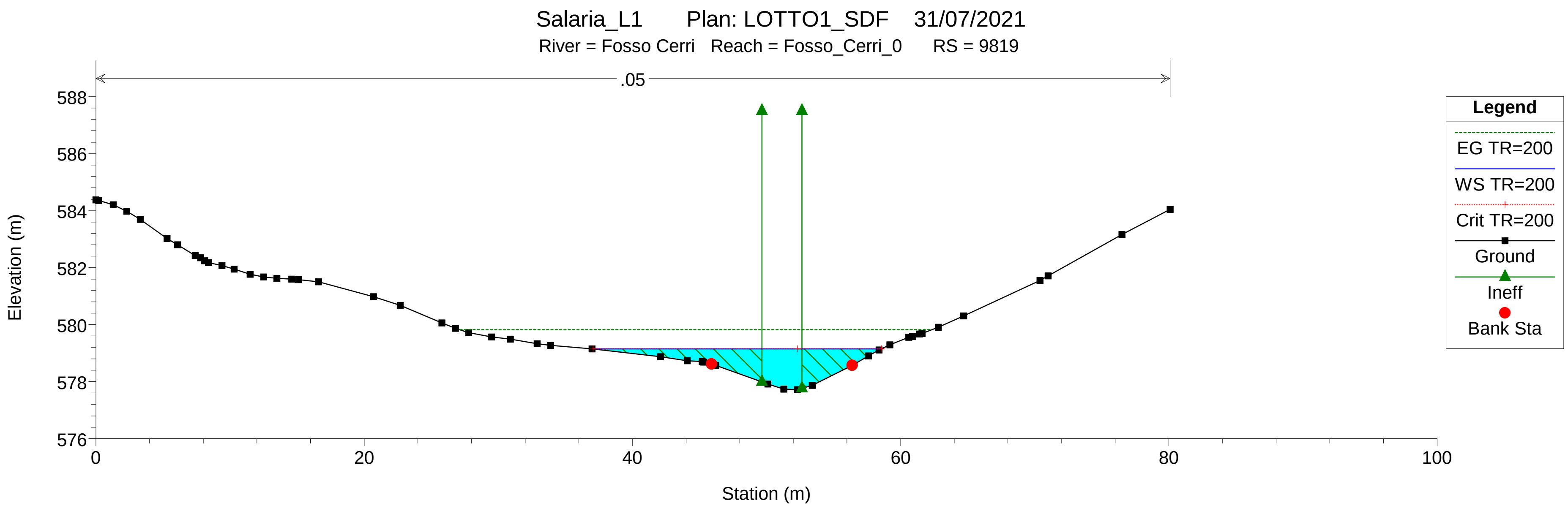


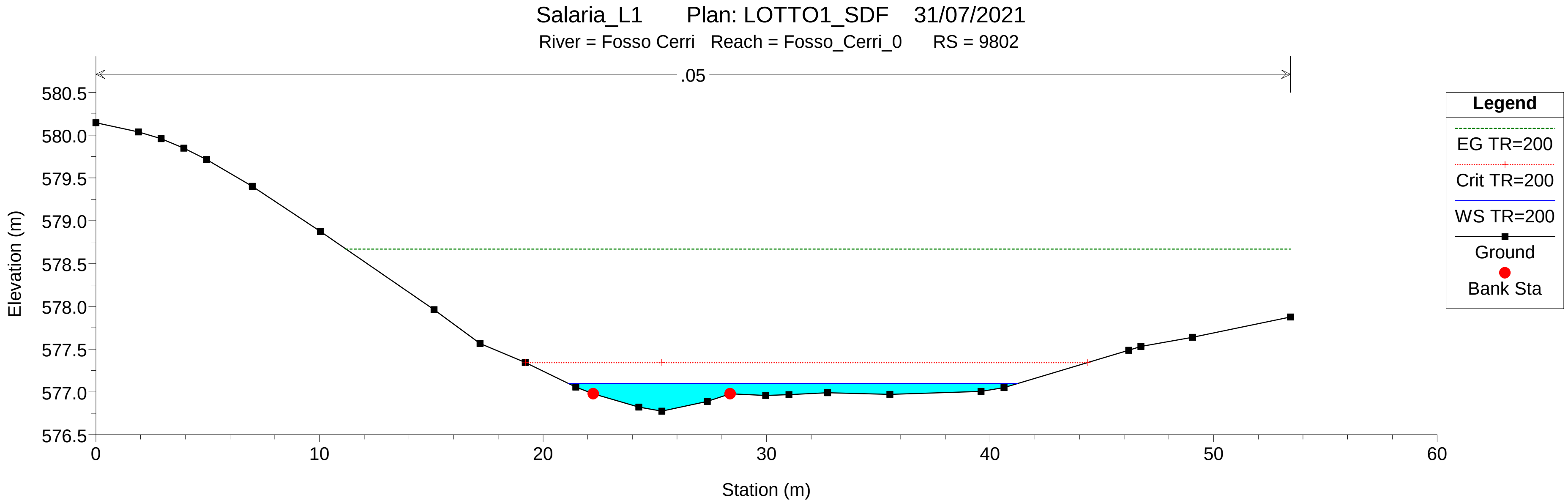
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9880
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

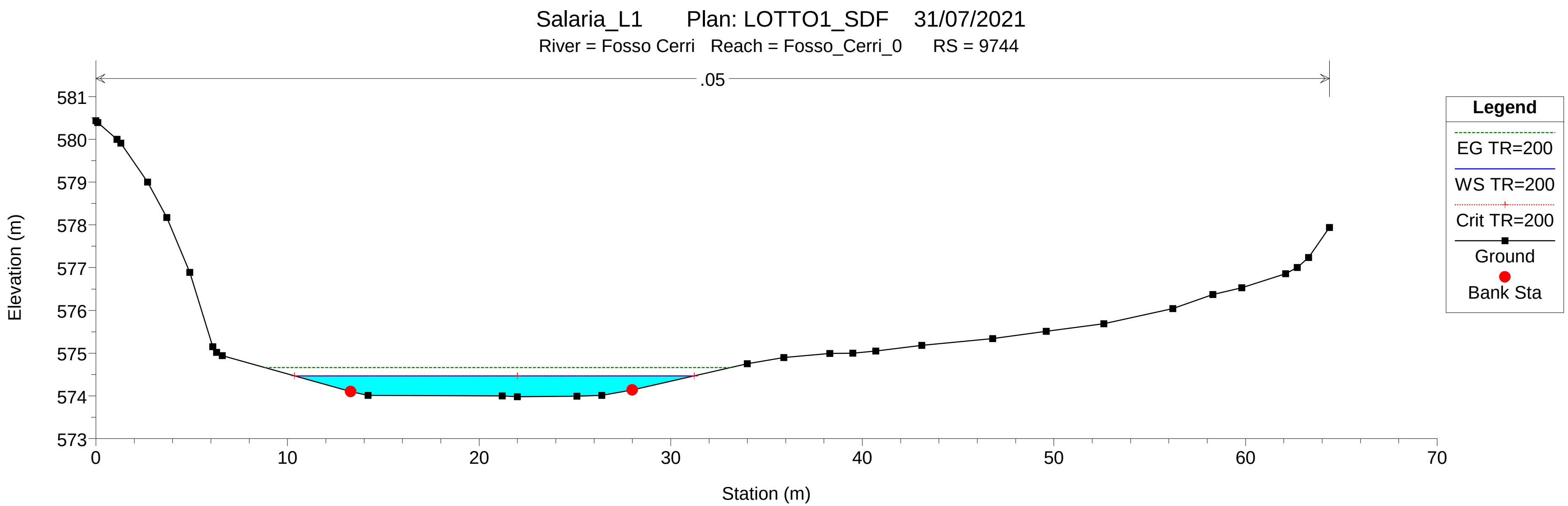


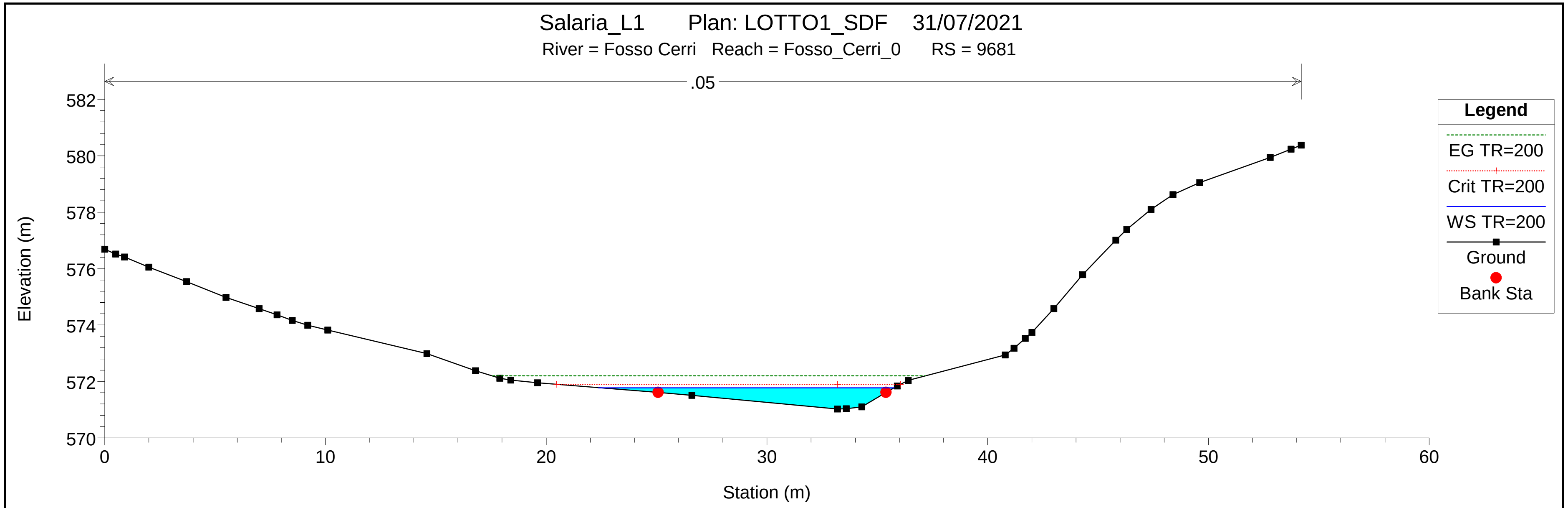
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9857
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

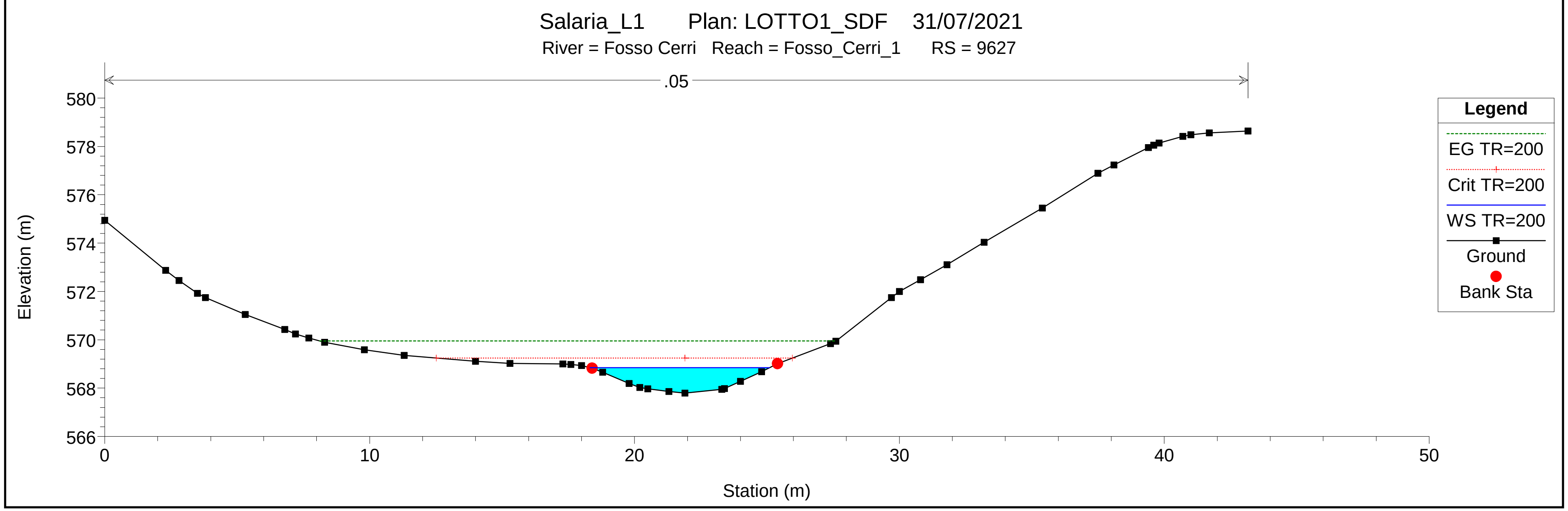

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9843 BR B.126 - Pk 7+125
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

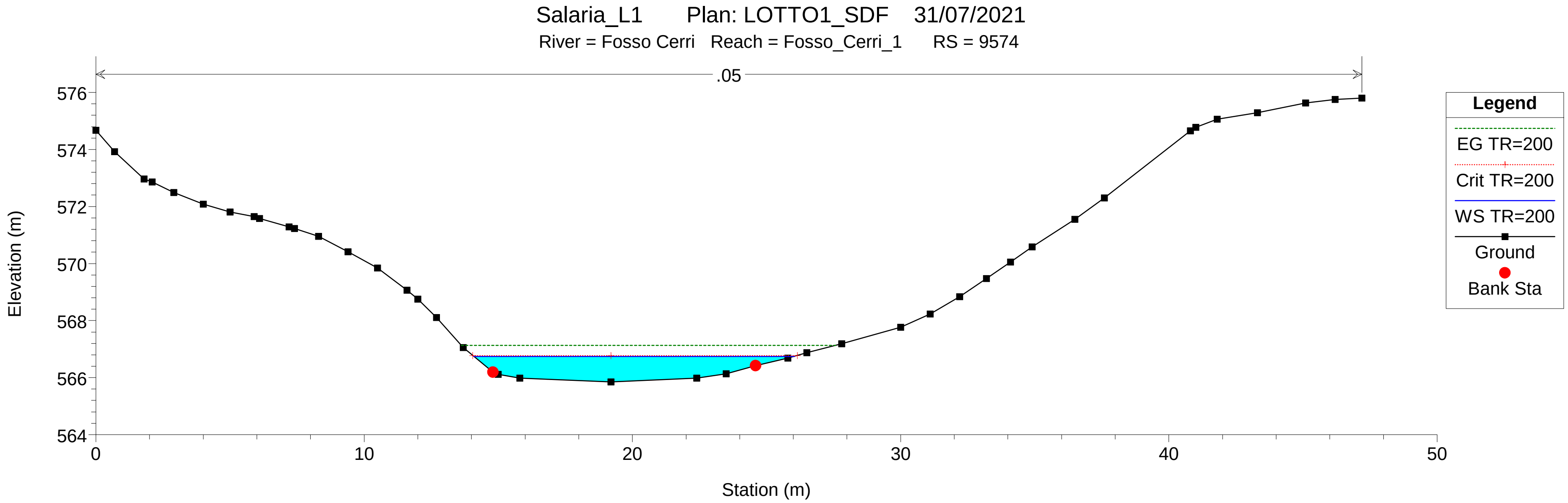

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9819
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

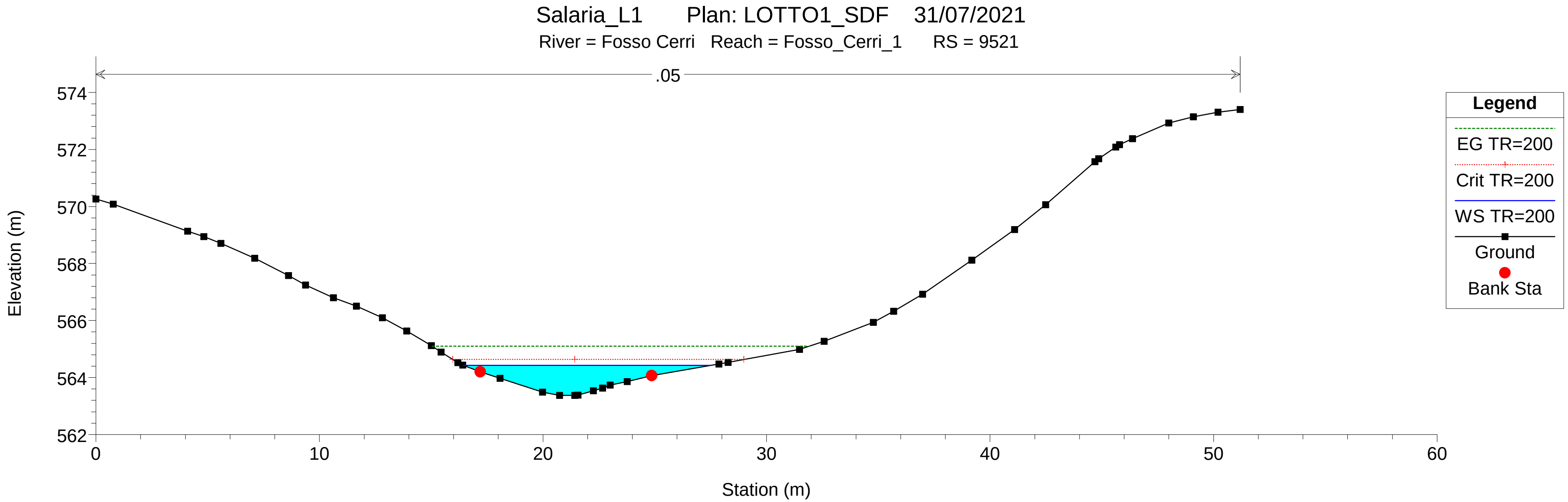

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9802
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

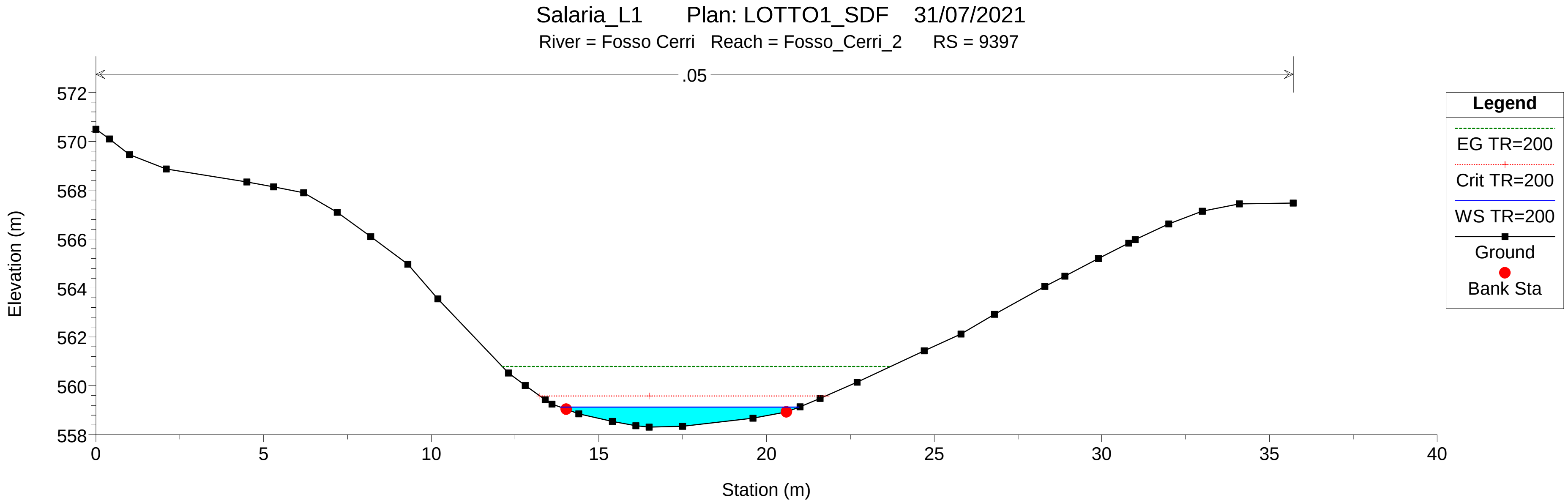

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9744
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

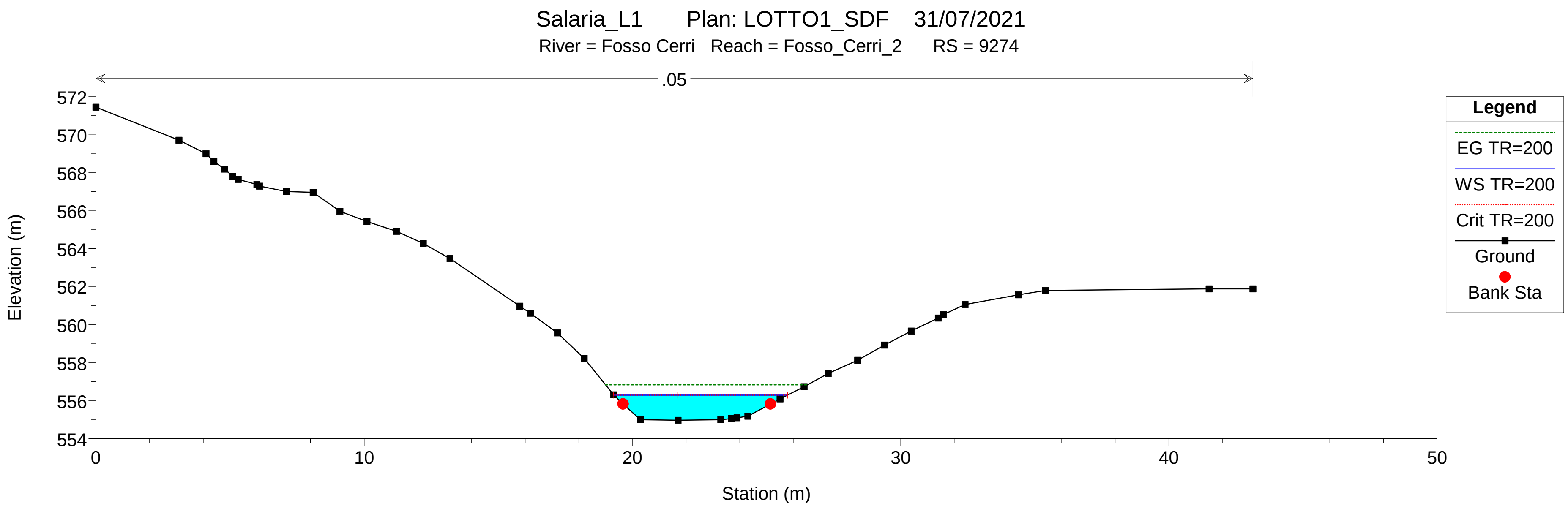

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9681
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

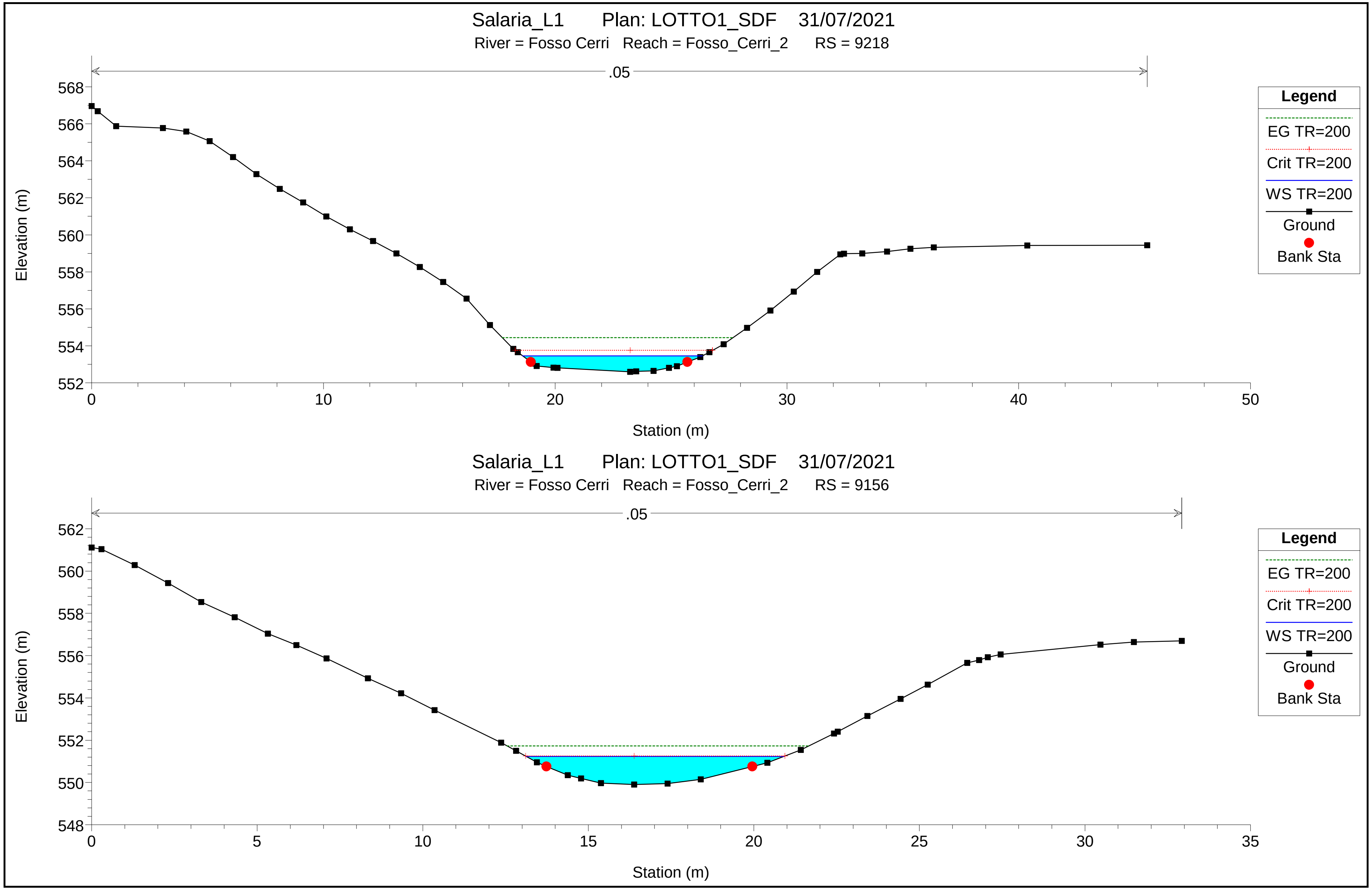

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_1 RS = 9627
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

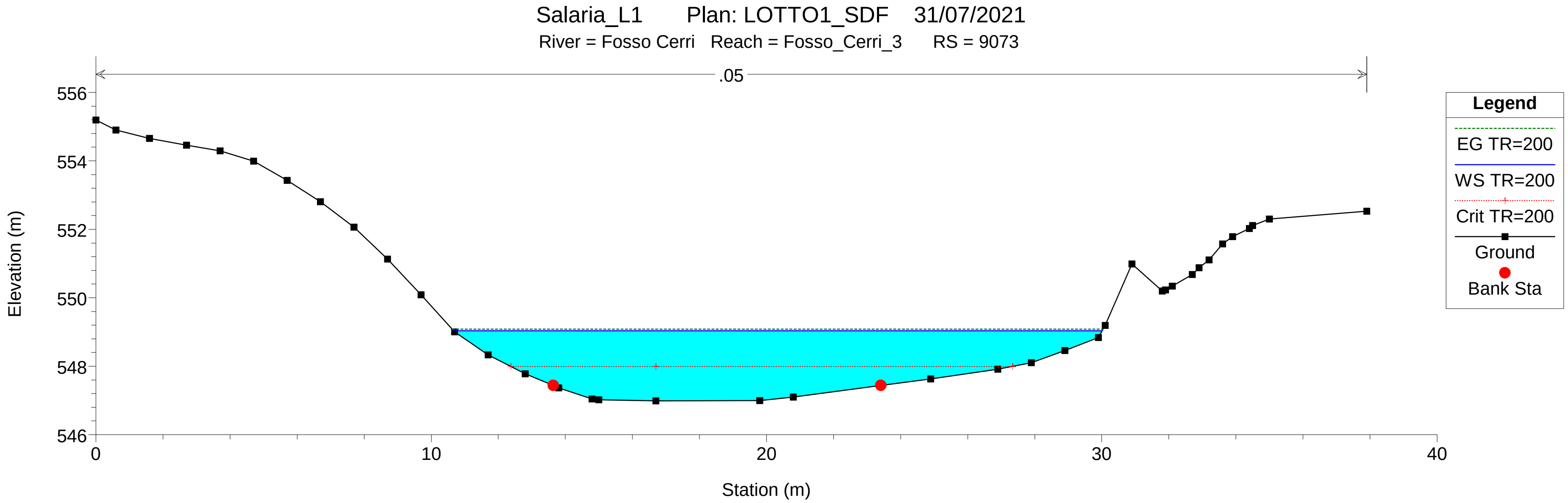

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_1 RS = 9574
.05
Elevation (m)
576
574
572
570
568
566
564
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

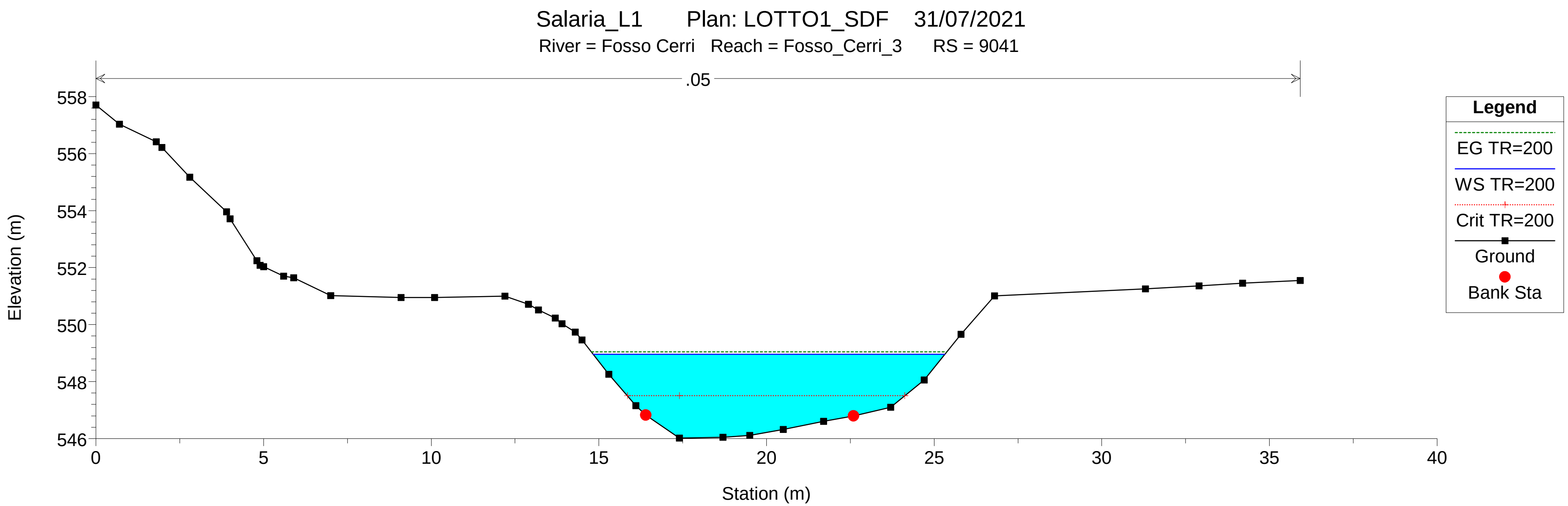

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_1 RS = 9521
.05
Elevation (m)
574
572
570
568
566
564
562
0
10
20
30
40
50
60
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

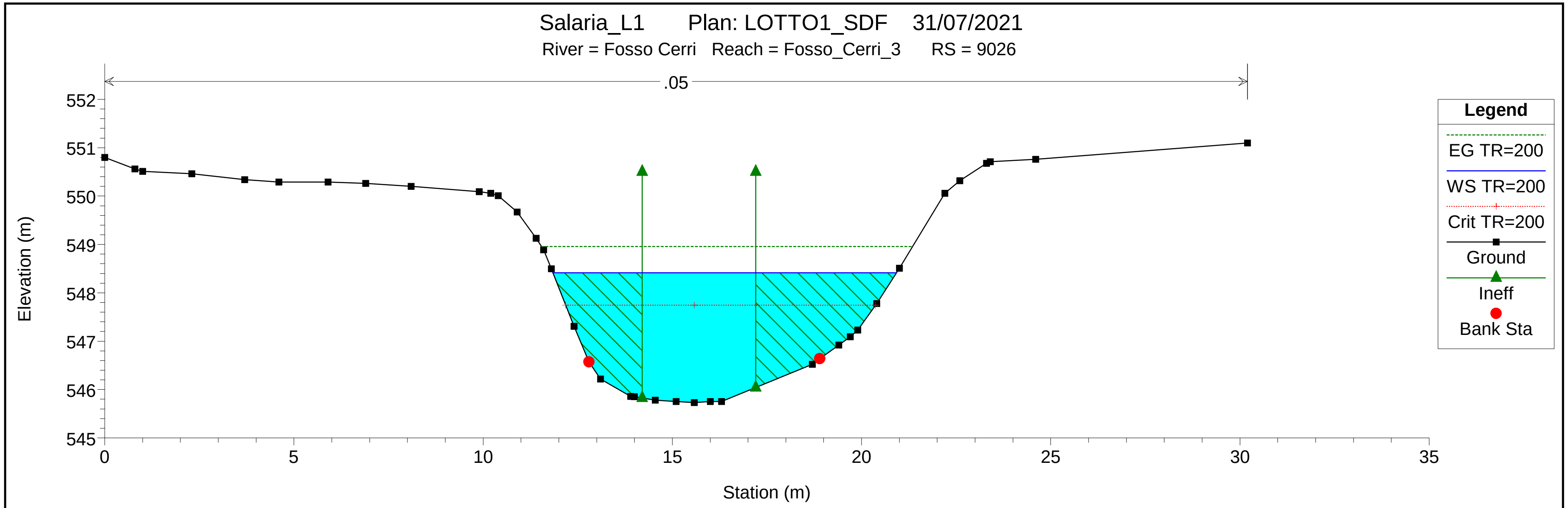

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_2 RS = 9397
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_2 RS = 9274
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

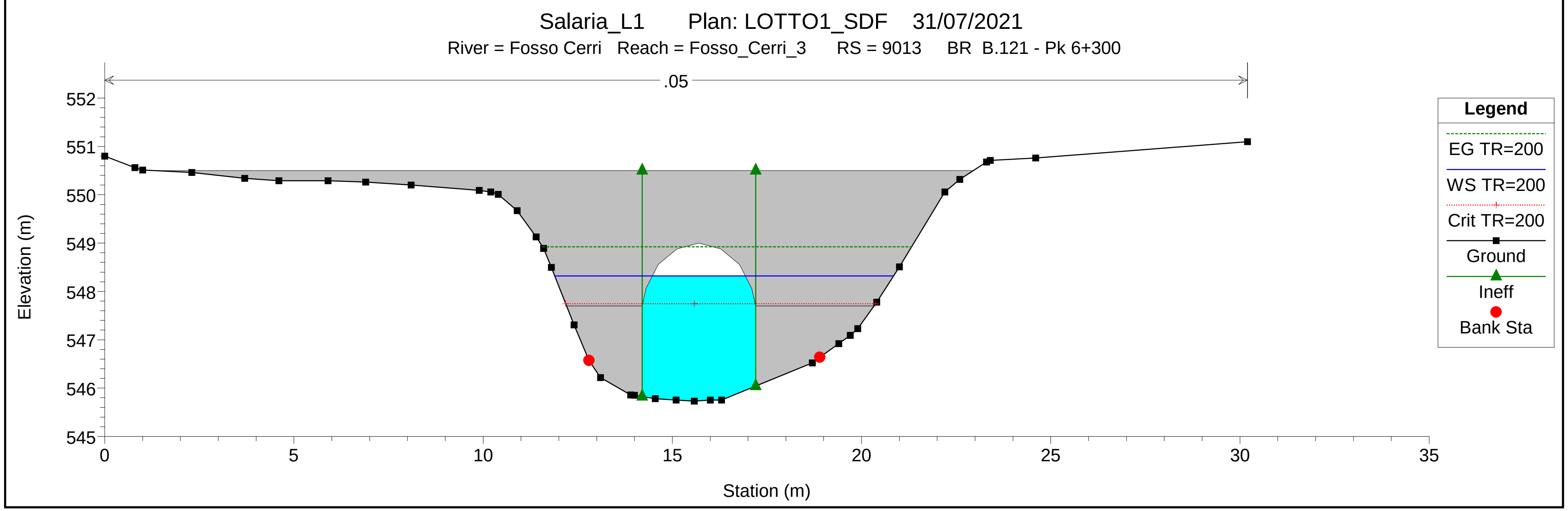

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_2 RS = 9218
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_2 RS = 9156
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9073
.05
Elevation (m)
556
554
552
550
548
546
0
10
20
30
40
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

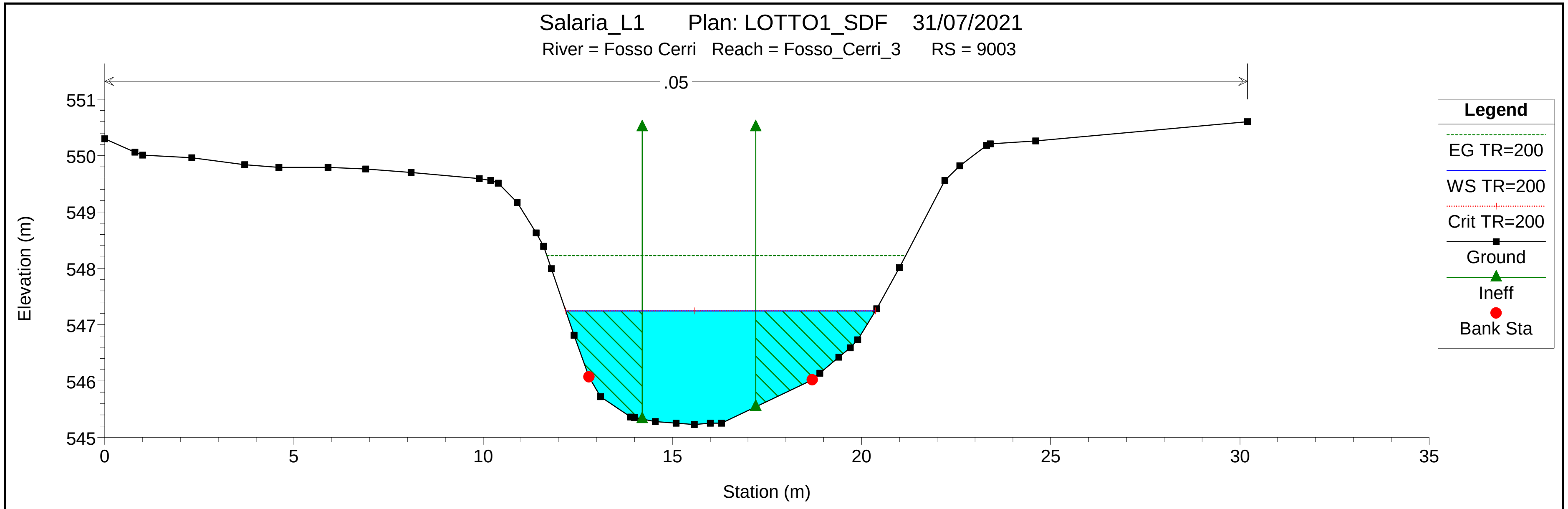

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9041
.05
Elevation (m)
558
556
554
552
550
548
546
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

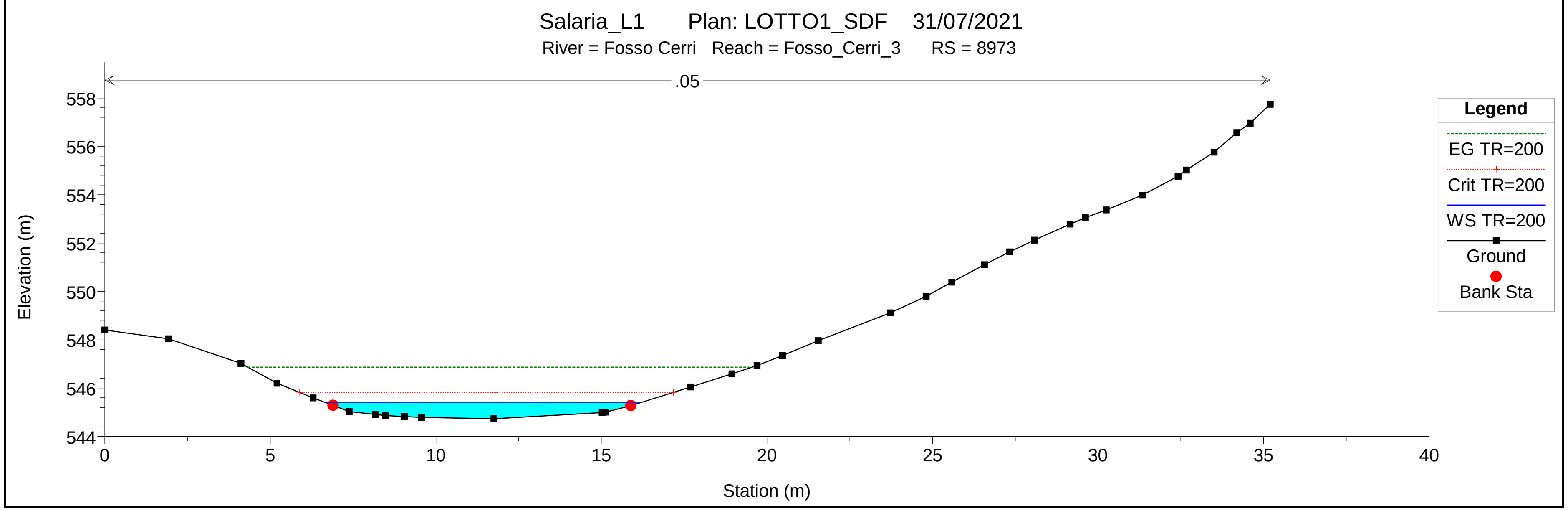


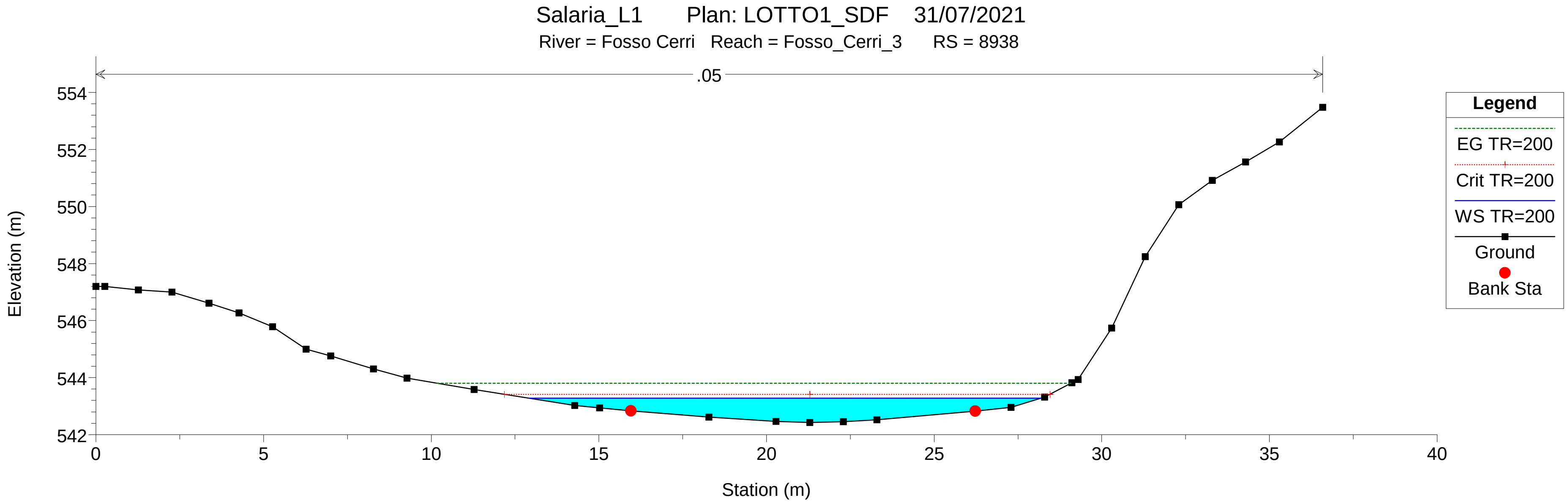
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9026
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

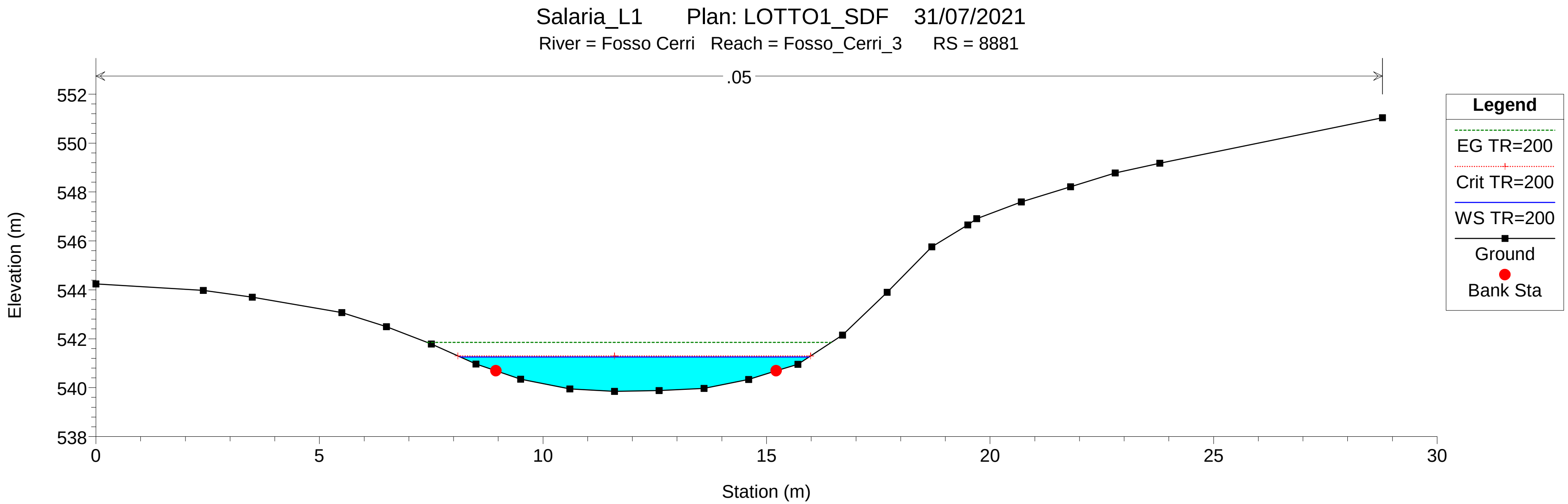


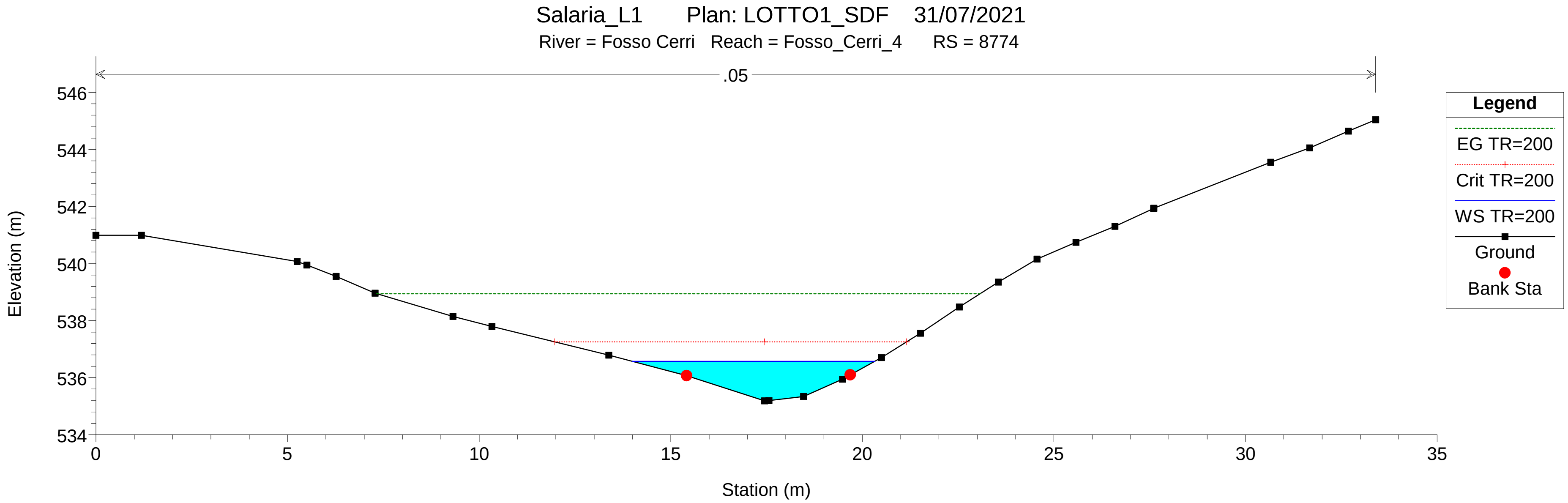
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9013 BR B.121 - Pk 6+300
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

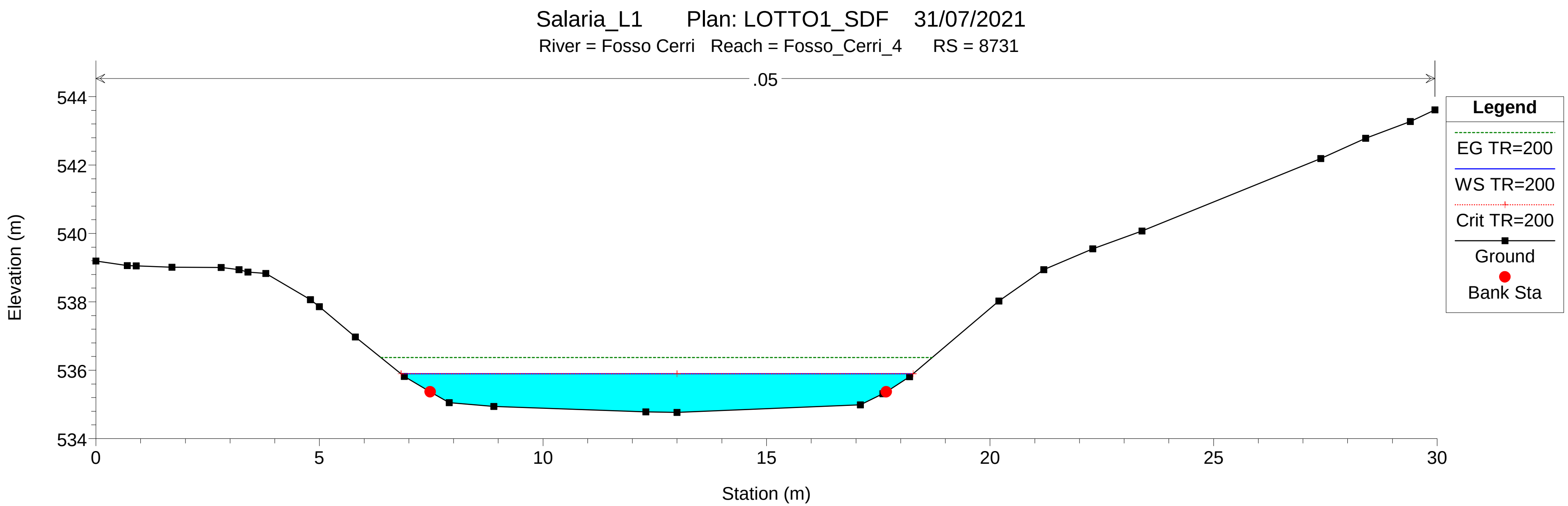

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9003
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

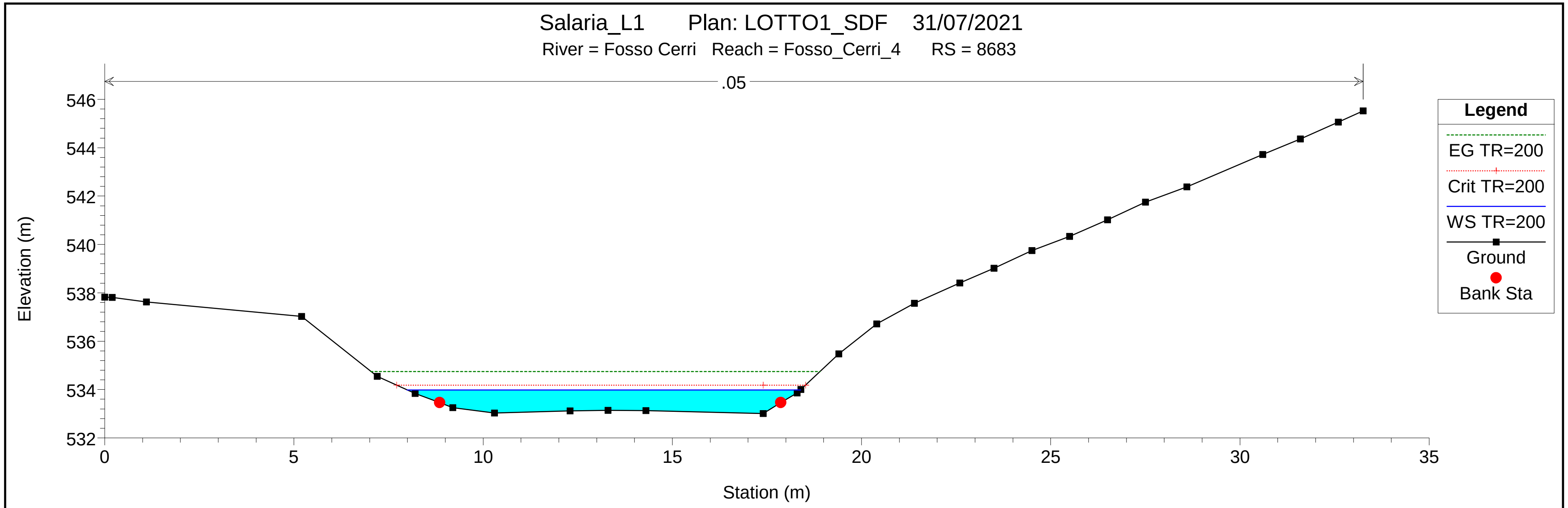

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 8973
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

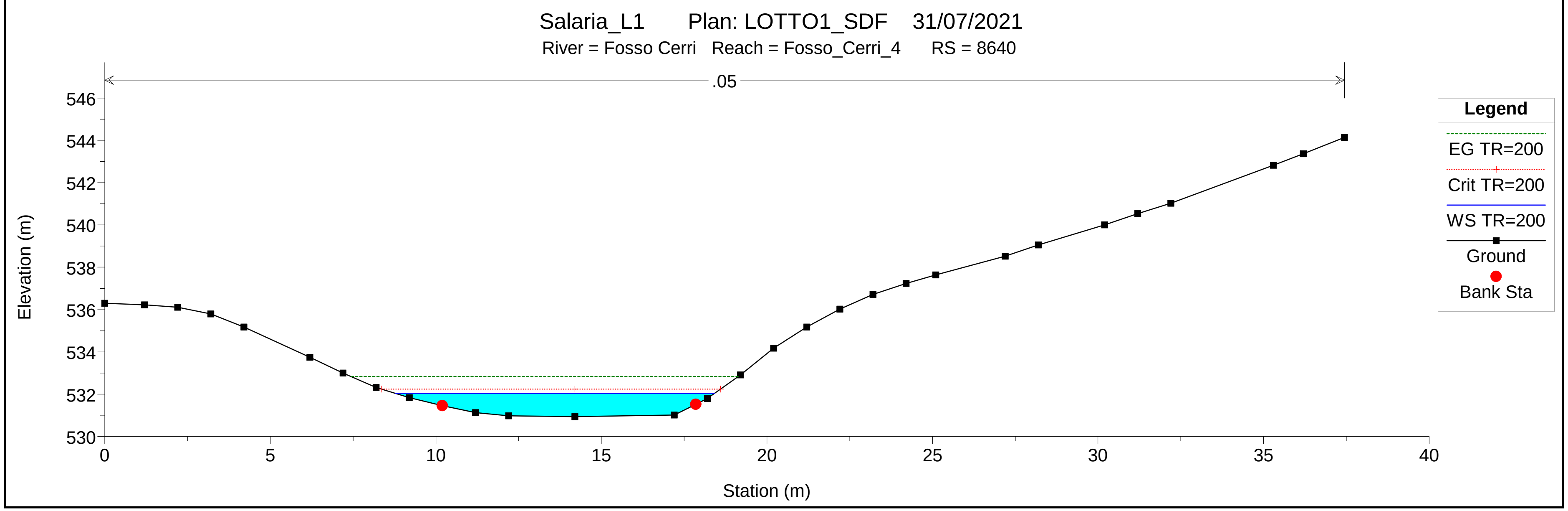

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 8938
.05
Elevation (m)
554
552
550
548
546
544
542
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

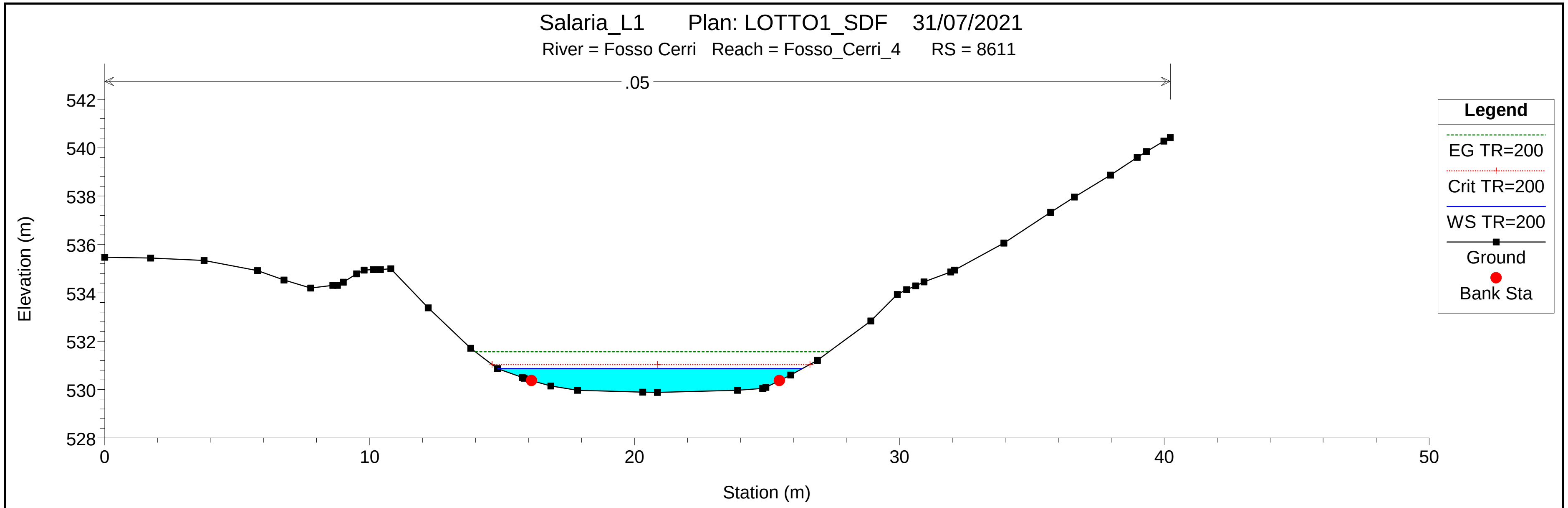

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 8881
.05
Elevation (m)
552
550
548
546
544
542
540
538
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

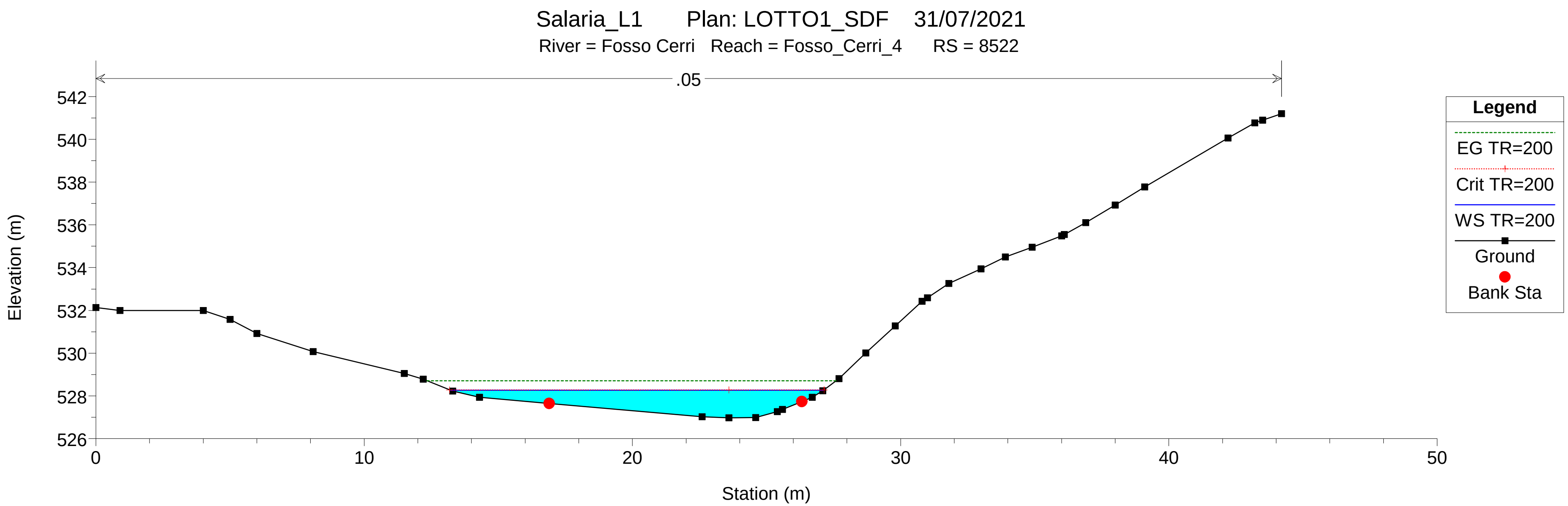

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8774
.05
Elevation (m)
546
544
542
540
538
536
534
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

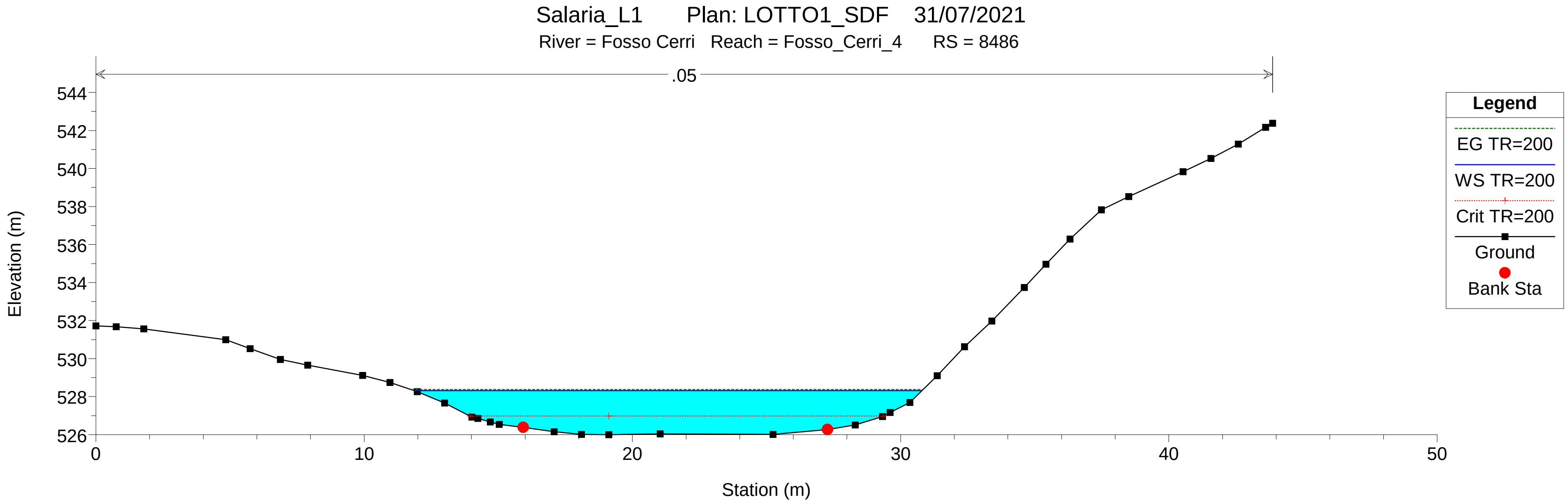

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8731
.05
Elevation (m)
544
542
540
538
536
534
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

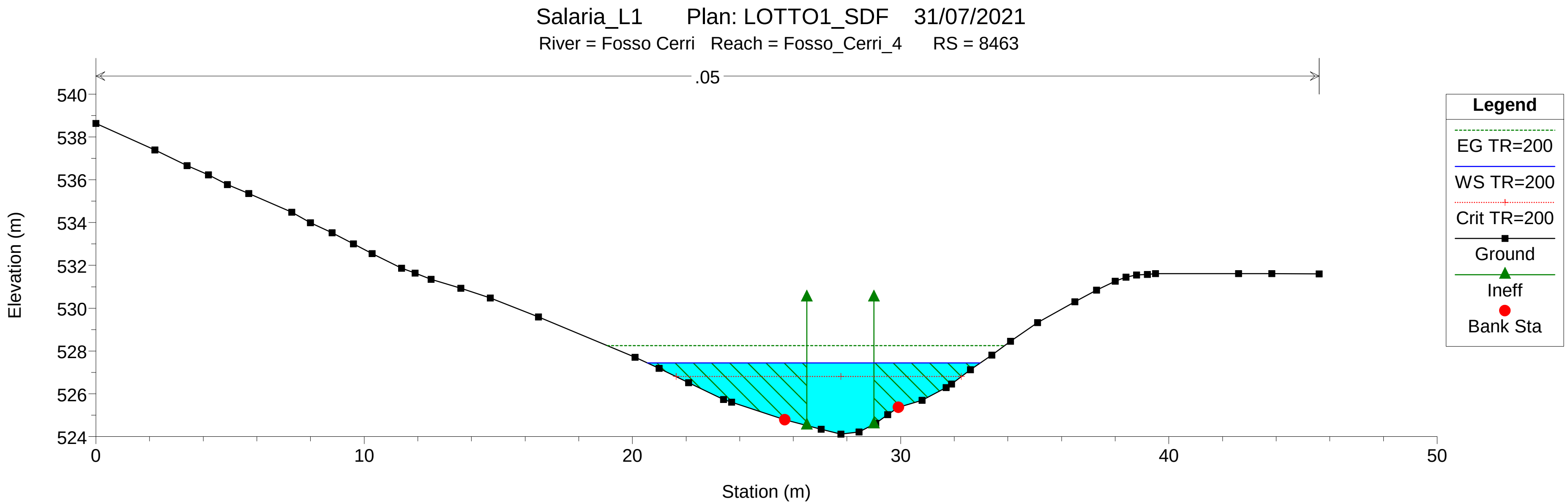

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8683
.05
Elevation (m)
546
544
542
540
538
536
534
532
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

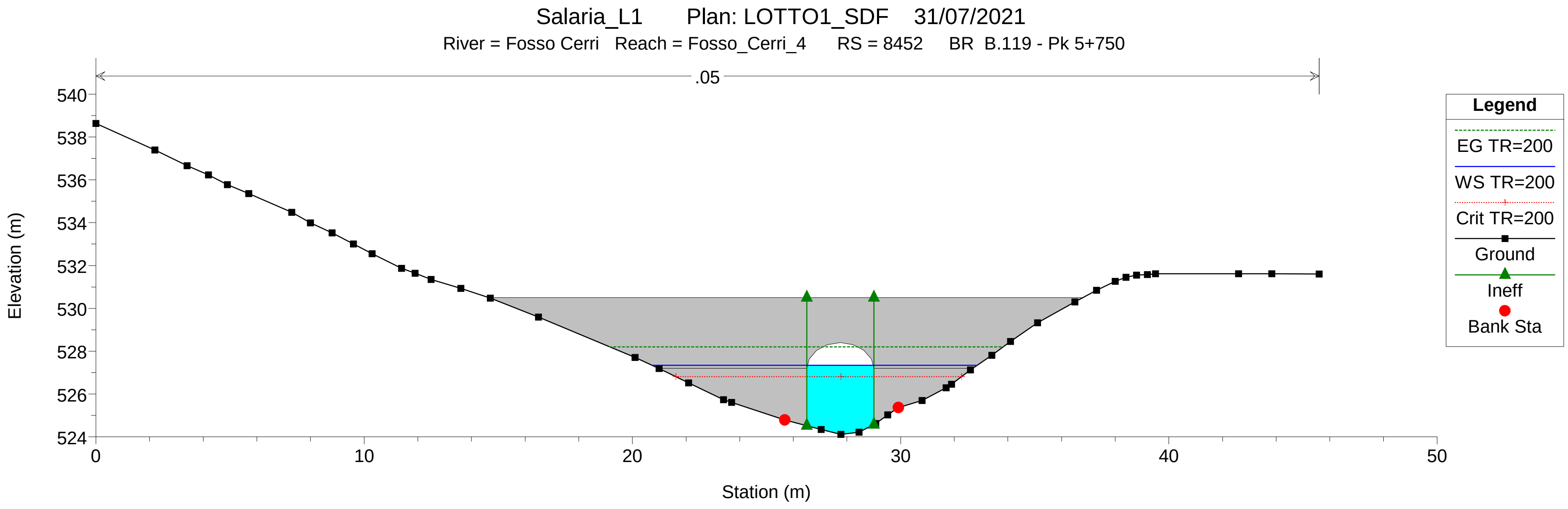

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8640
.05
Elevation (m)
546
544
542
540
538
536
534
532
530
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

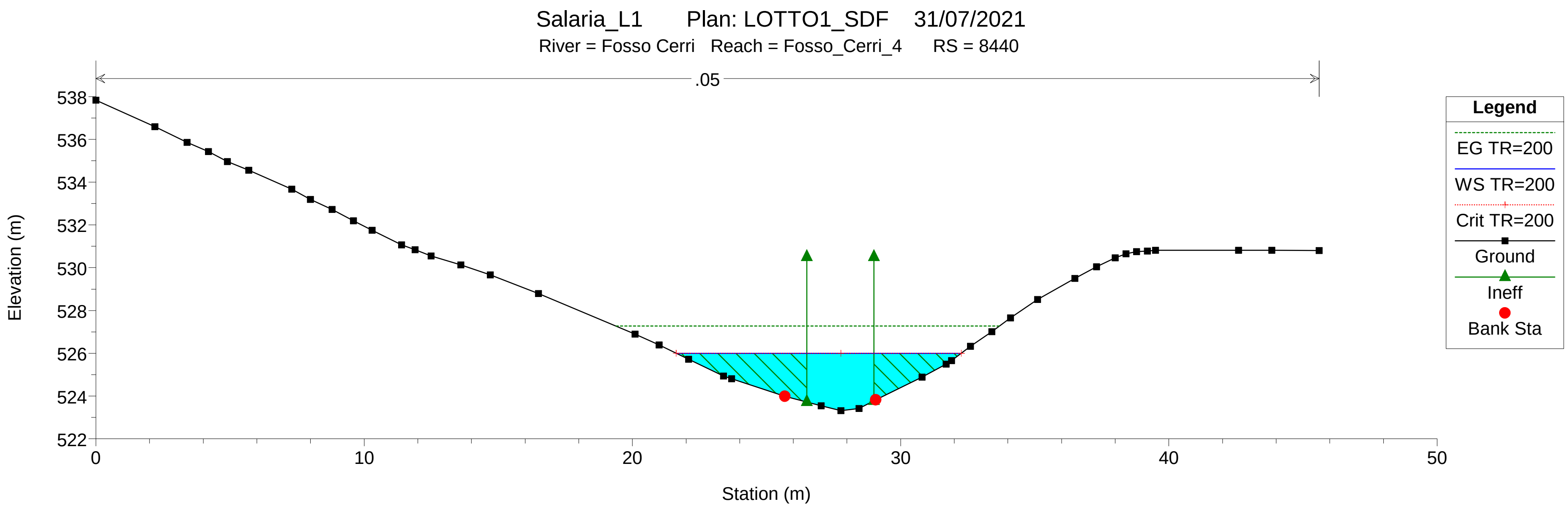

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8611
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

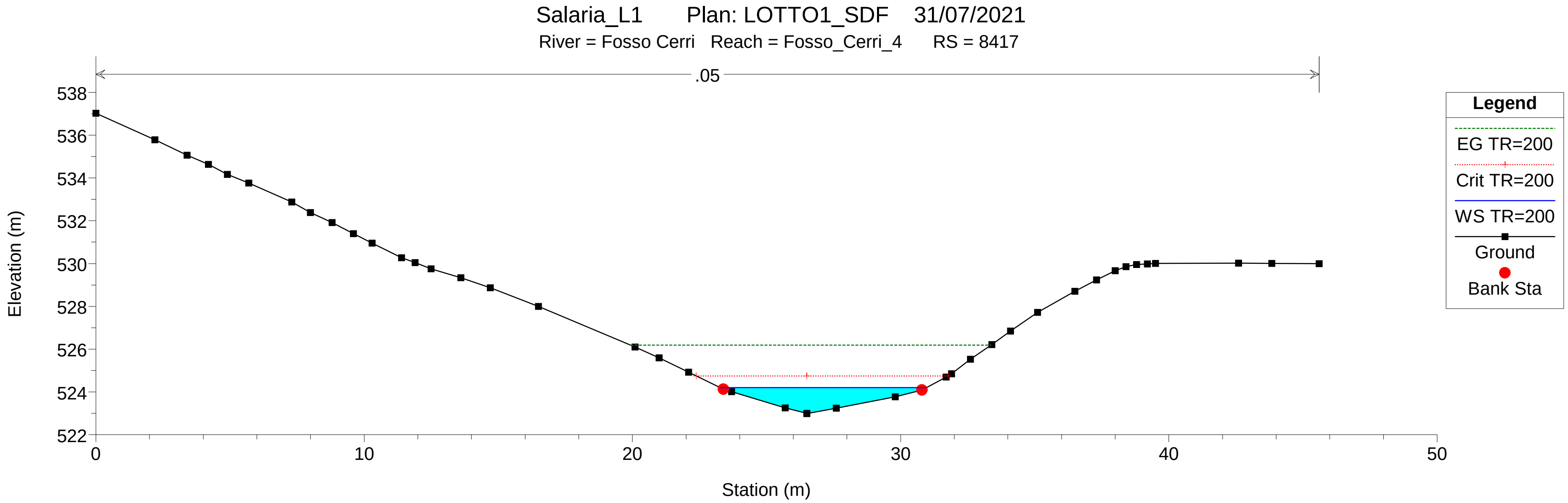

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8522
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

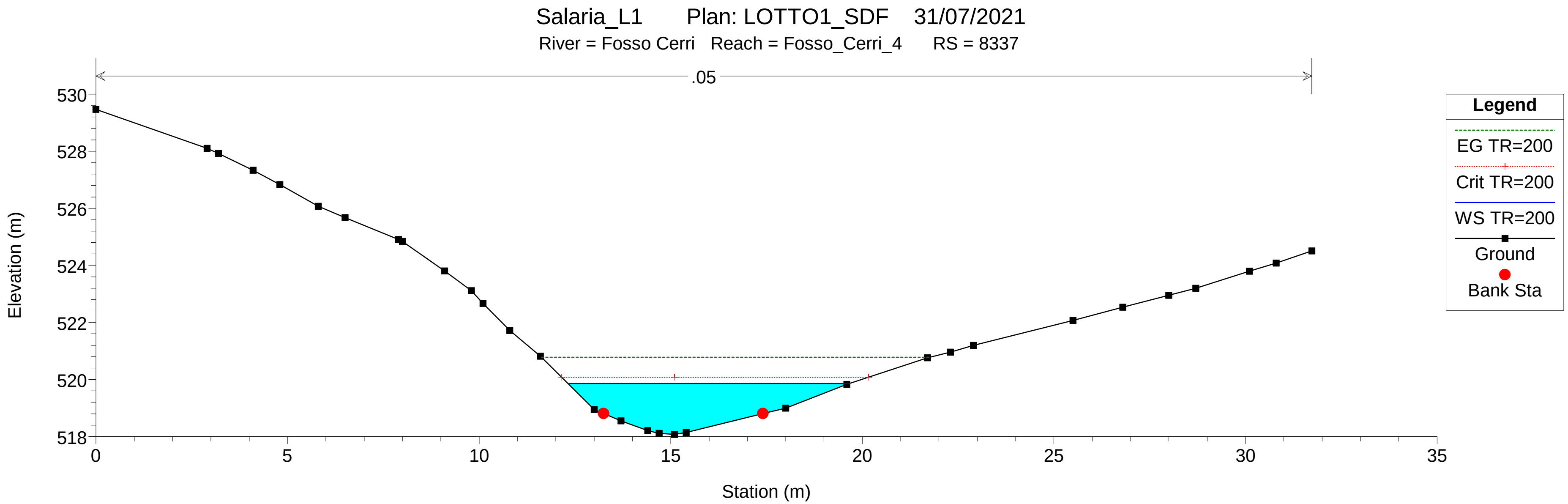

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8486
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

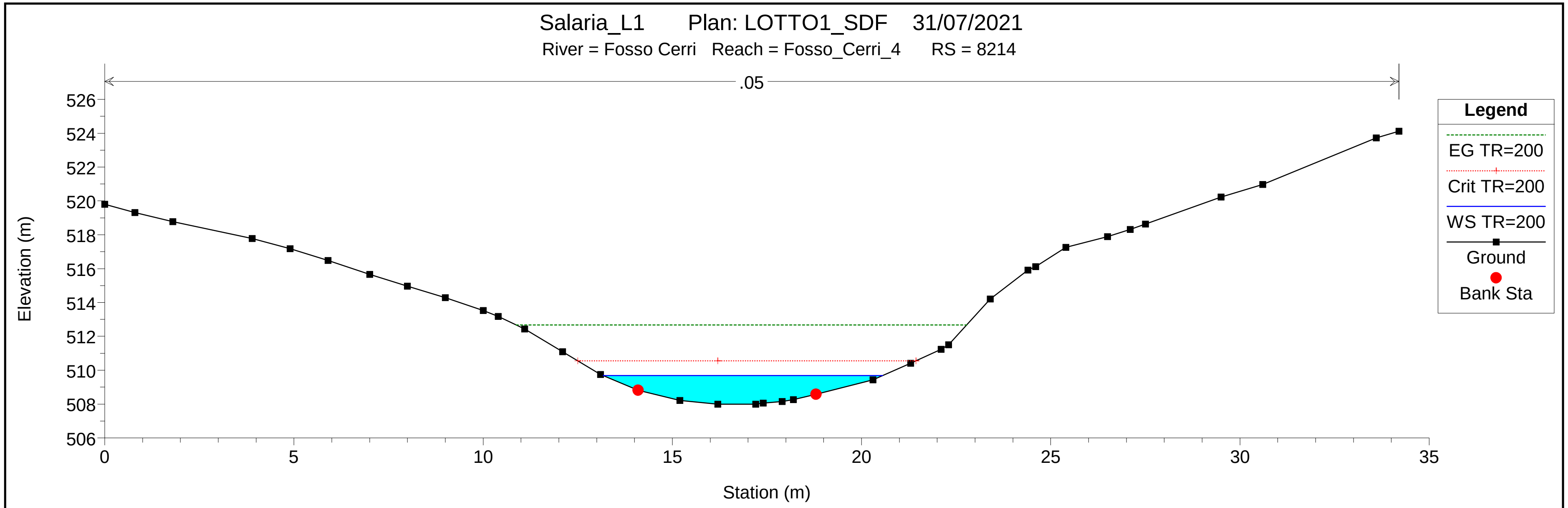

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8463
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

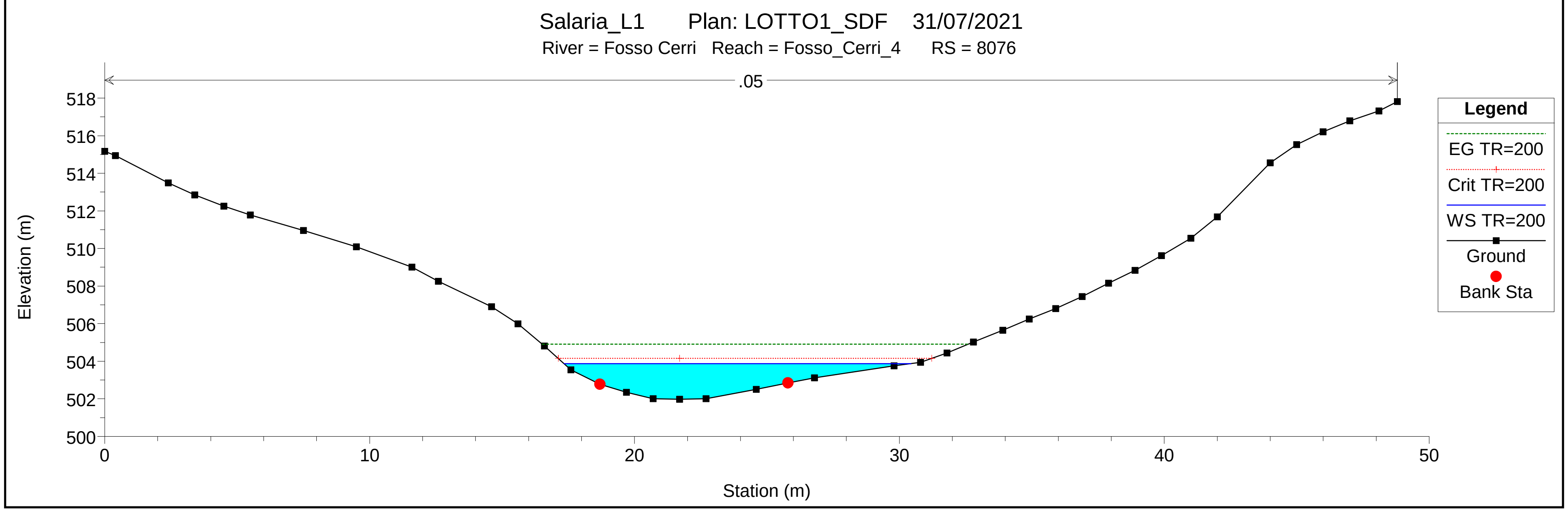

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8452 BR B.119 - Pk 5+750
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

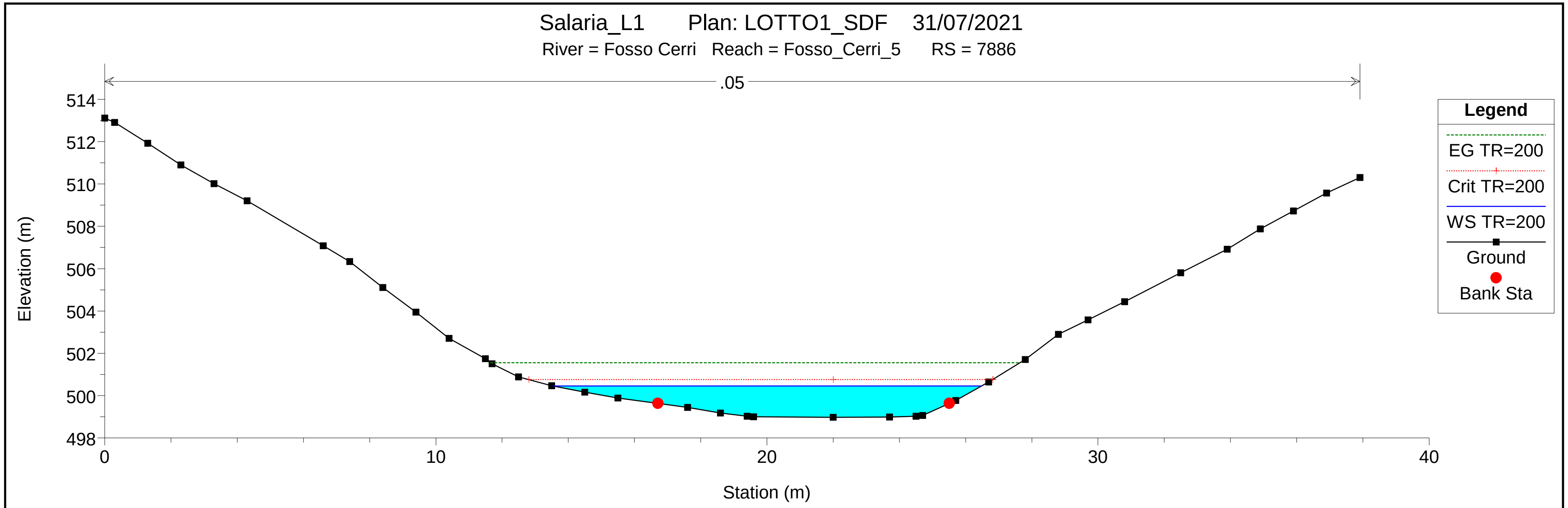

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8440
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

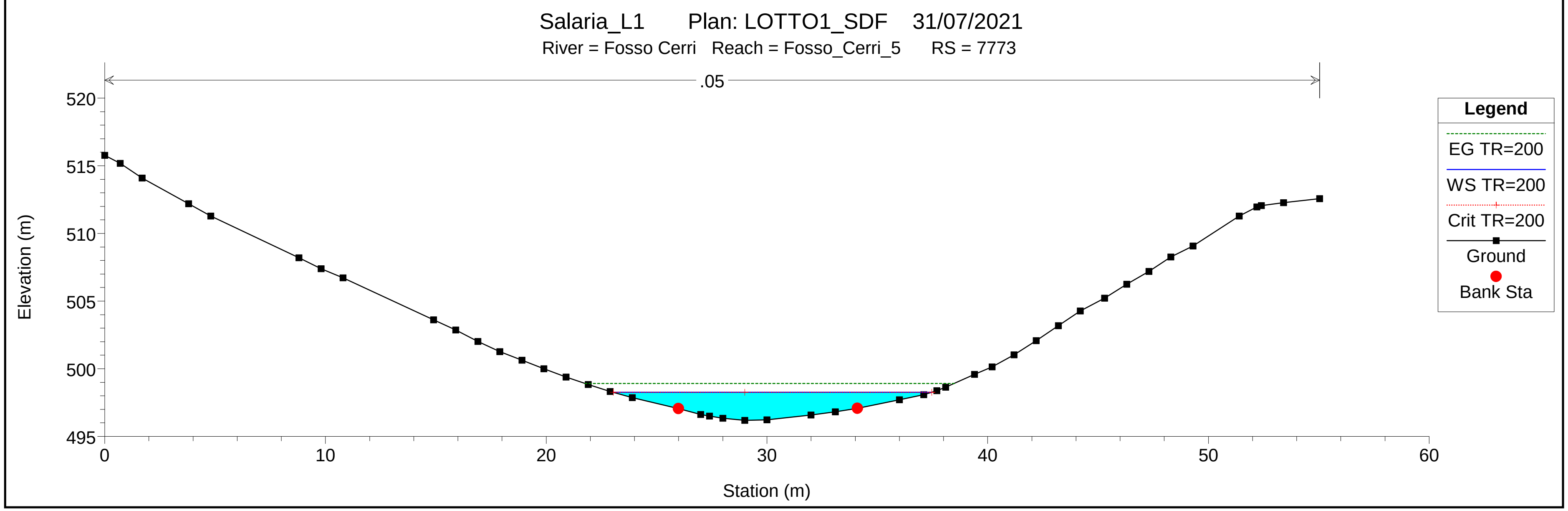

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8417
.05
Elevation (m)
538
536
534
532
530
528
526
524
522
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

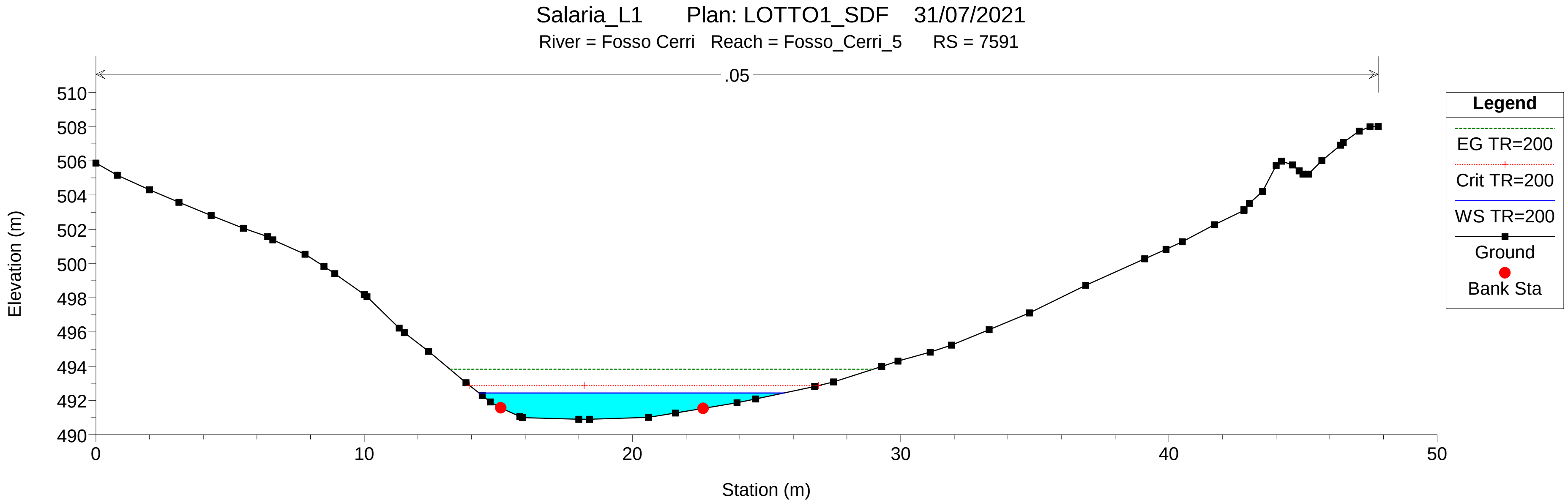

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8337
.05
Elevation (m)
530
528
526
524
522
520
518
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

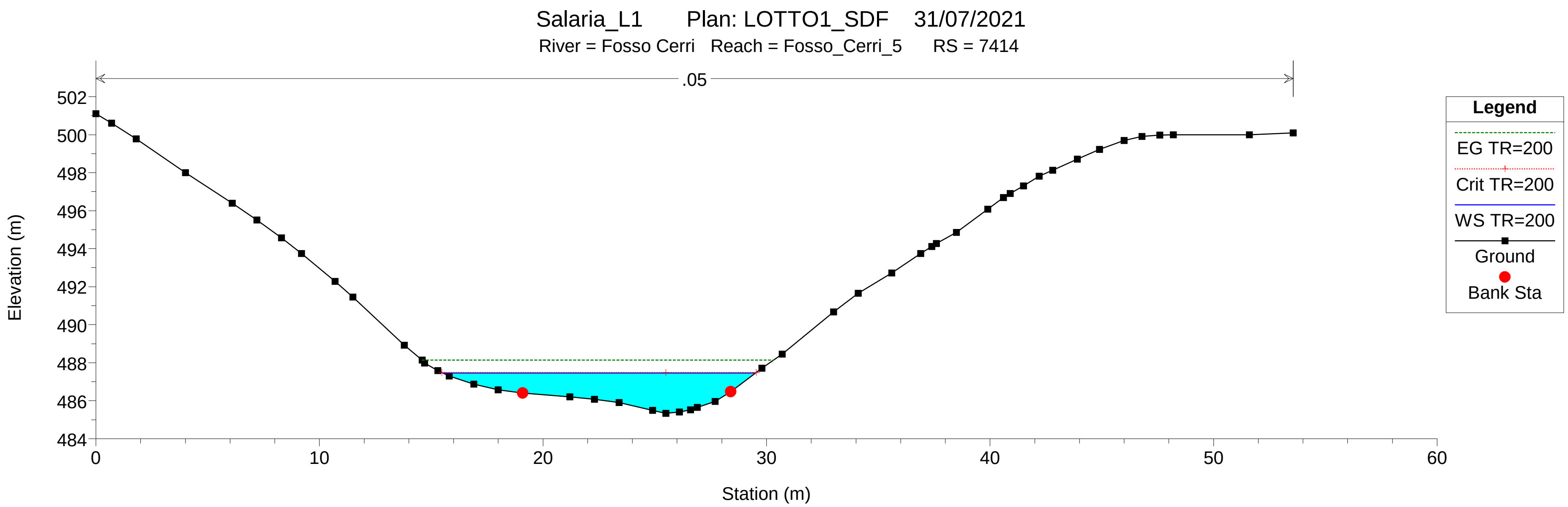

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8214
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

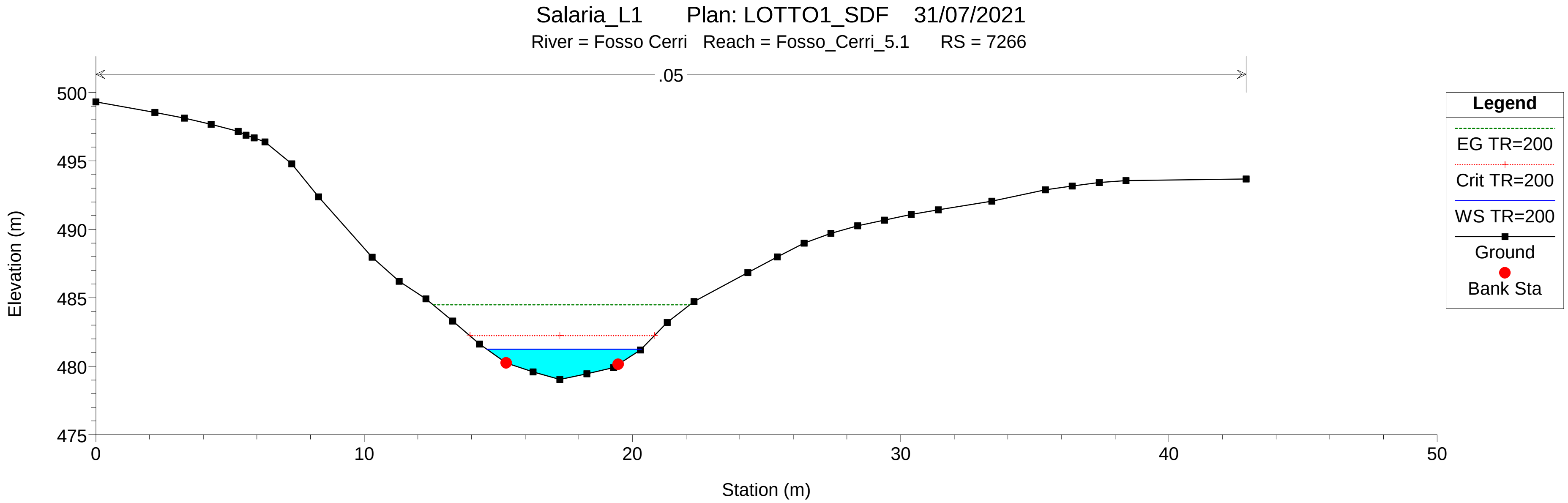

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8076
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_5 RS = 7886
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

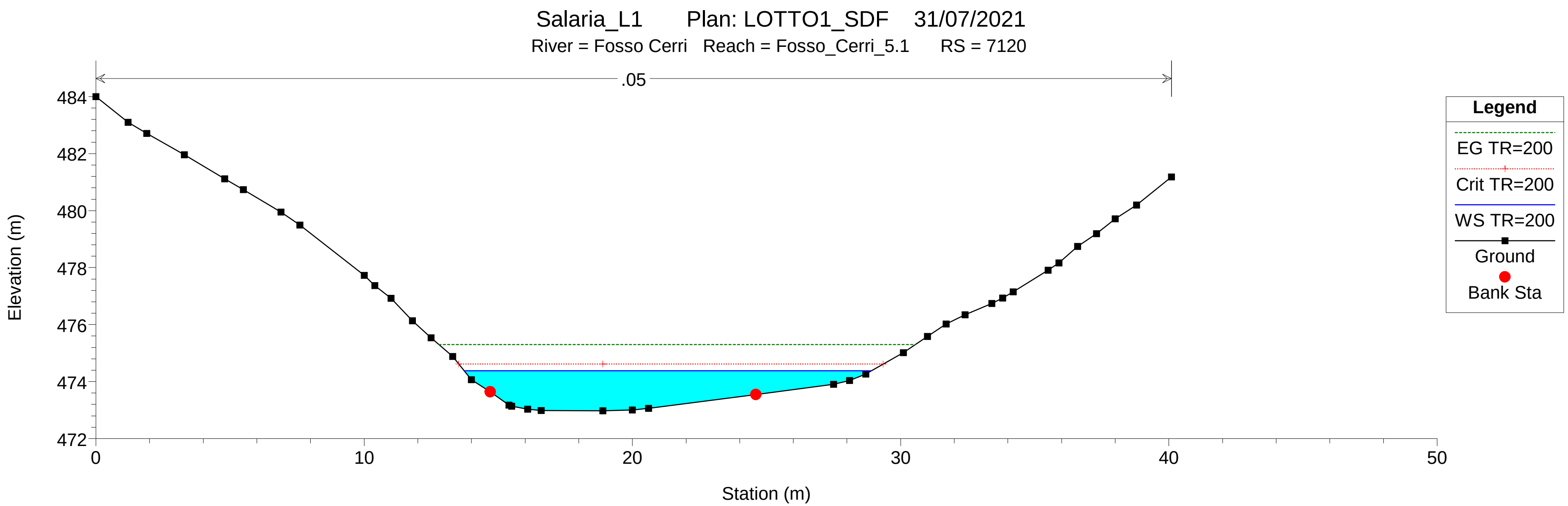

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_5 RS = 7773
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_5 RS = 7591
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

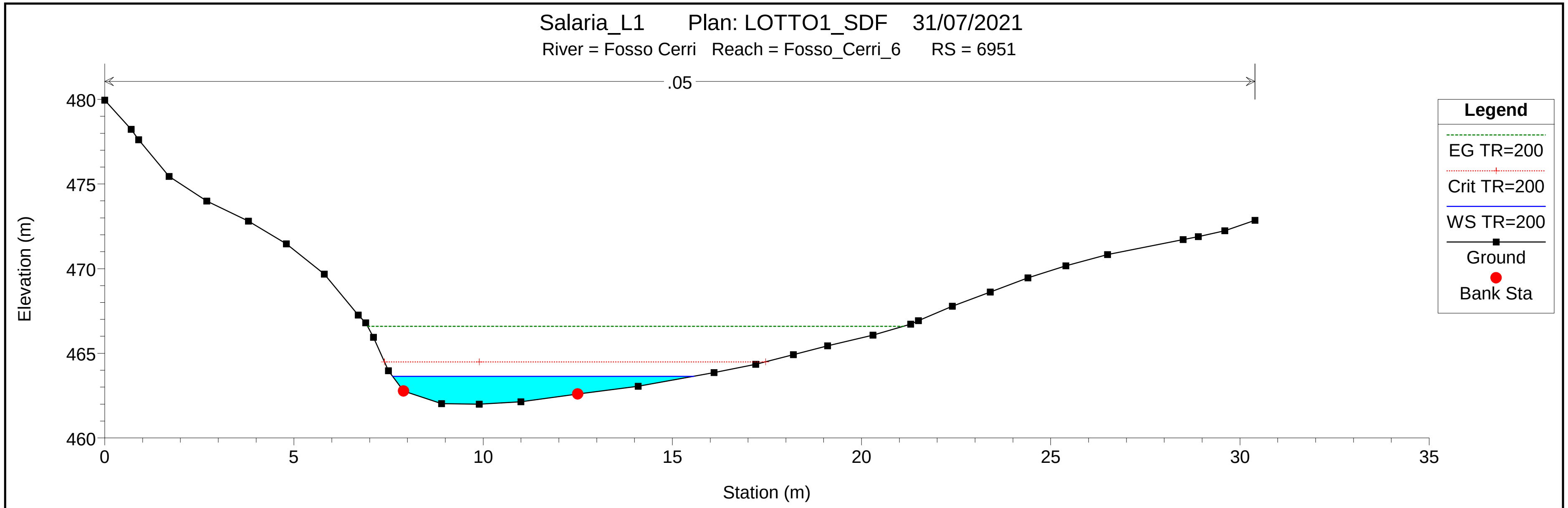

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_5 RS = 7414
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

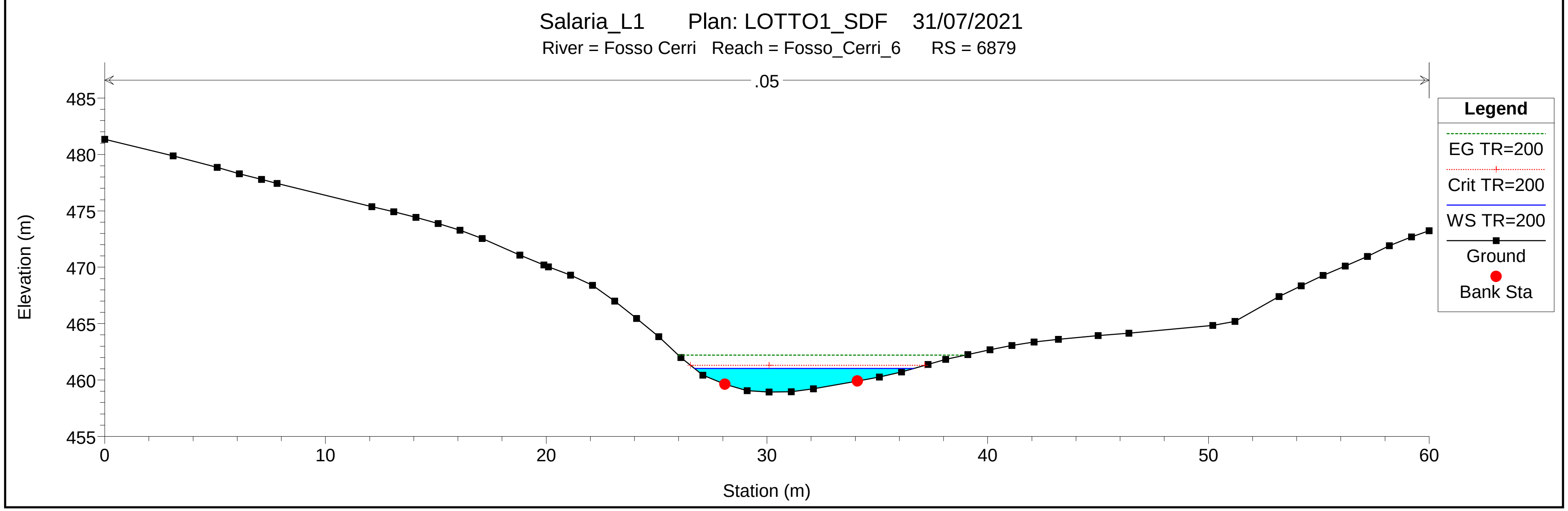


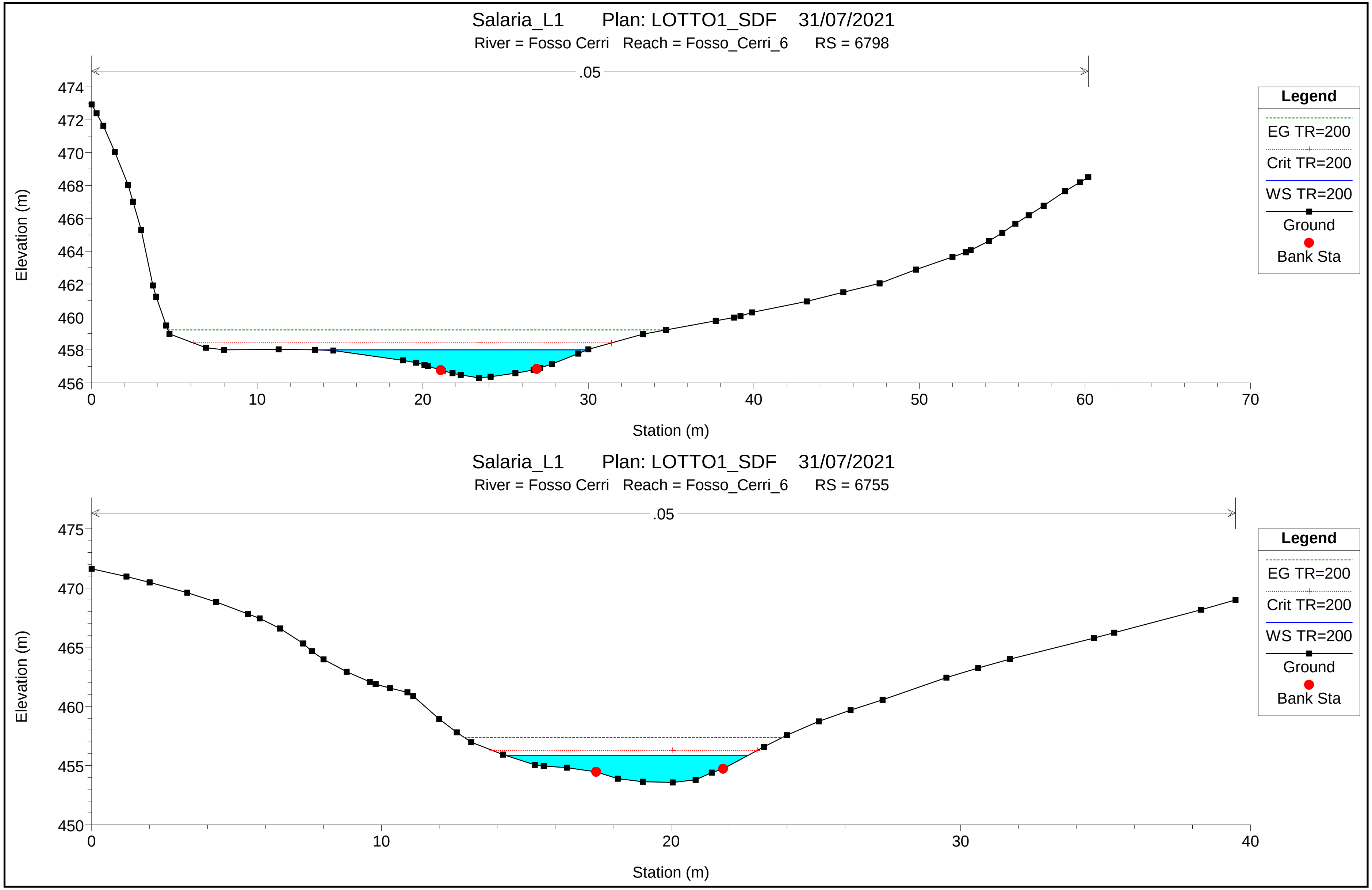
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_5.1 RS = 7266
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

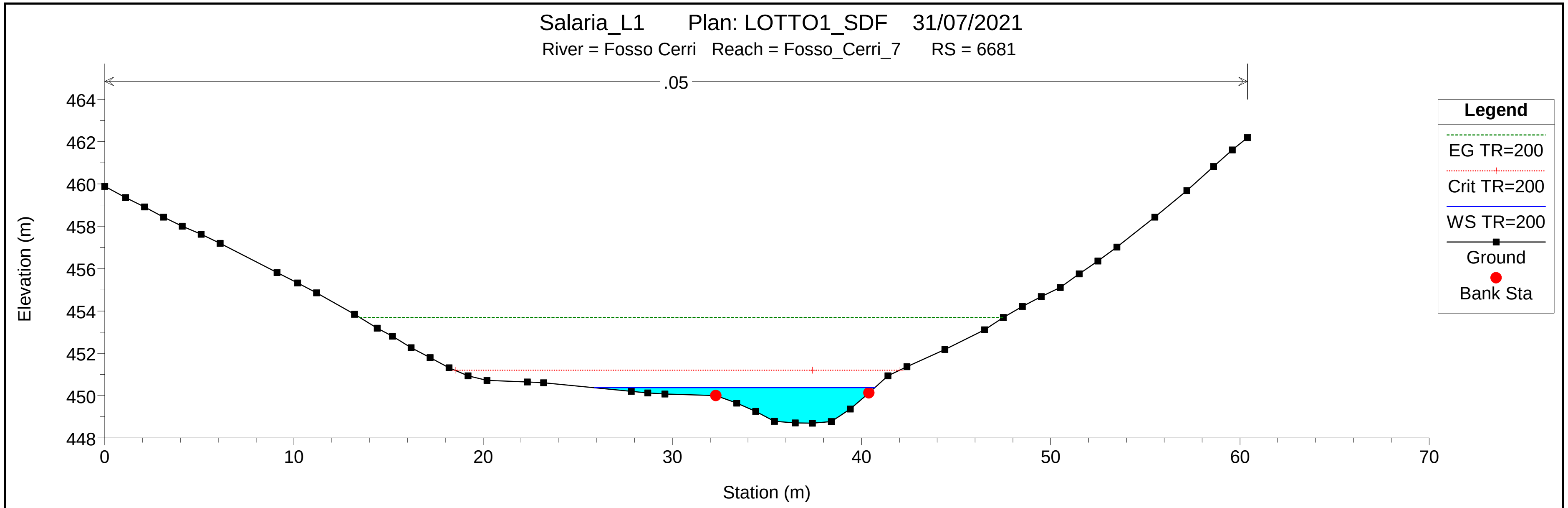


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_5.1 RS = 7120
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

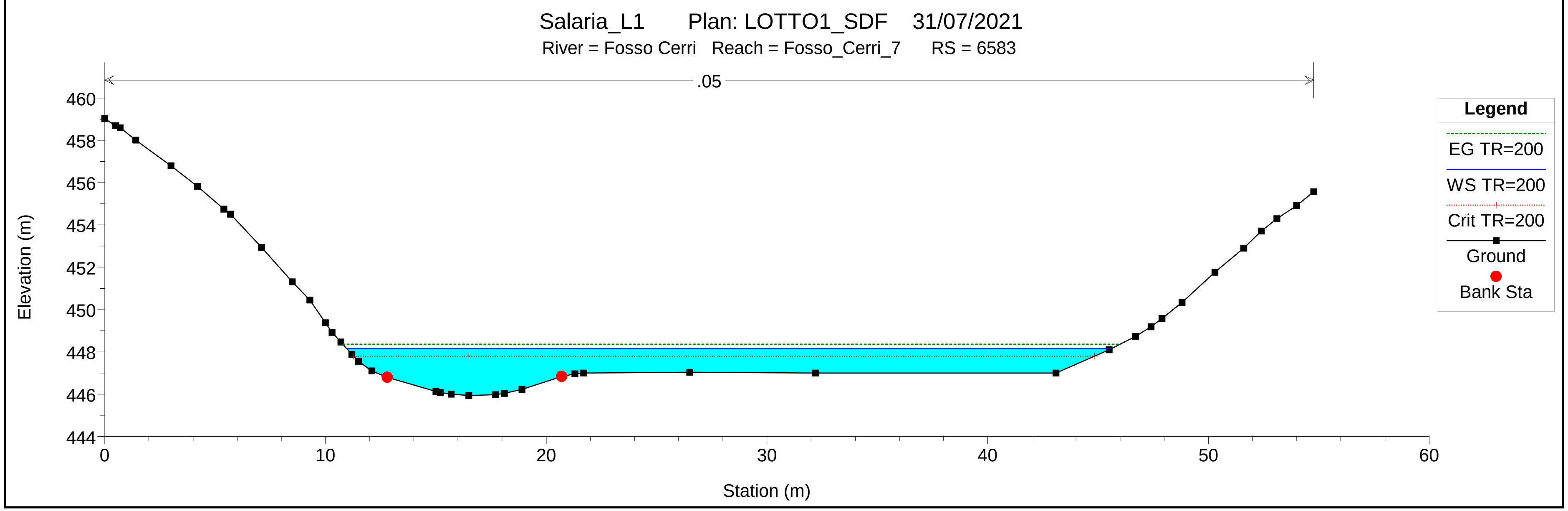

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_6 RS = 6951
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_6 RS = 6879
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

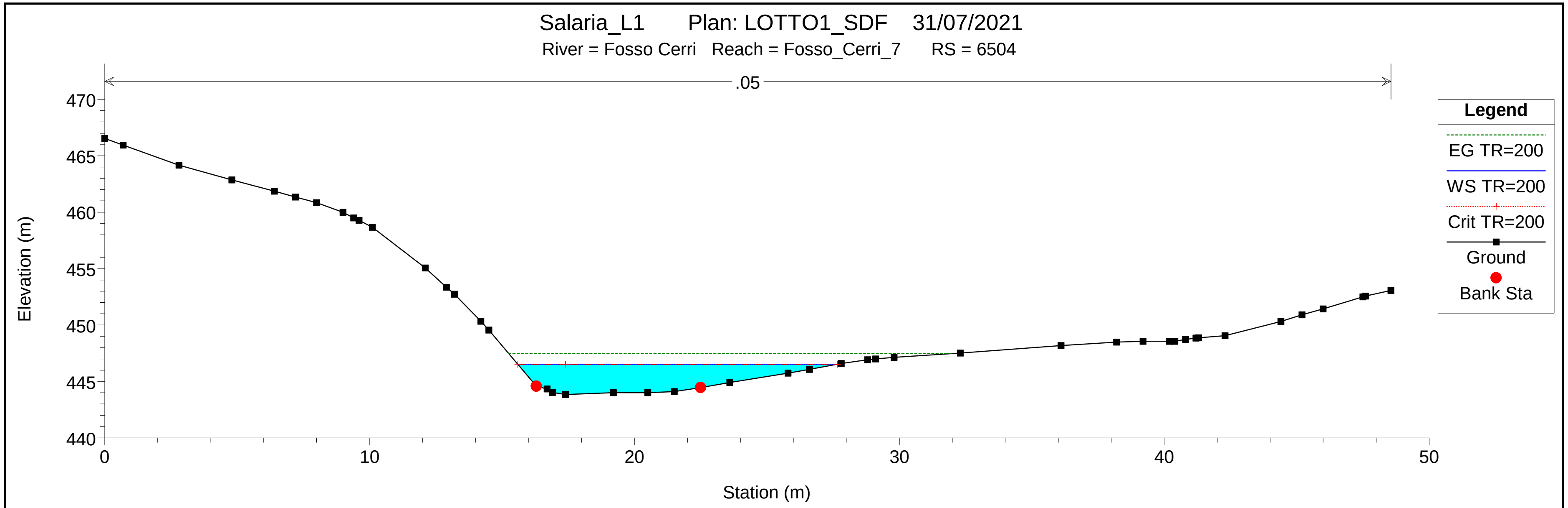

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_6 RS = 6798
.05
Elevation (m)
474
472
470
468
466
464
462
460
458
456
0
10
20
30
40
50
60
70
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_6 RS = 6755
.05
Elevation (m)
475
470
465
460
455
450
0
10
20
30
40
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

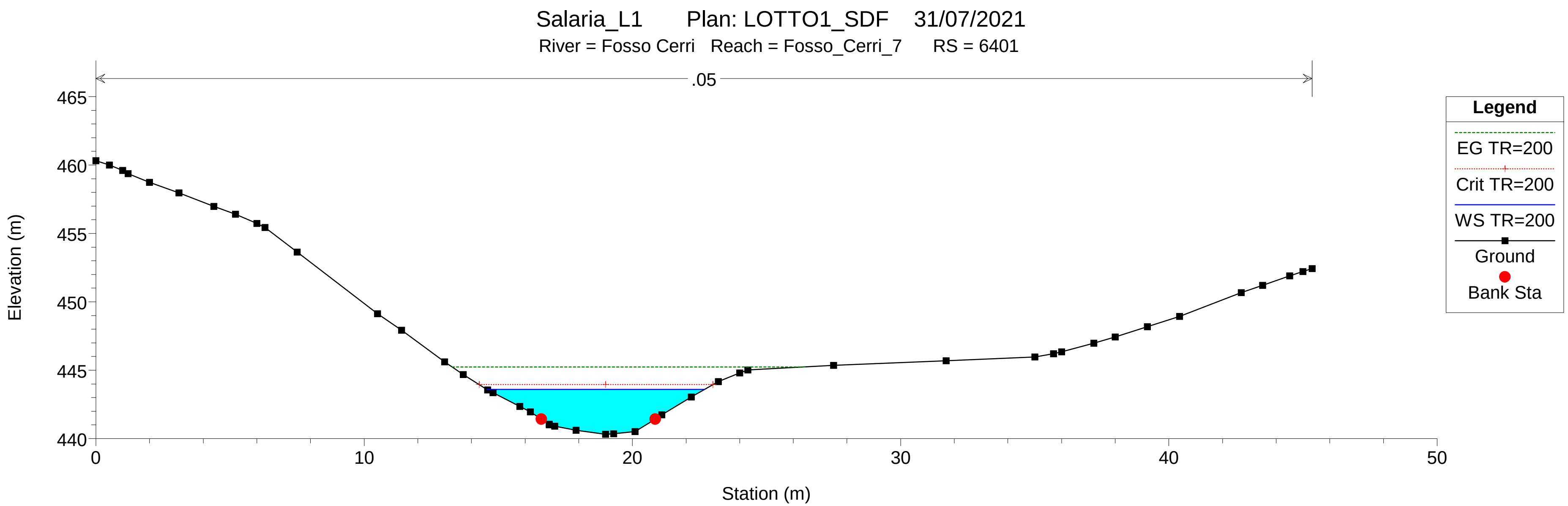


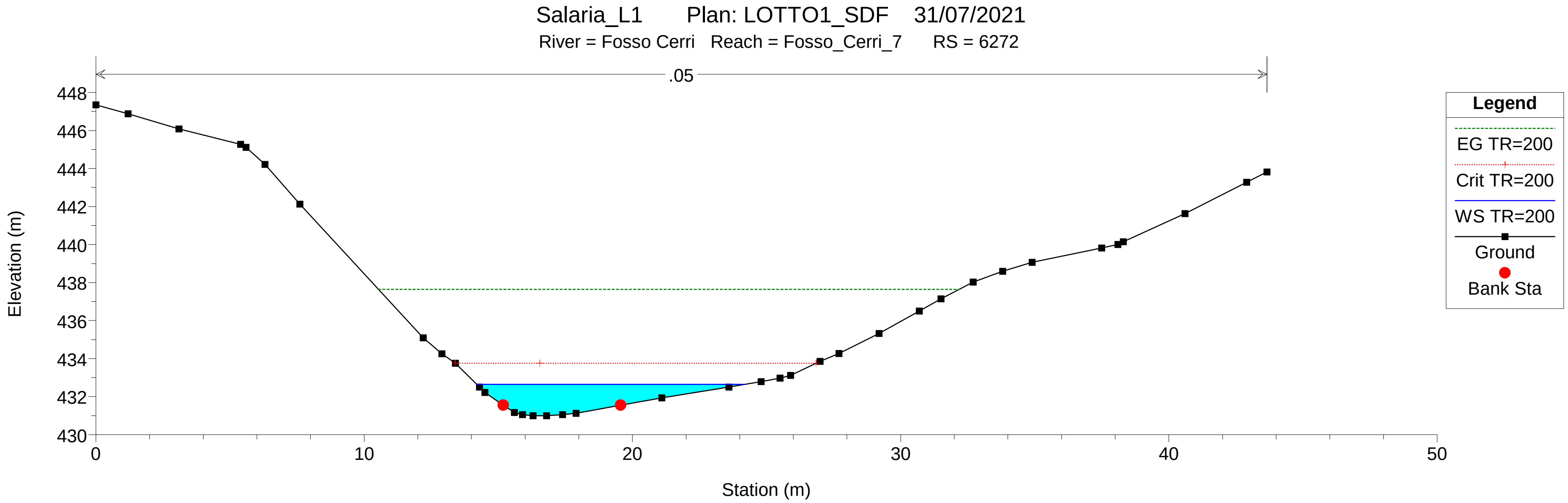
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6681
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

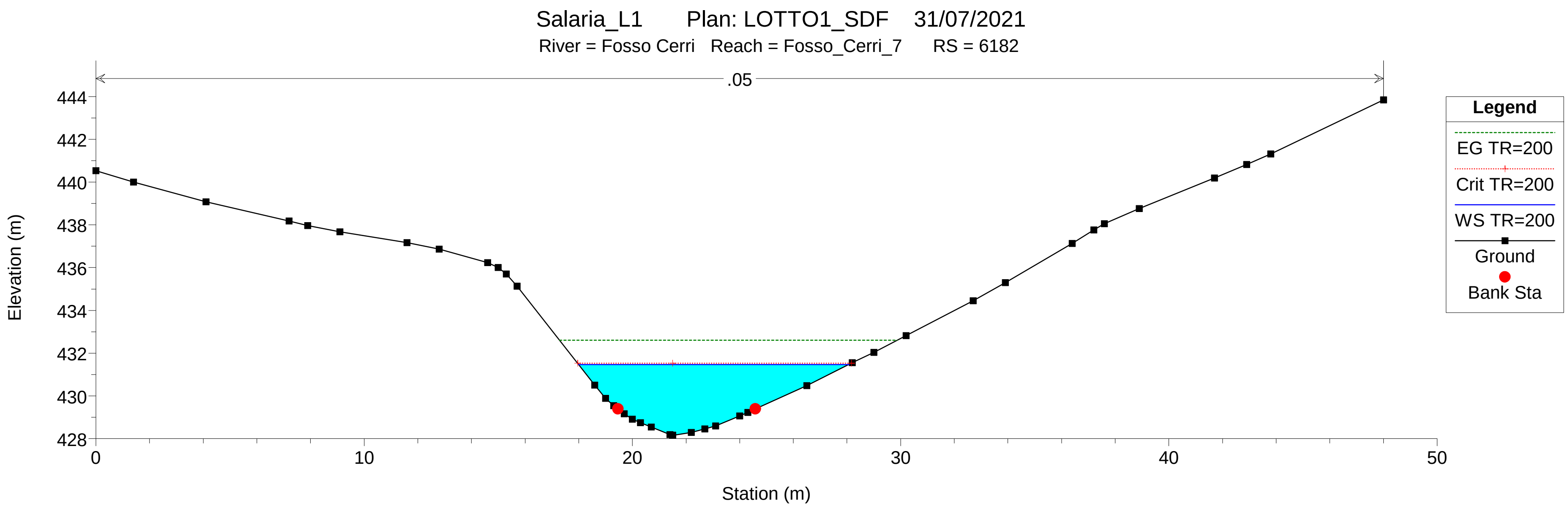


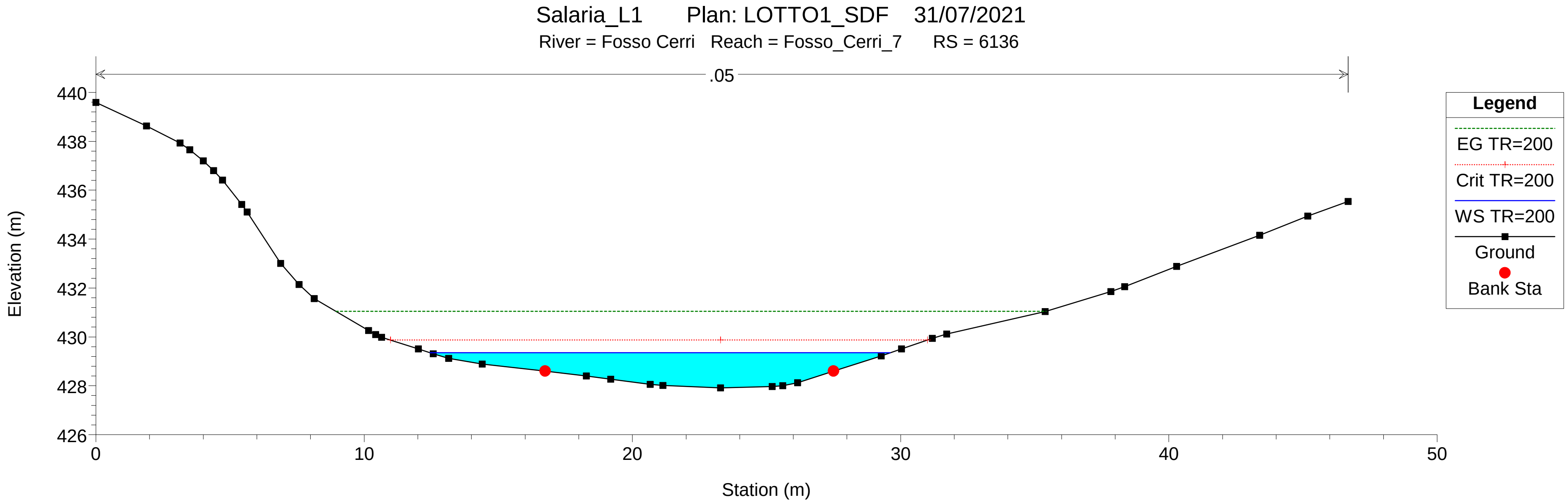
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6583
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6504
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
470
465
460
455
450
445
440
0
10
20
30
40
50

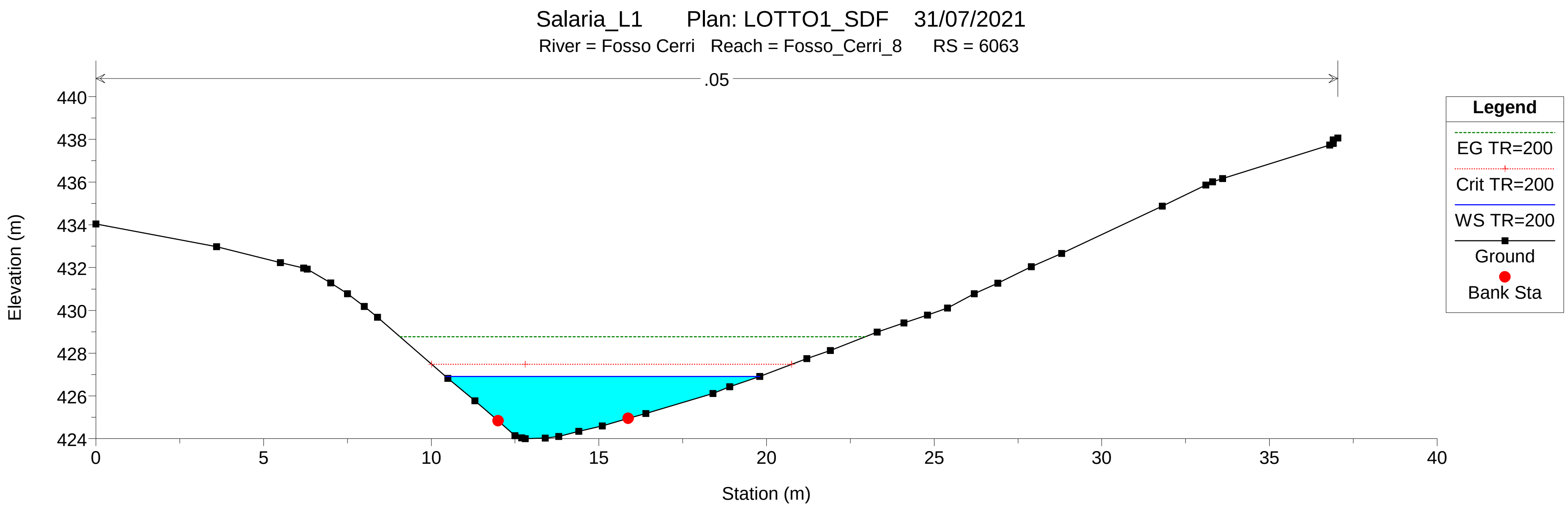

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6401
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
465
460
455
450
445
440
0
10
20
30
40
50


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6272
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

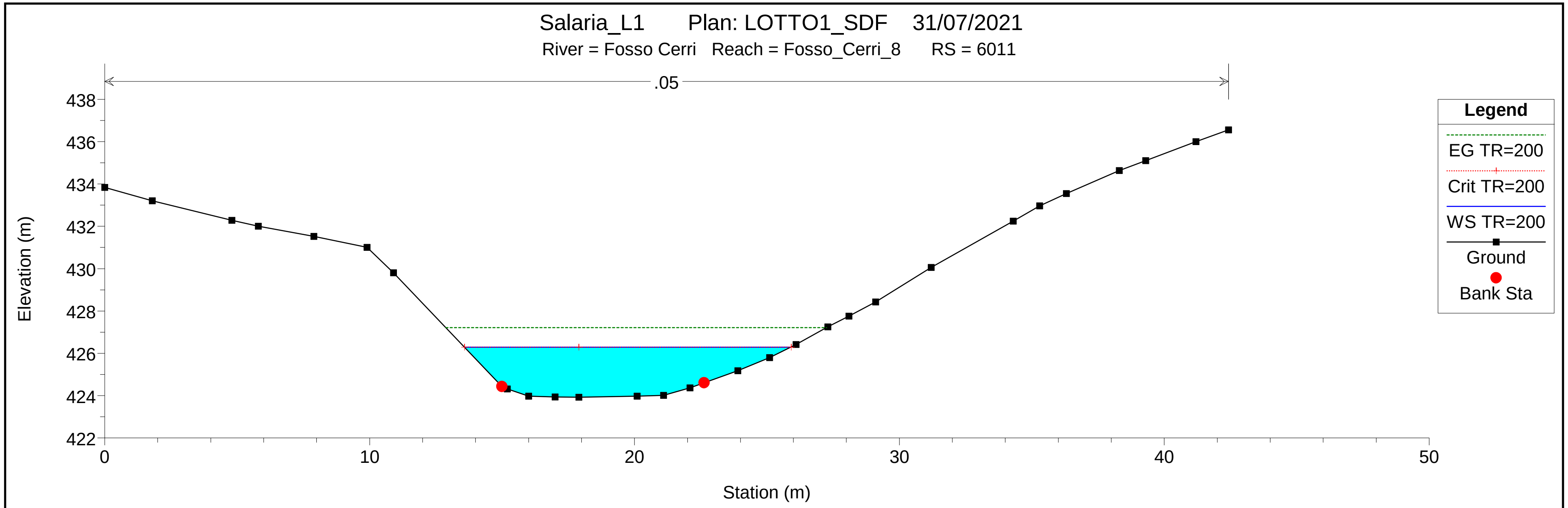

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6182
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

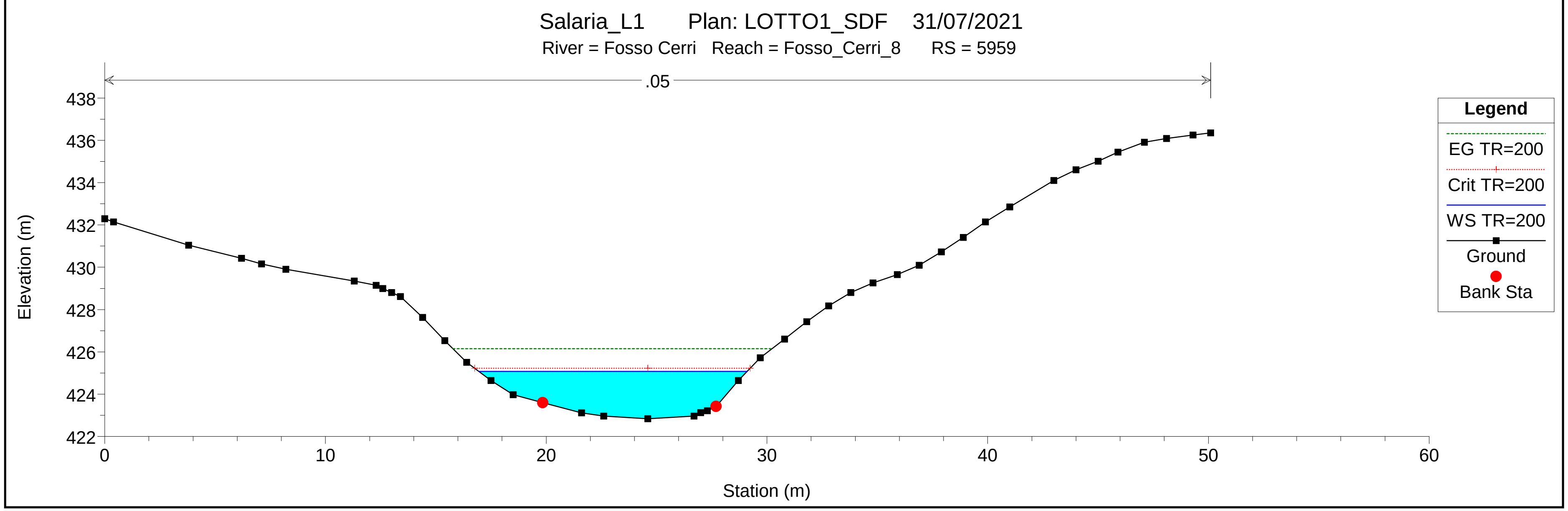


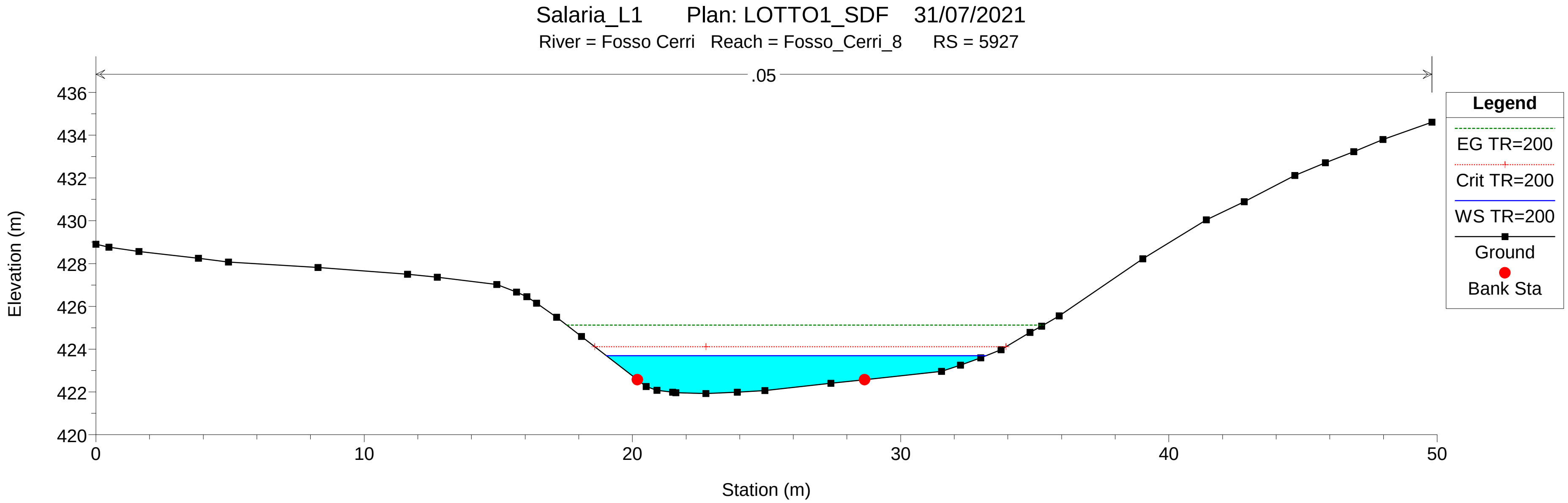
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6136
.05
Elevation (m)
440
438
436
434
432
430
428
426
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

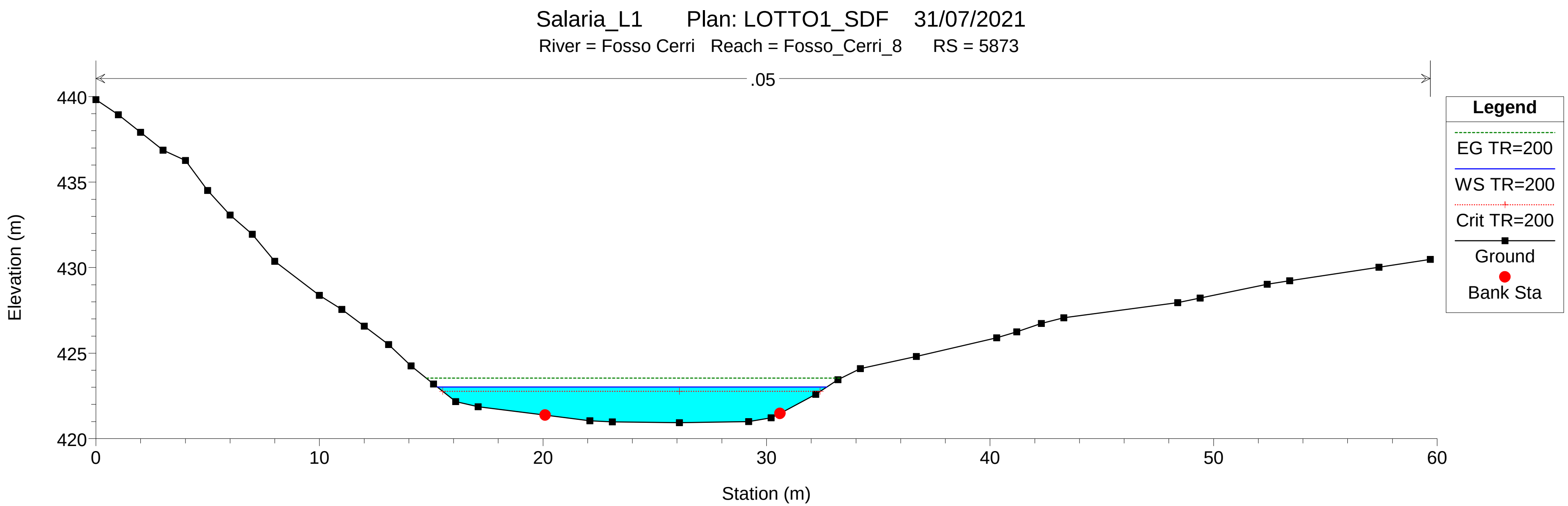


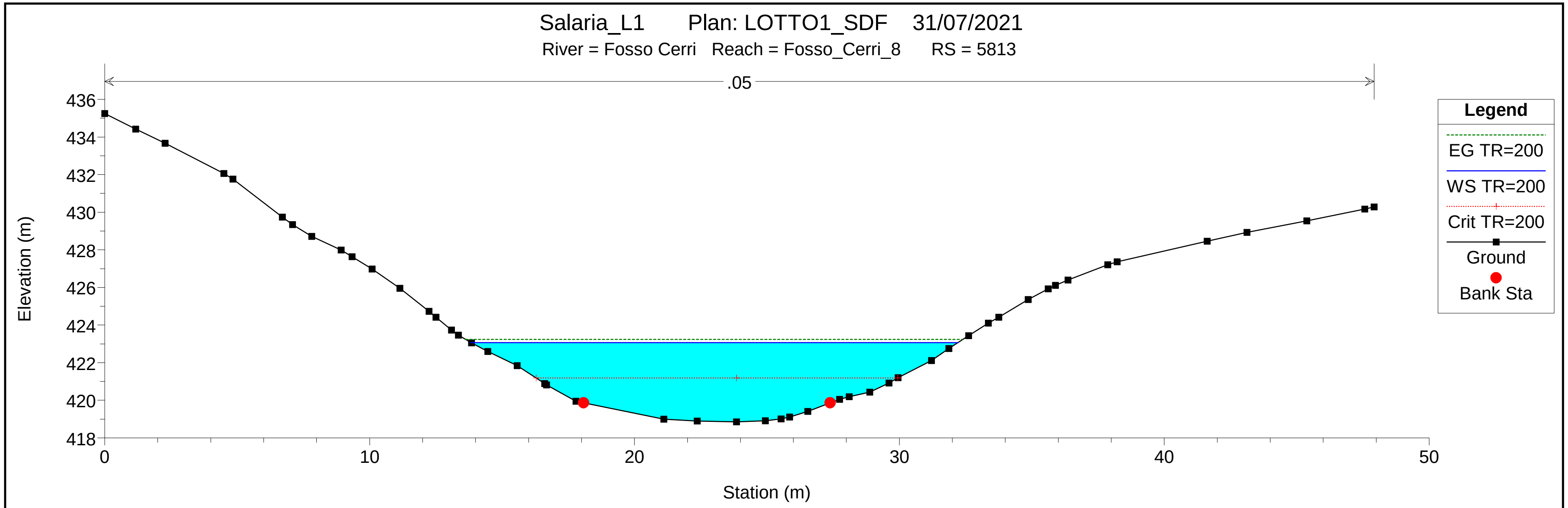
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 6063
.05
Elevation (m)
440
438
436
434
432
430
428
426
424
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 6011
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

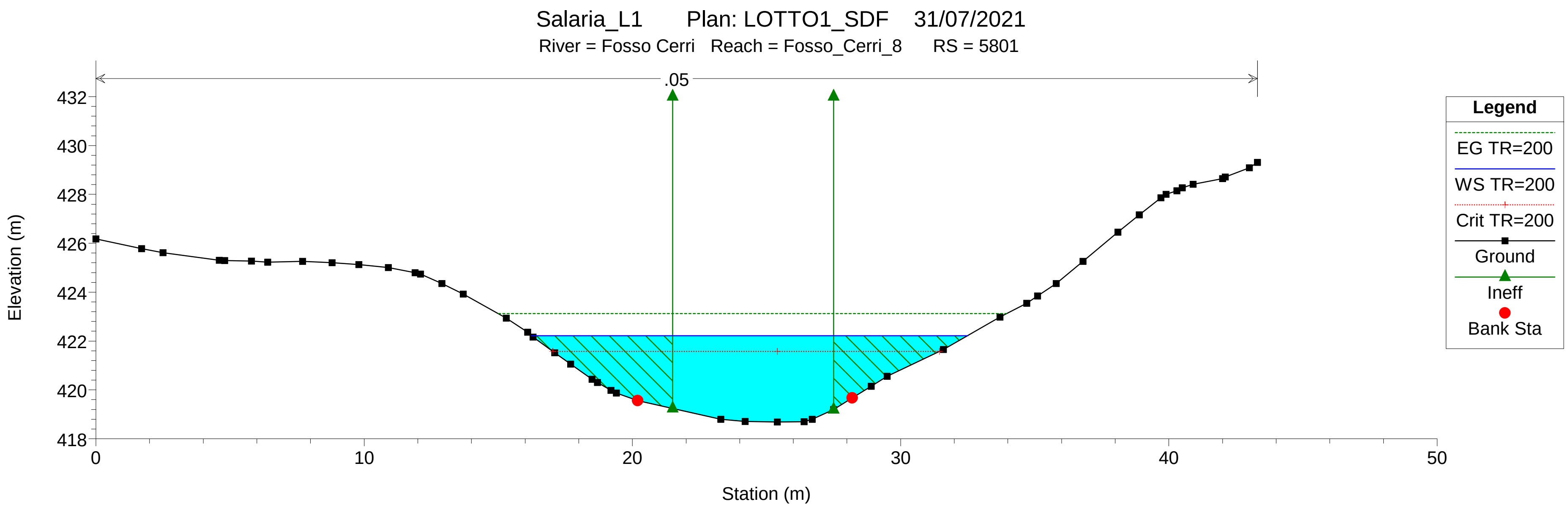

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 5959
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 5927
.05
Elevation (m)
436
434
432
430
428
426
424
422
420
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

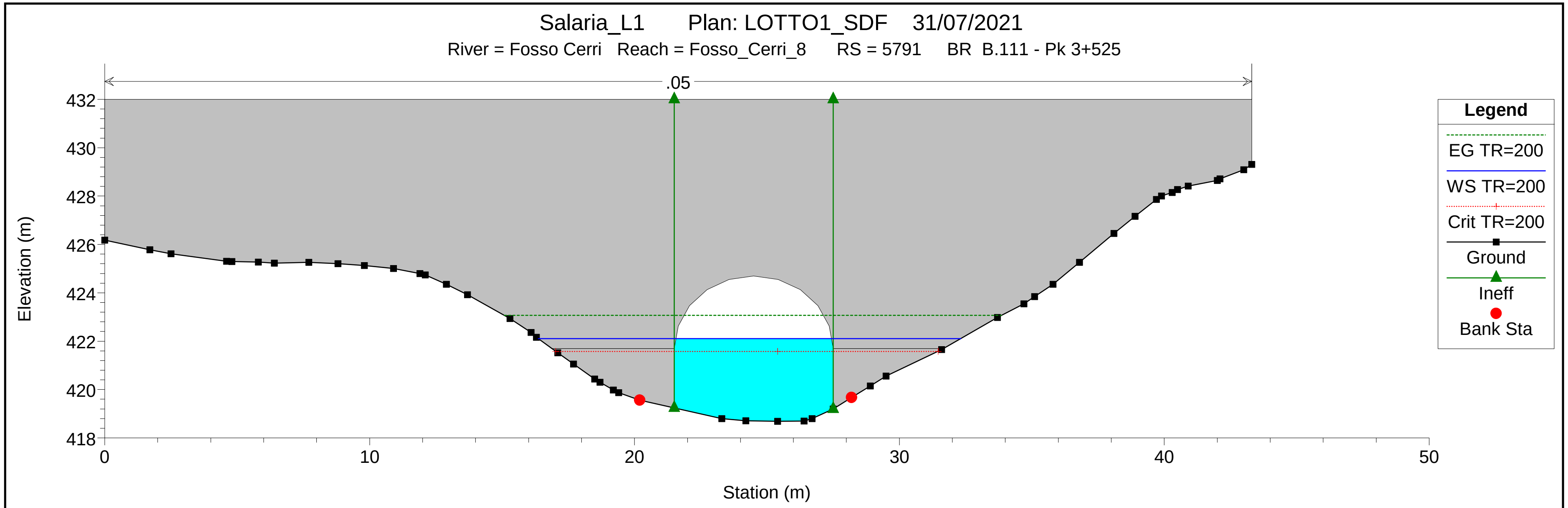

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 5873
.05
Elevation (m)
440
435
430
425
420
0
10
20
30
40
50
60
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta



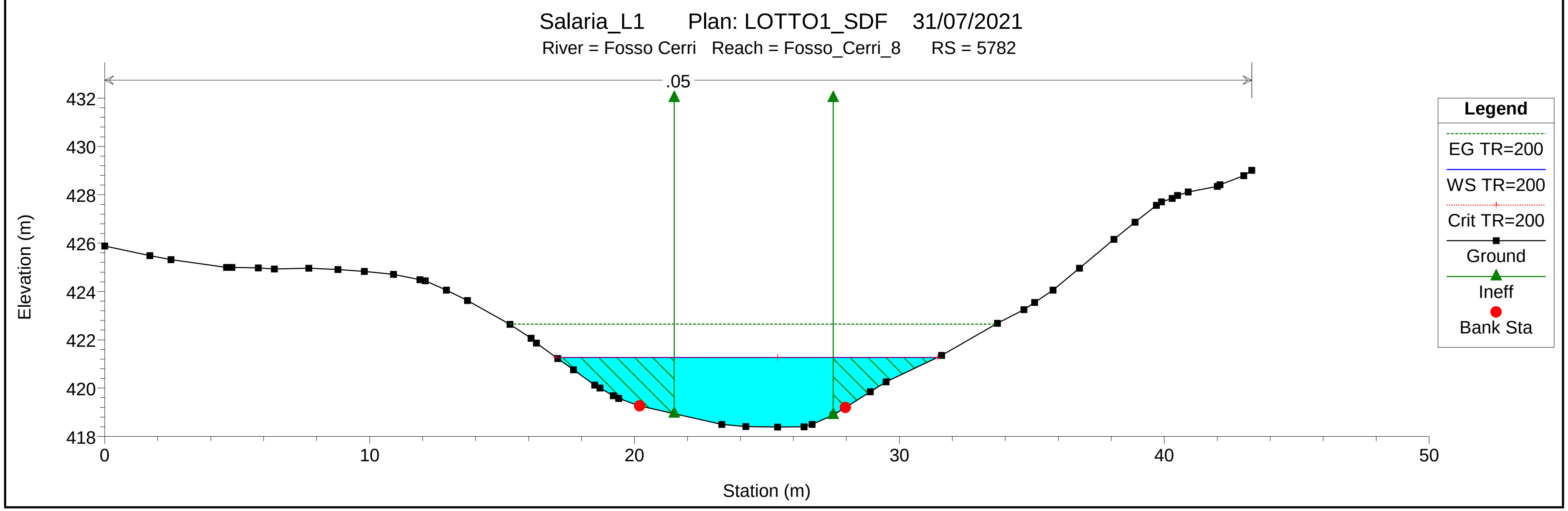
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 5813
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta



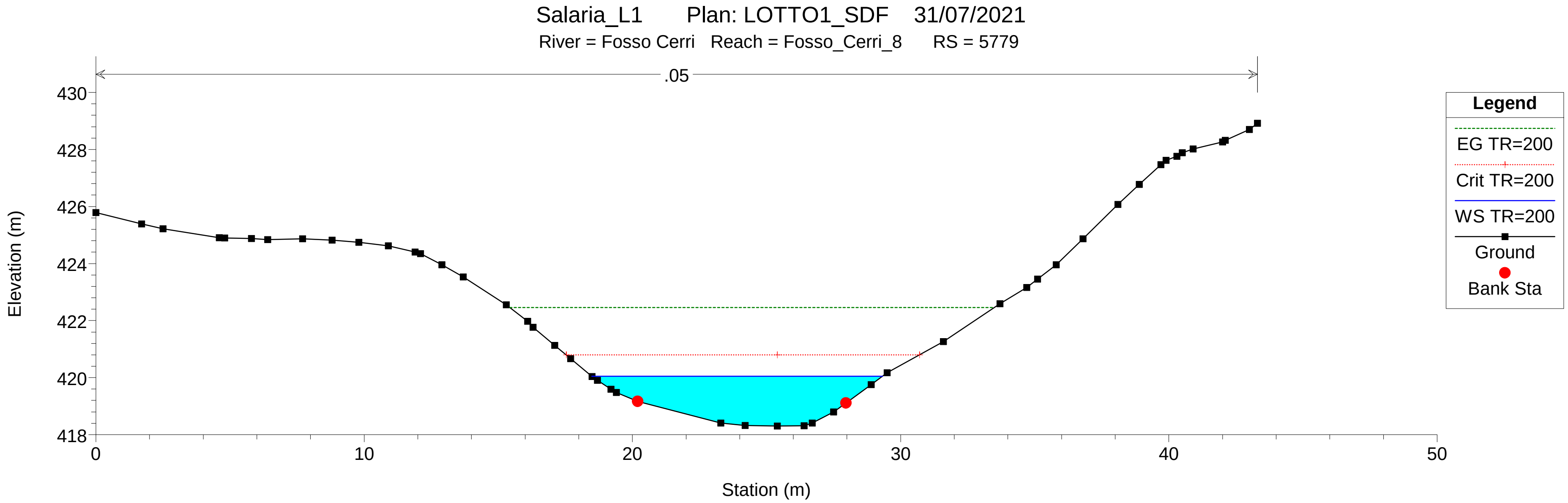
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 5801
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

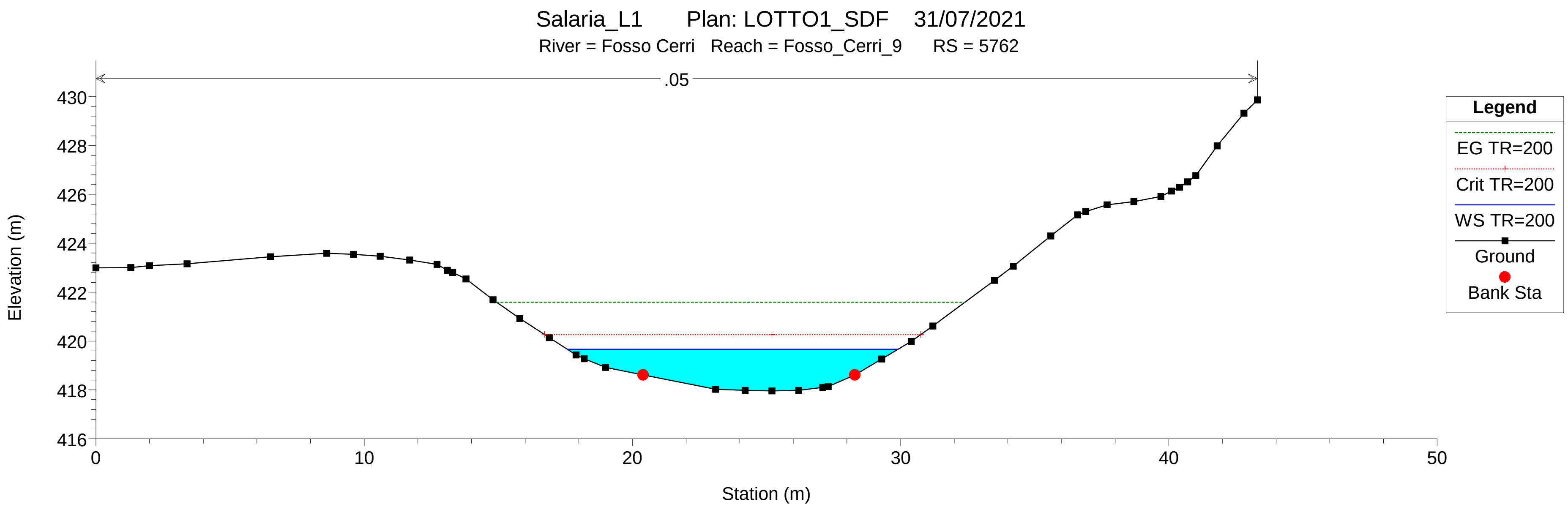


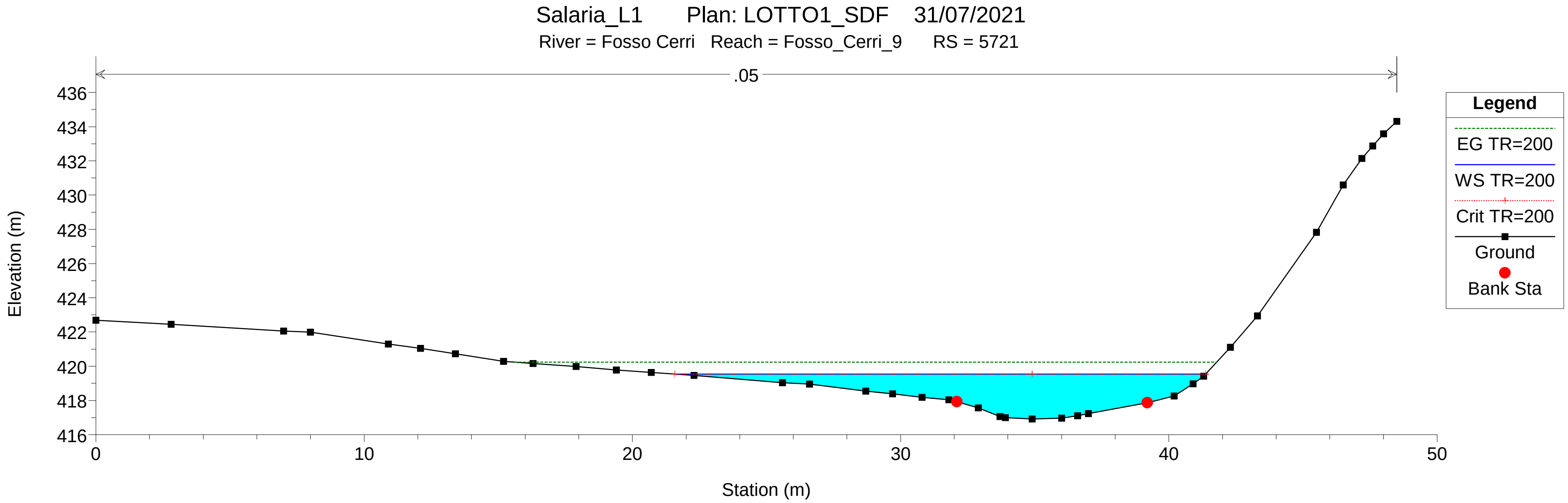
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 5791 BR B.111 - Pk 3+525
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



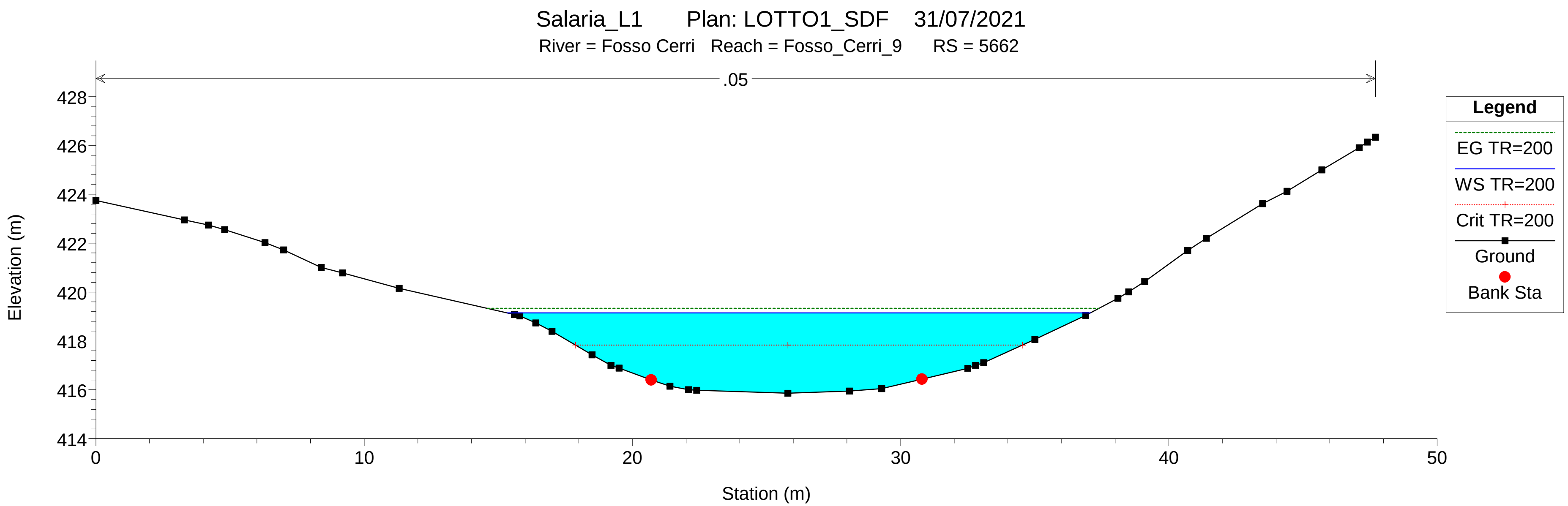
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 5782
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_8 RS = 5779
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

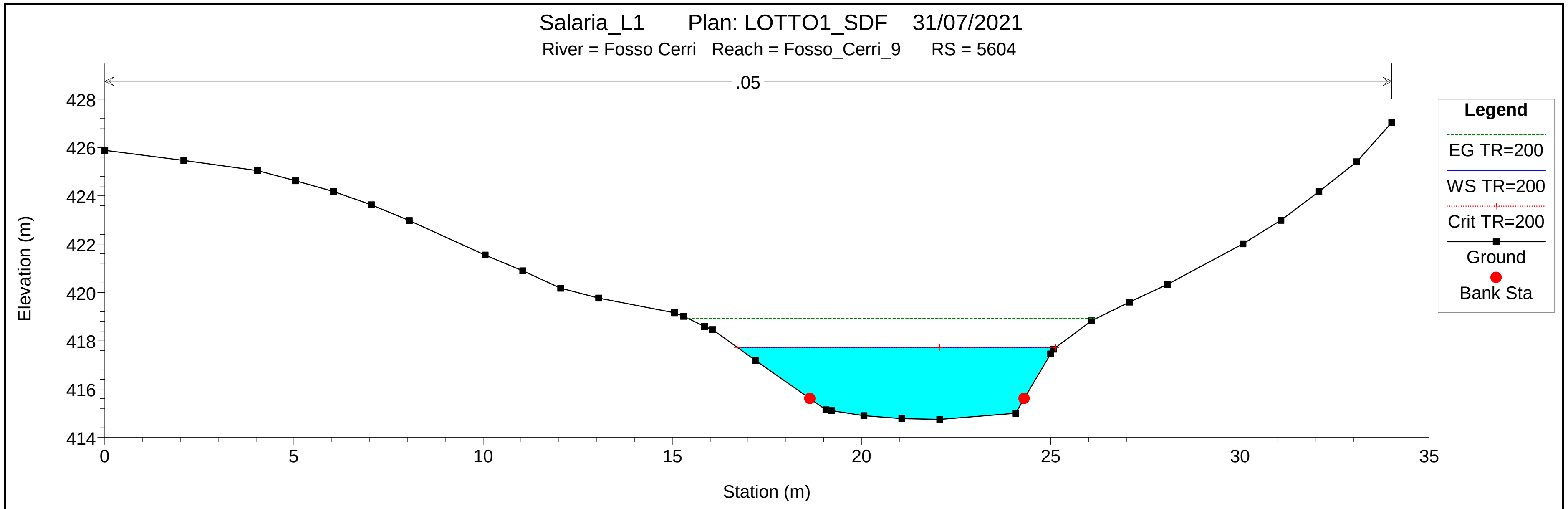

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5762
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

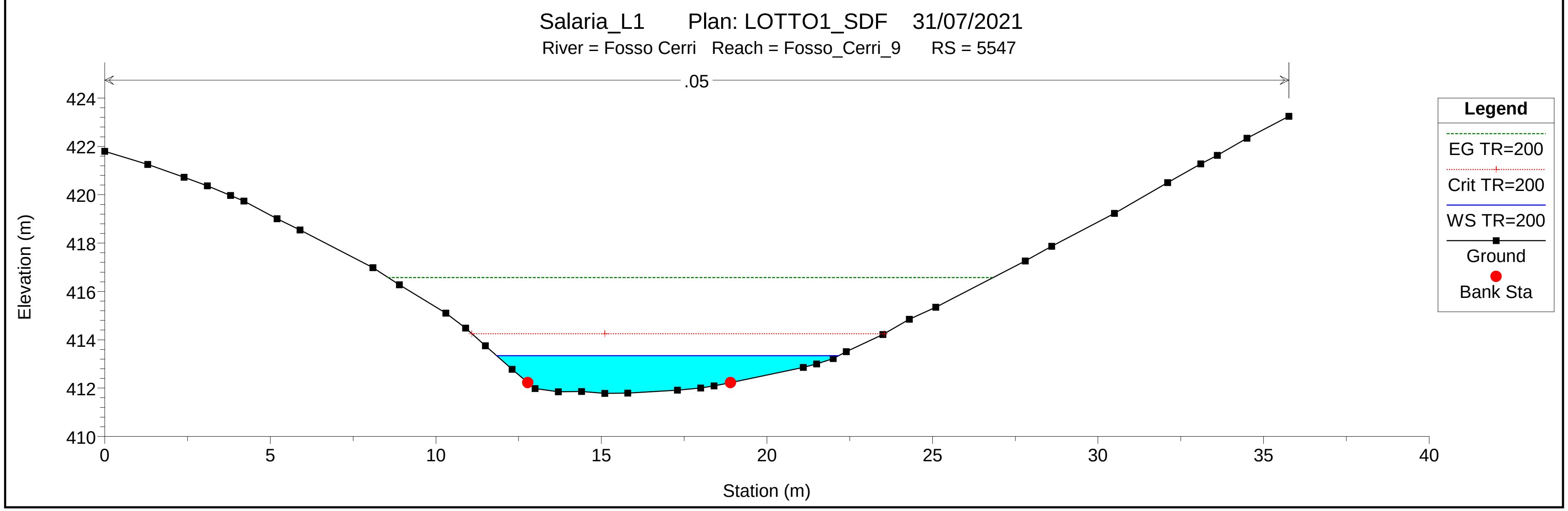


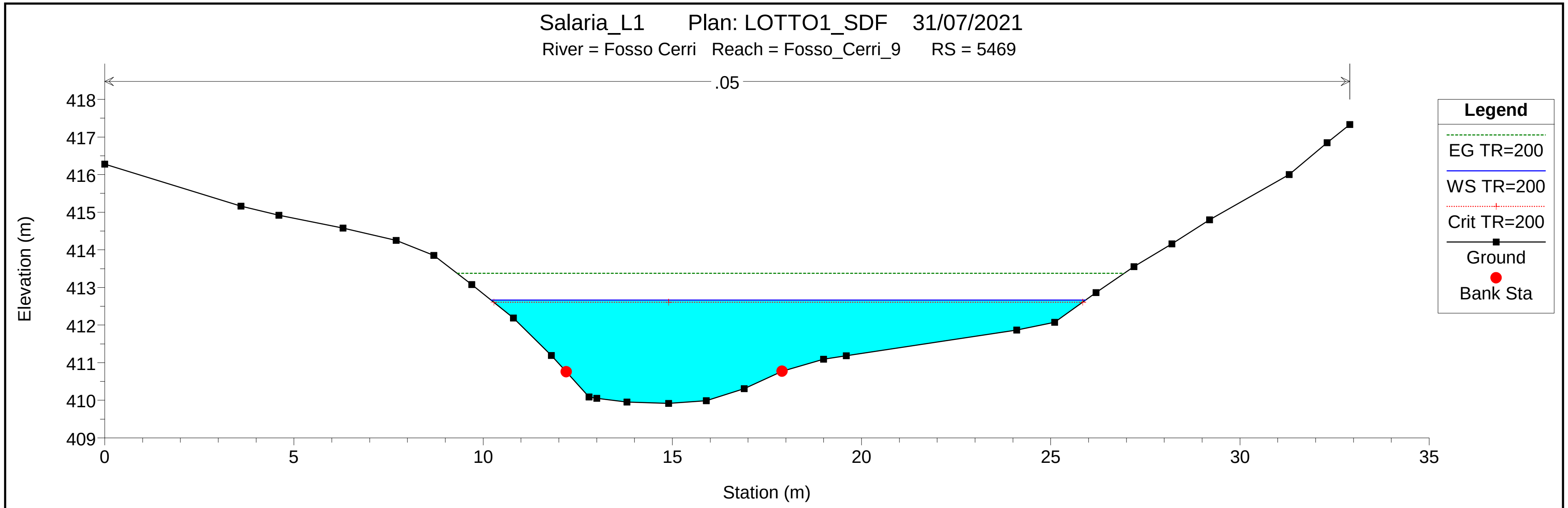
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5721
.05
Elevation (m)
436
434
432
430
428
426
424
422
420
418
416
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

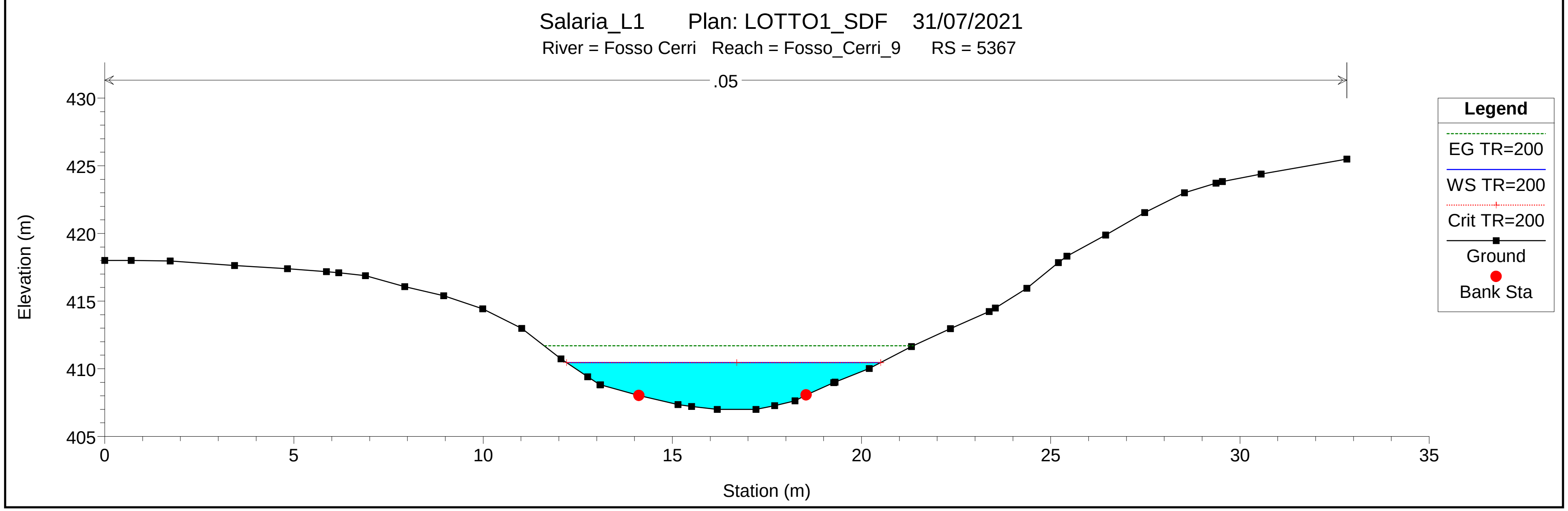


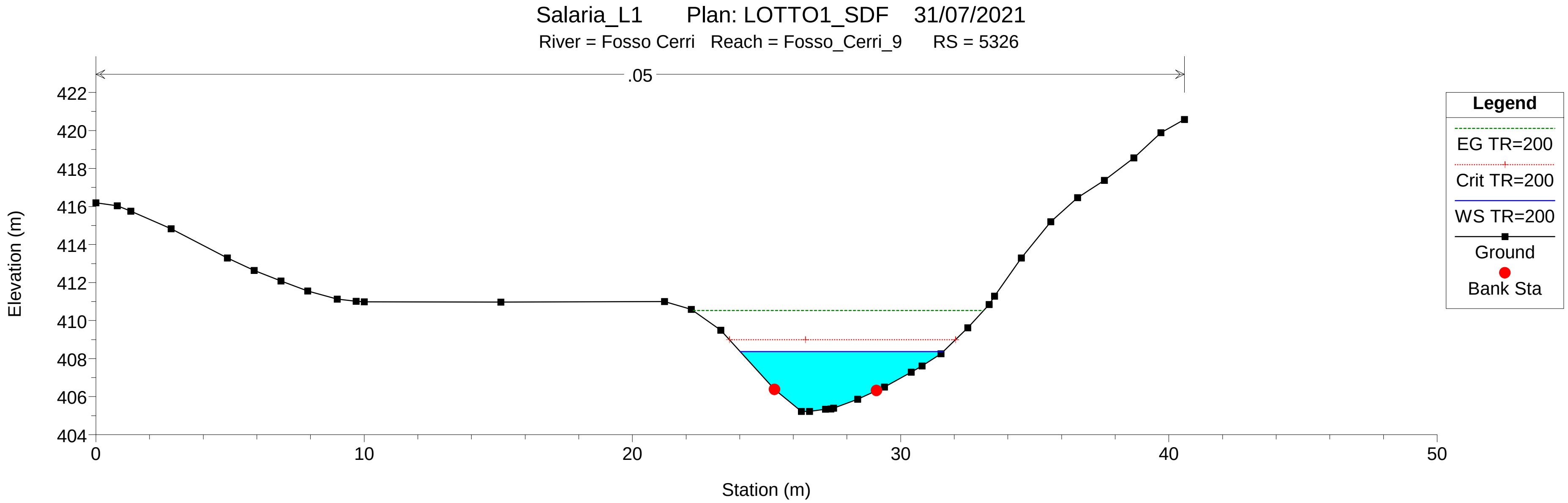
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5662
.05
Elevation (m)
428
426
424
422
420
418
416
414
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

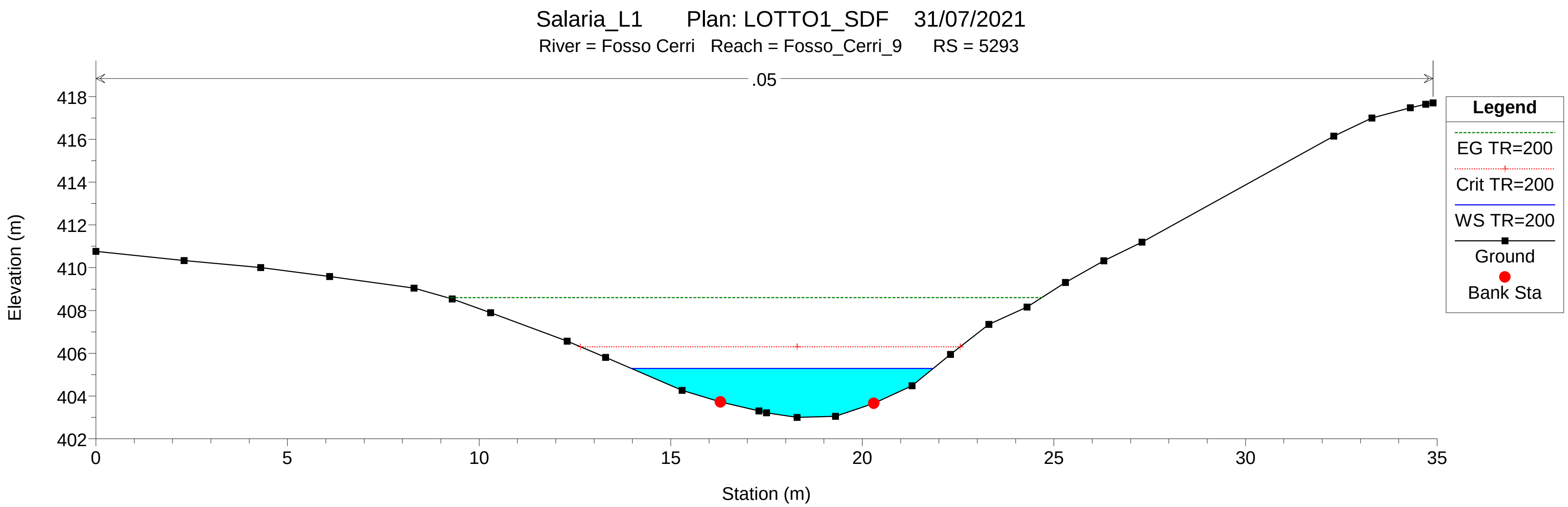

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5604
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

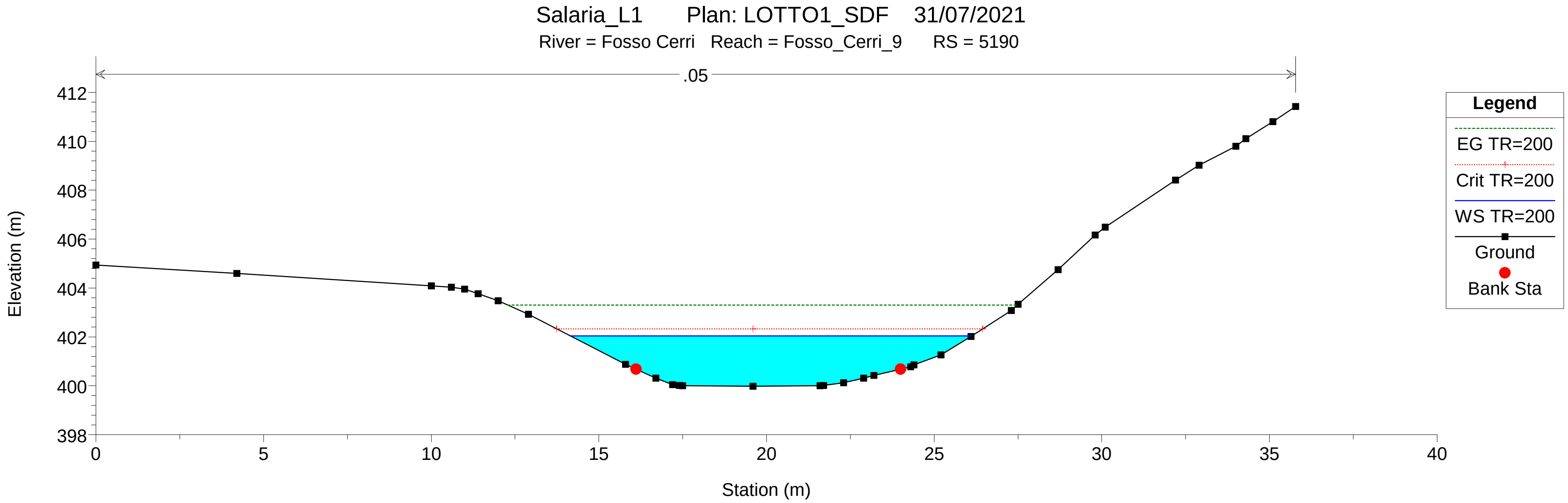

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5547
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

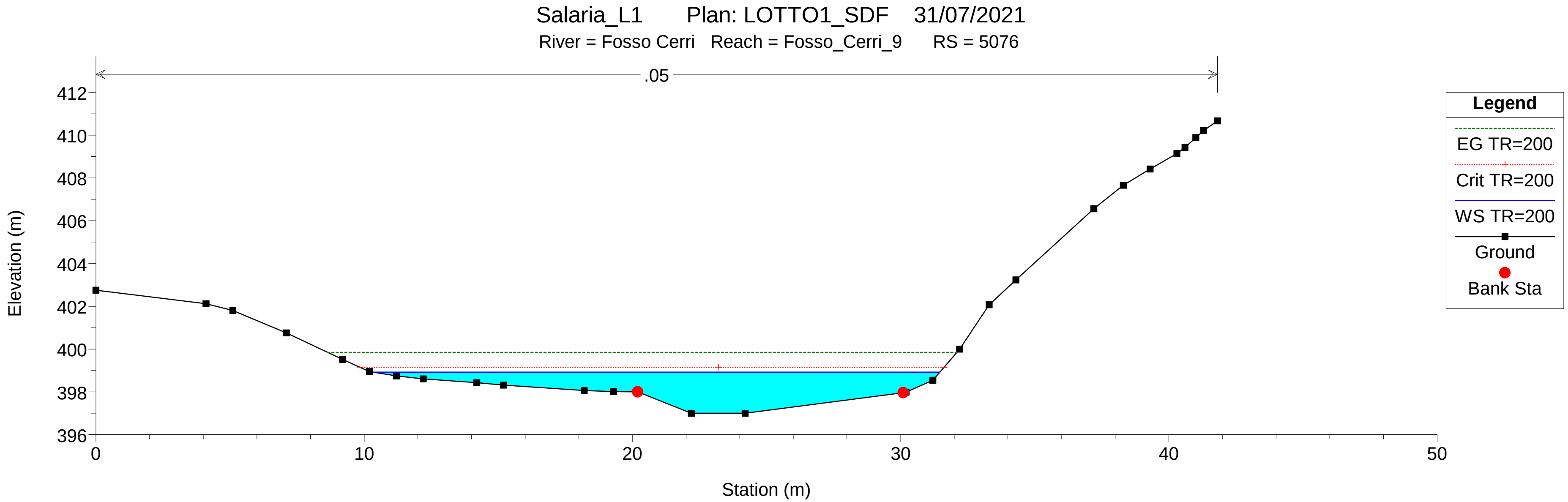

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5469
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

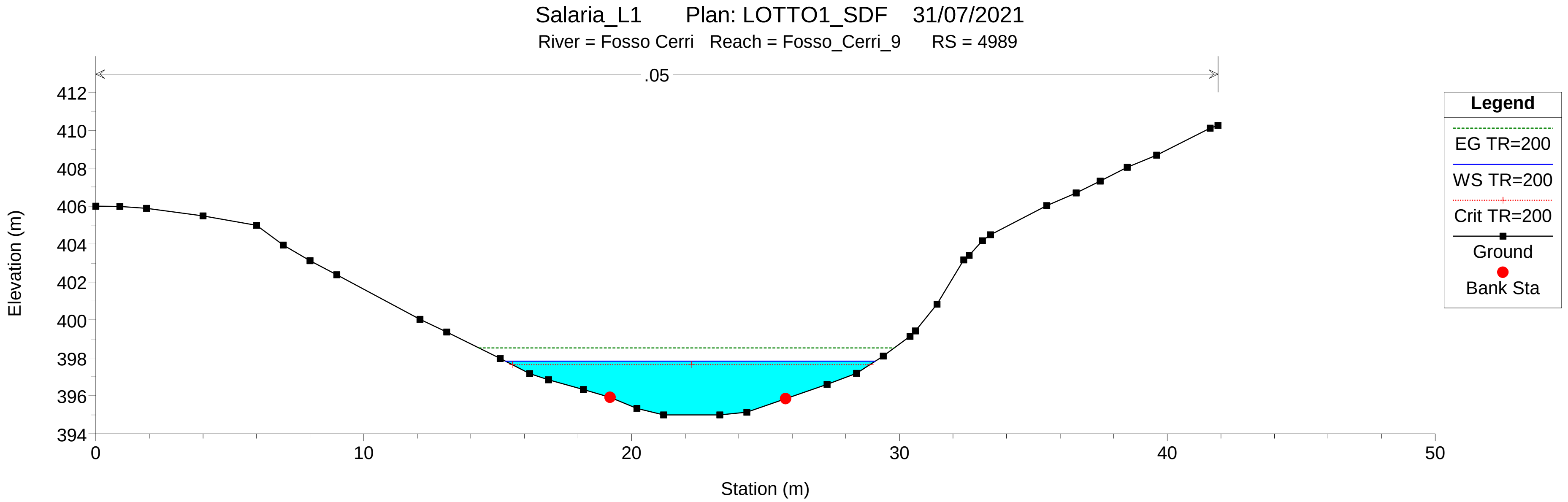

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5367
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

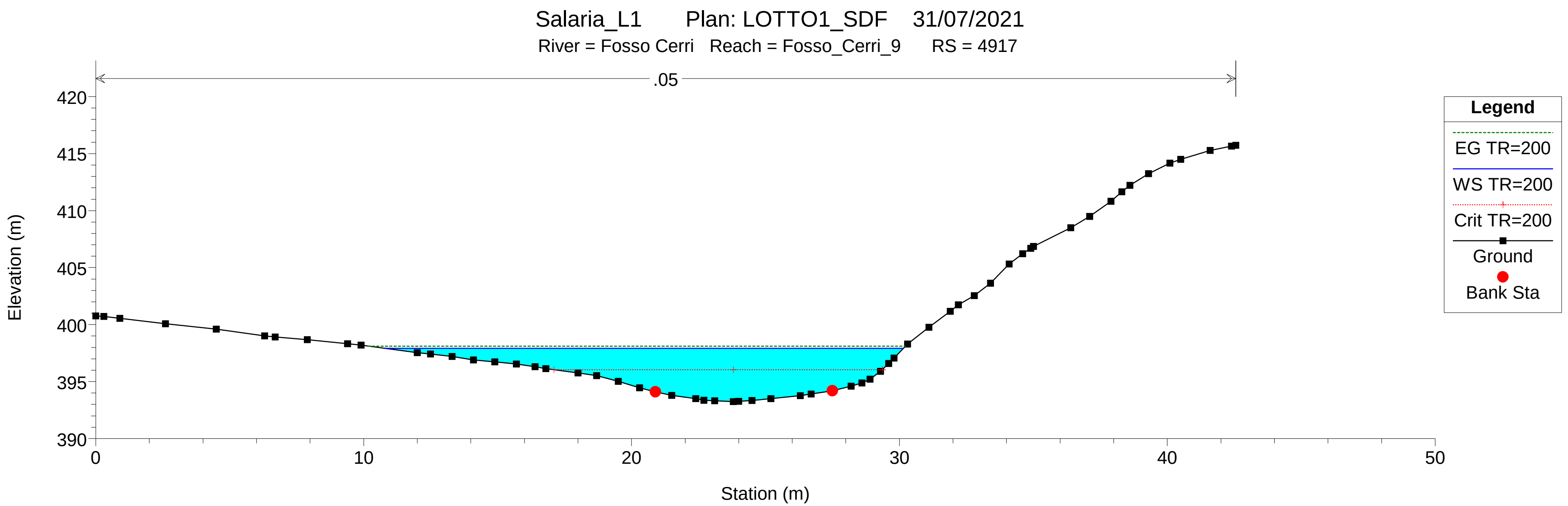

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5326
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

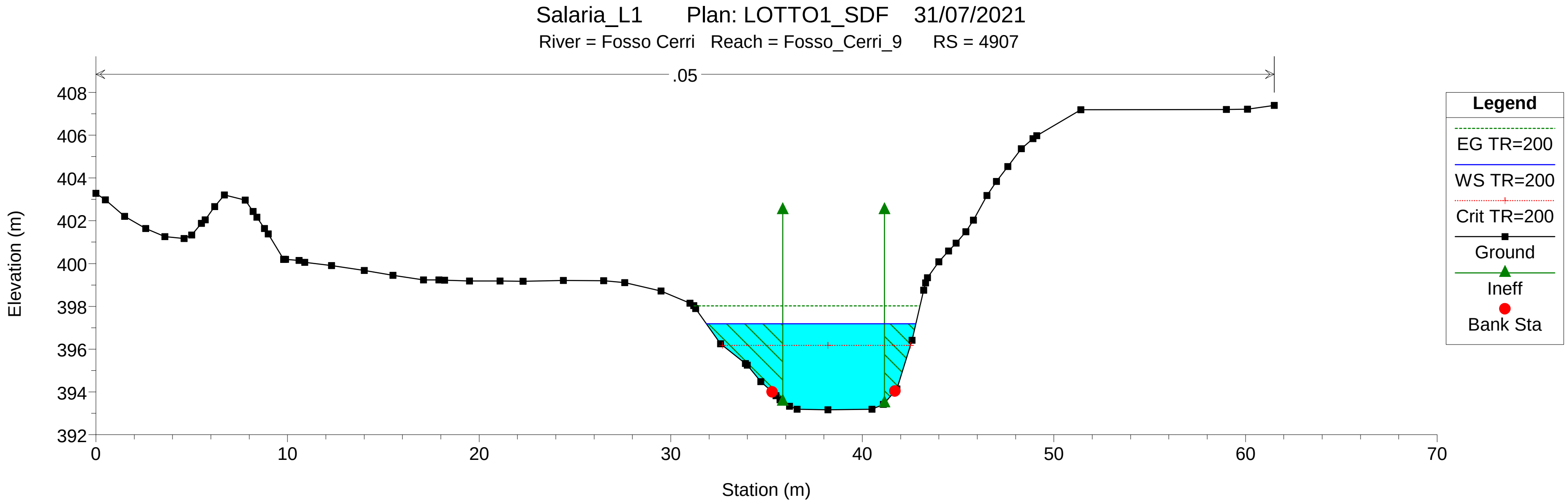

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5293
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

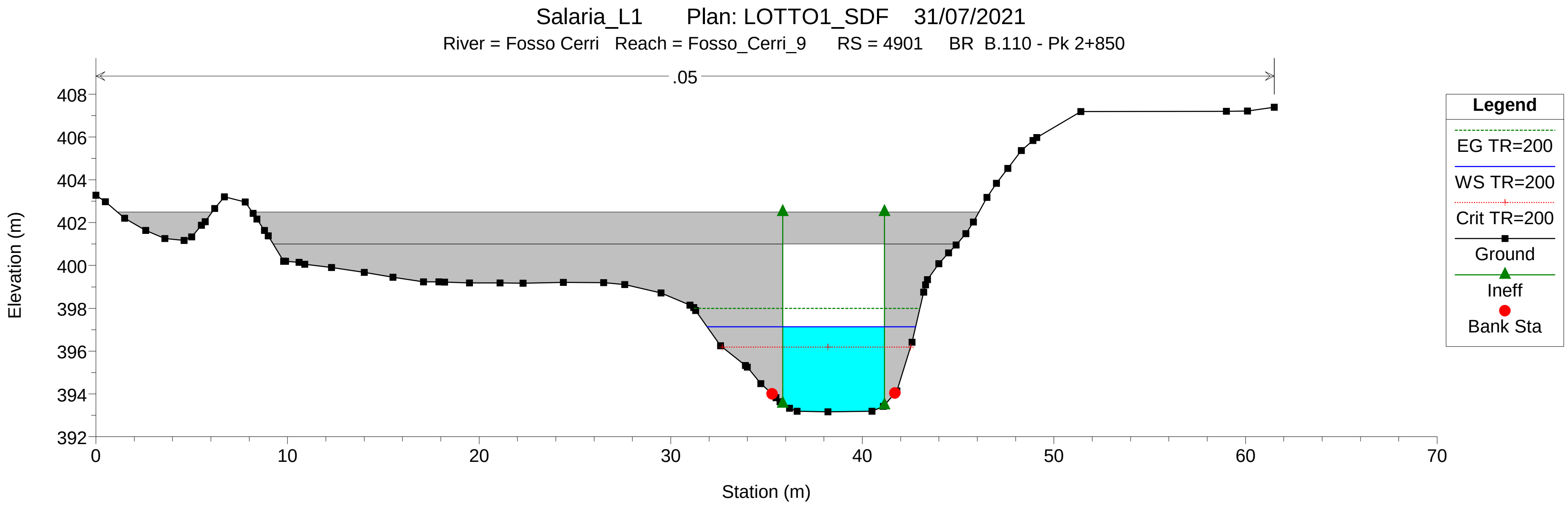

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5190
.05
Elevation (m)
412
410
408
406
404
402
400
398
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

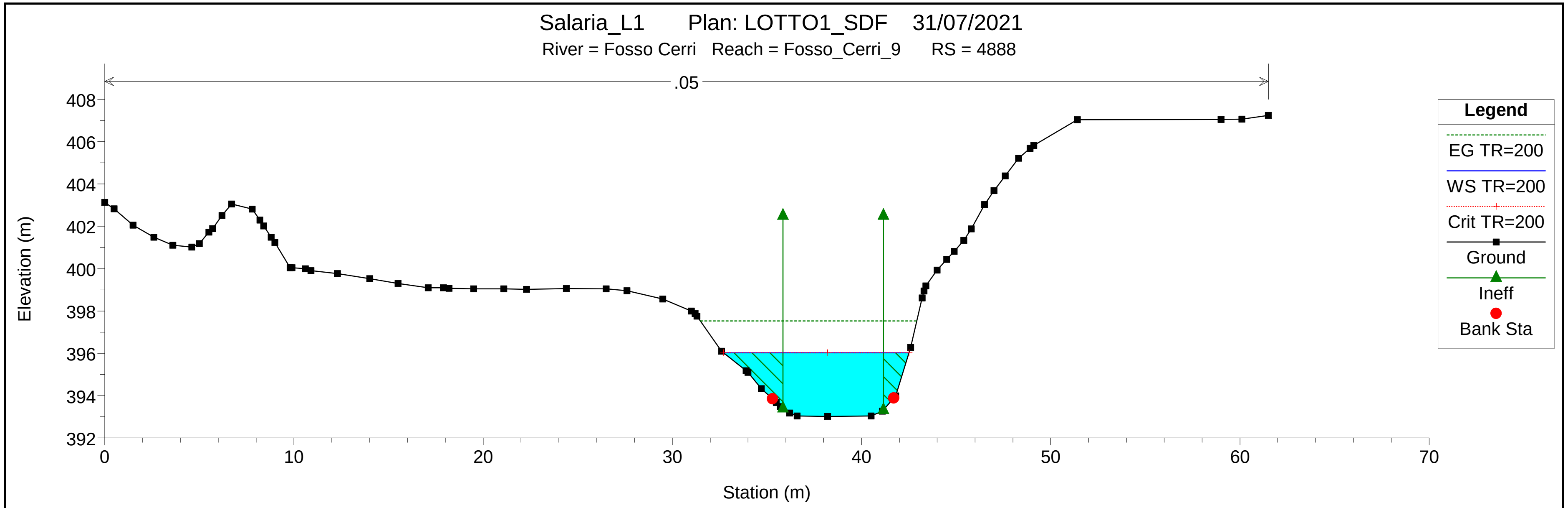

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5076
.05
Elevation (m)
412
410
408
406
404
402
400
398
396
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

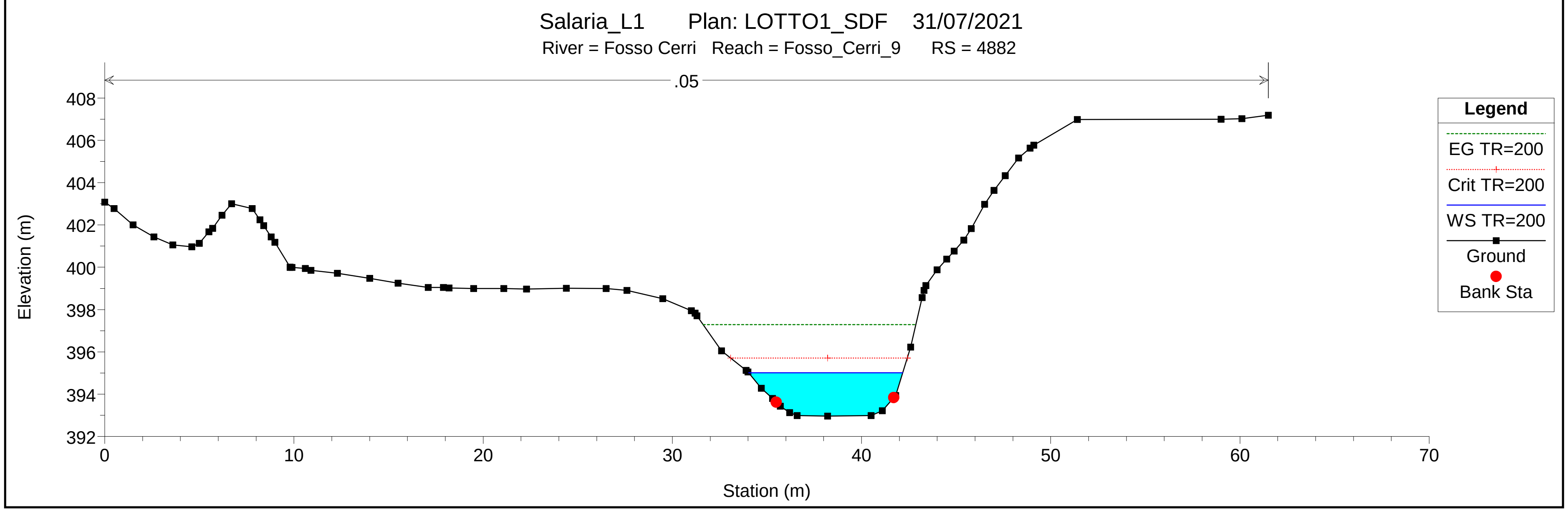

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4989
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

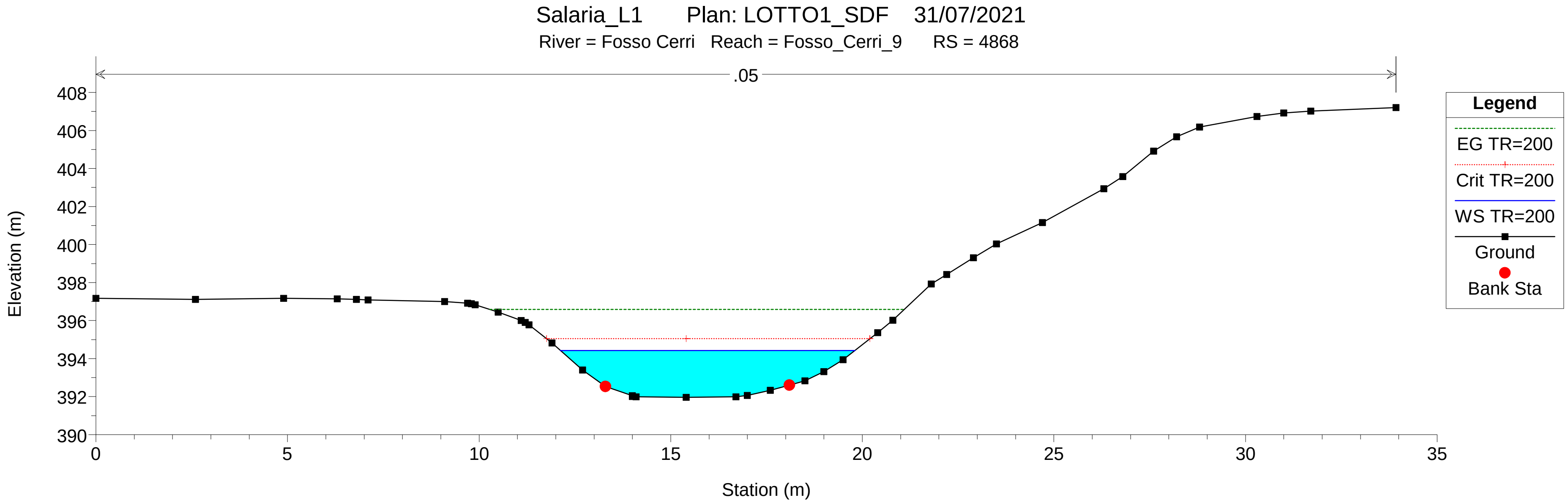

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4917
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

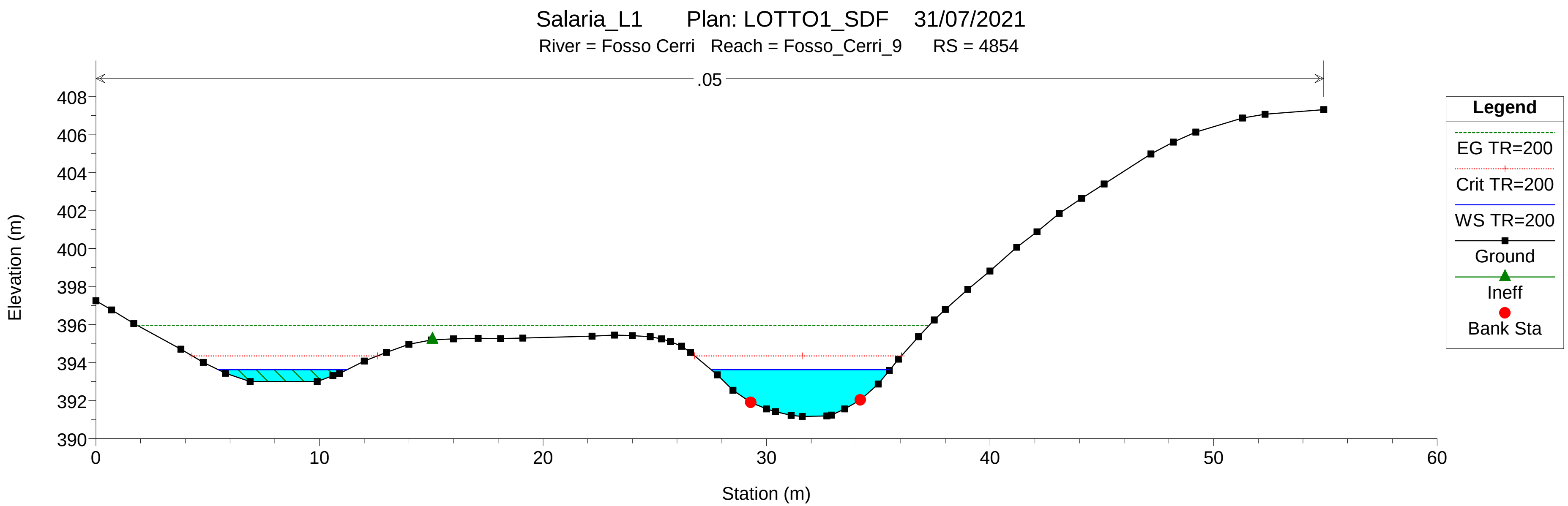

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4907
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

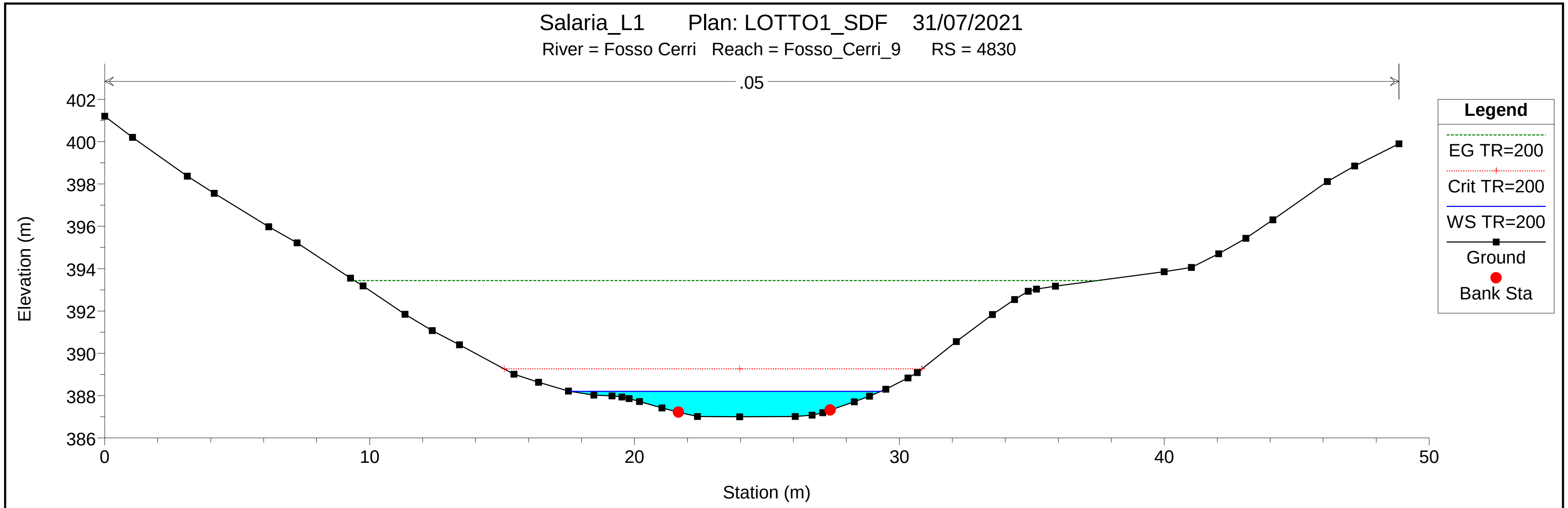

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4901 BR B.110 - Pk 2+850
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

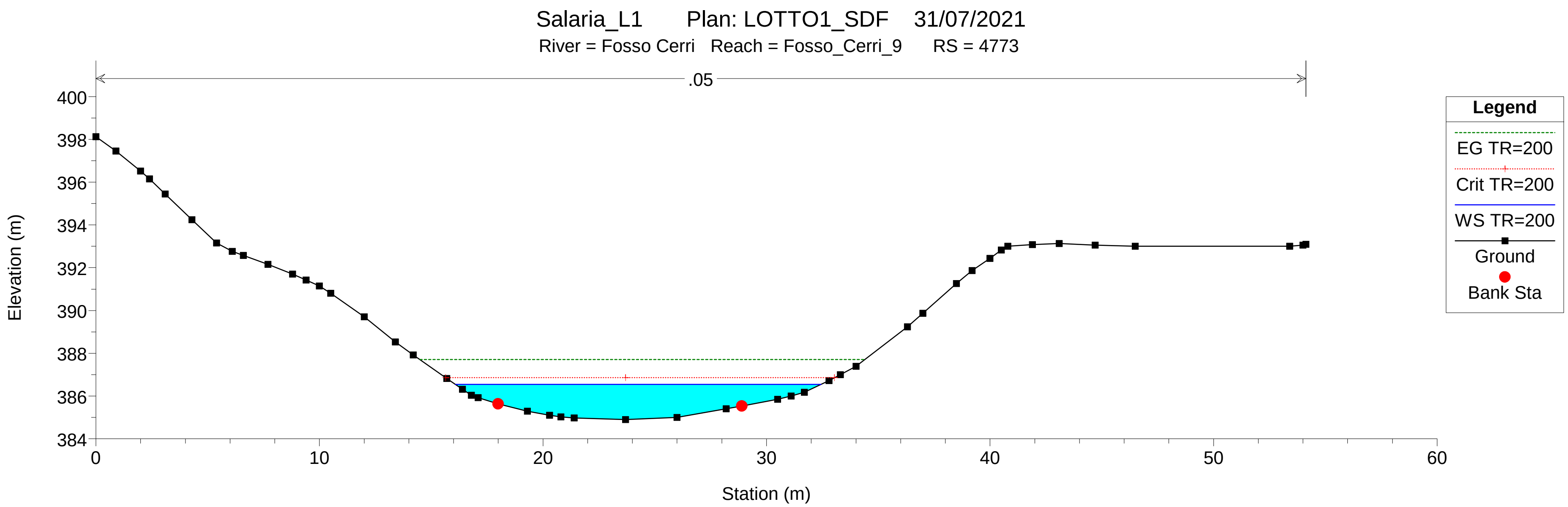

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4888
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

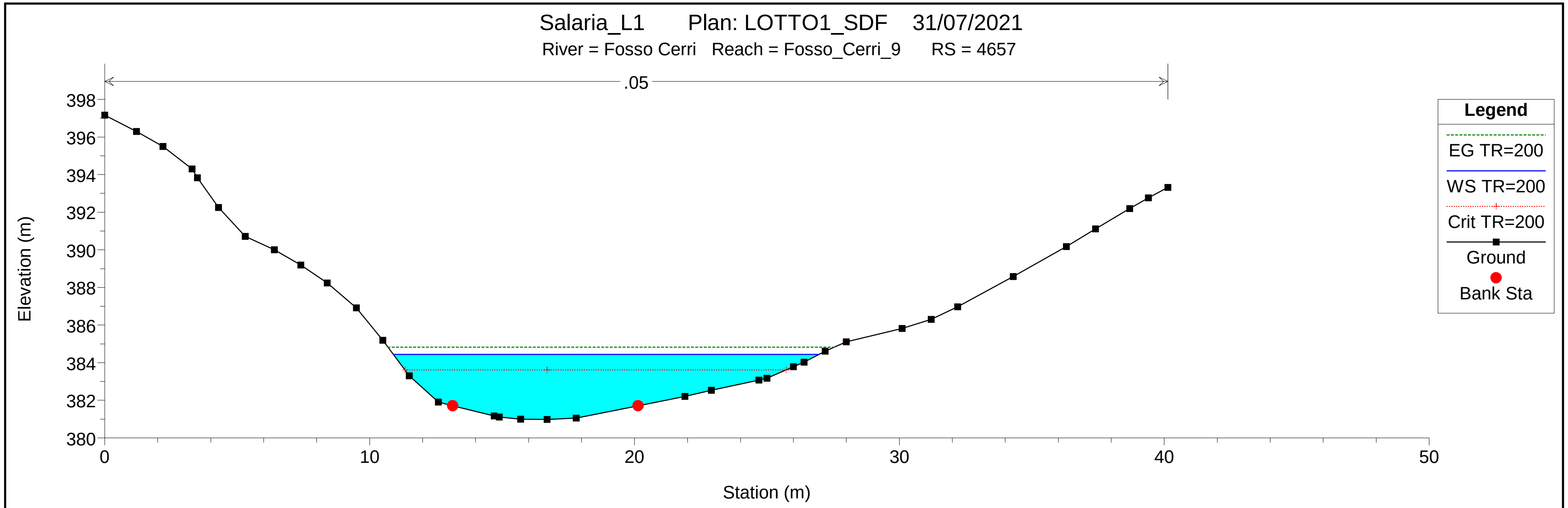

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4882
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

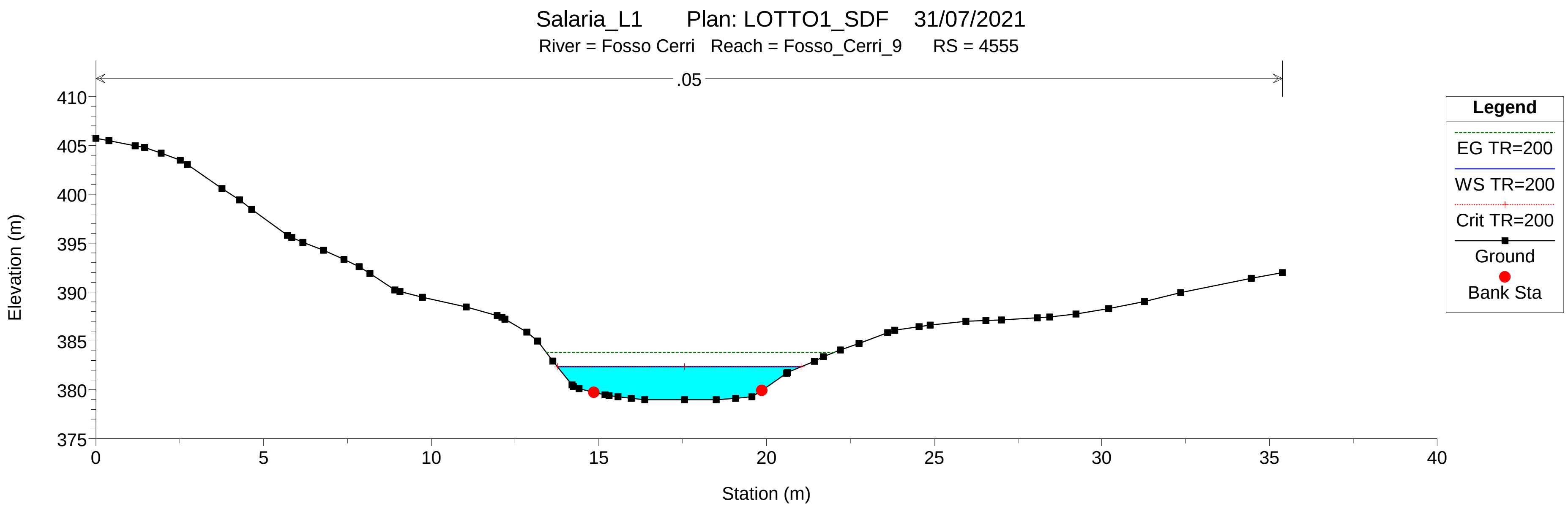

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4868
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

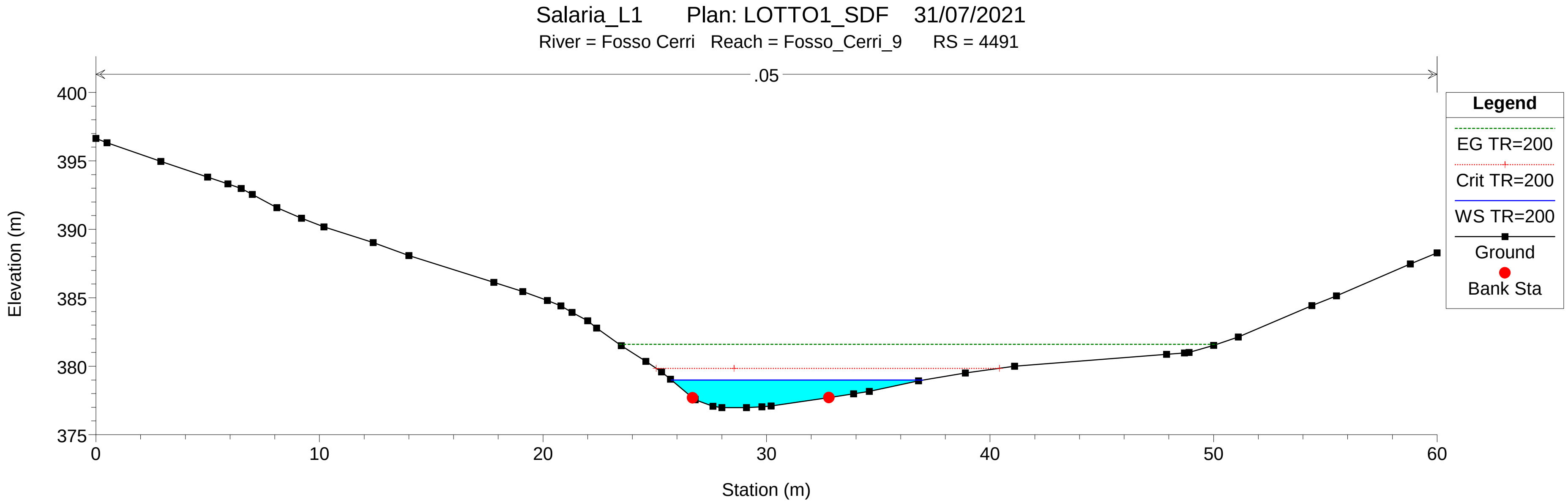

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4854
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

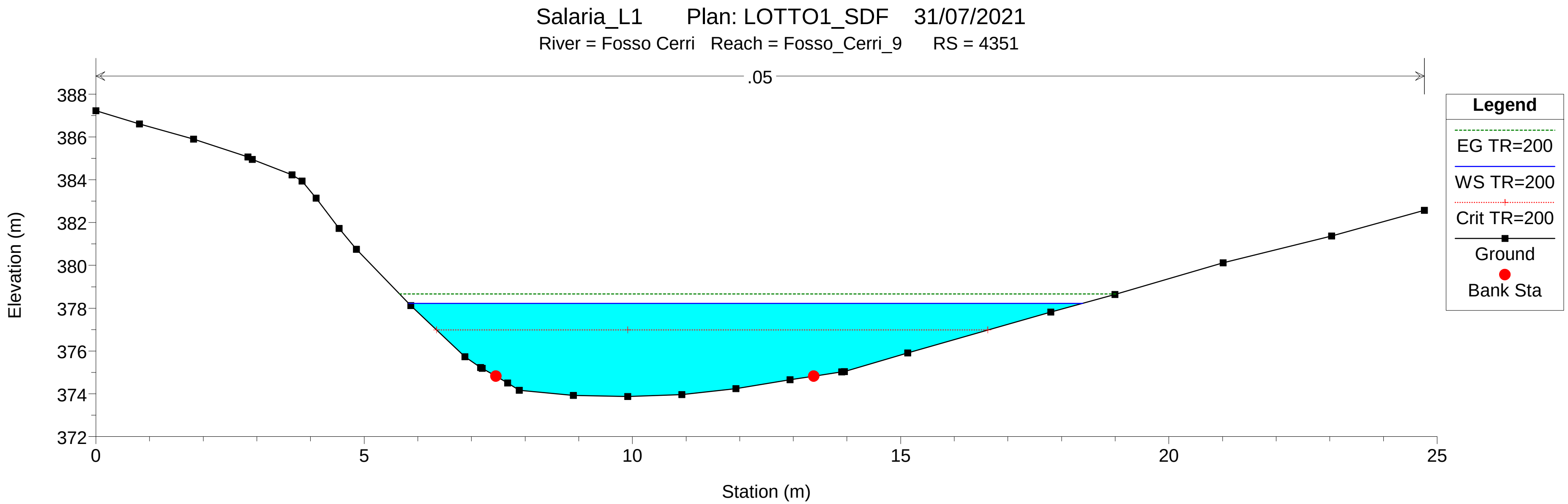

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4830
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

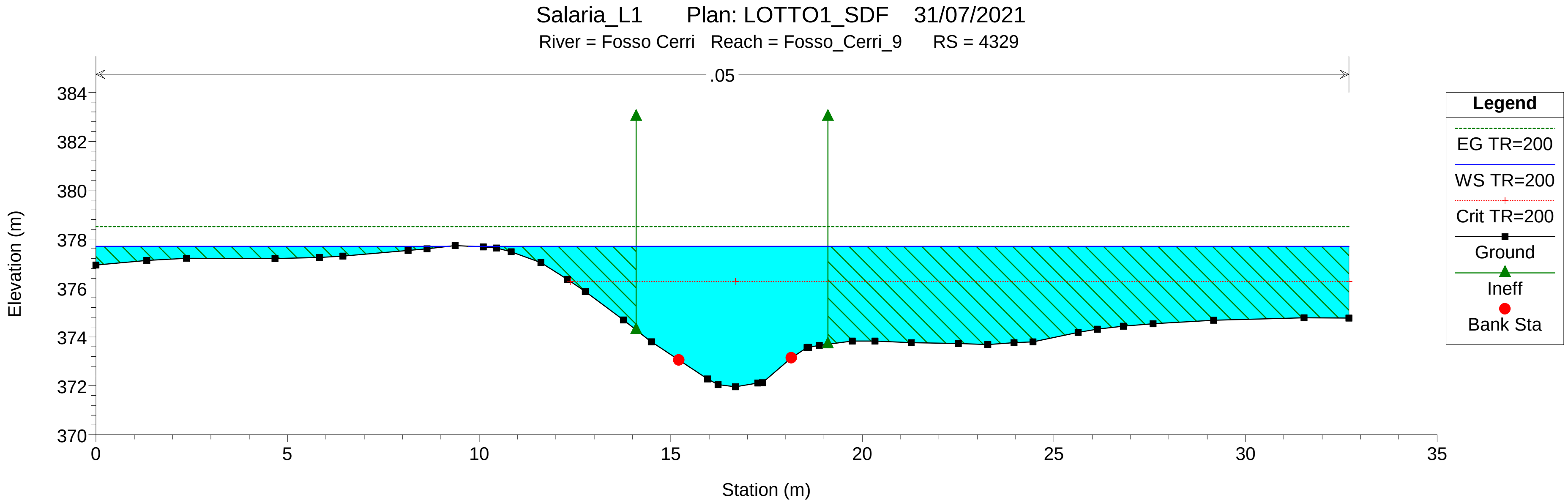

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4773
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

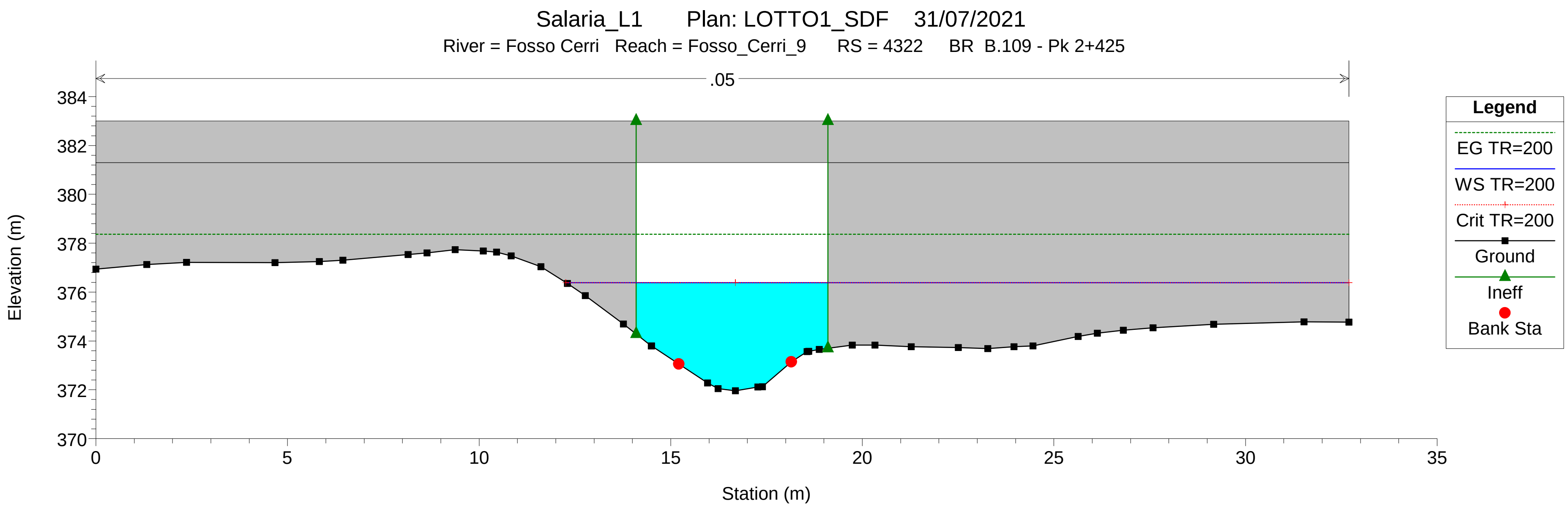

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4657
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

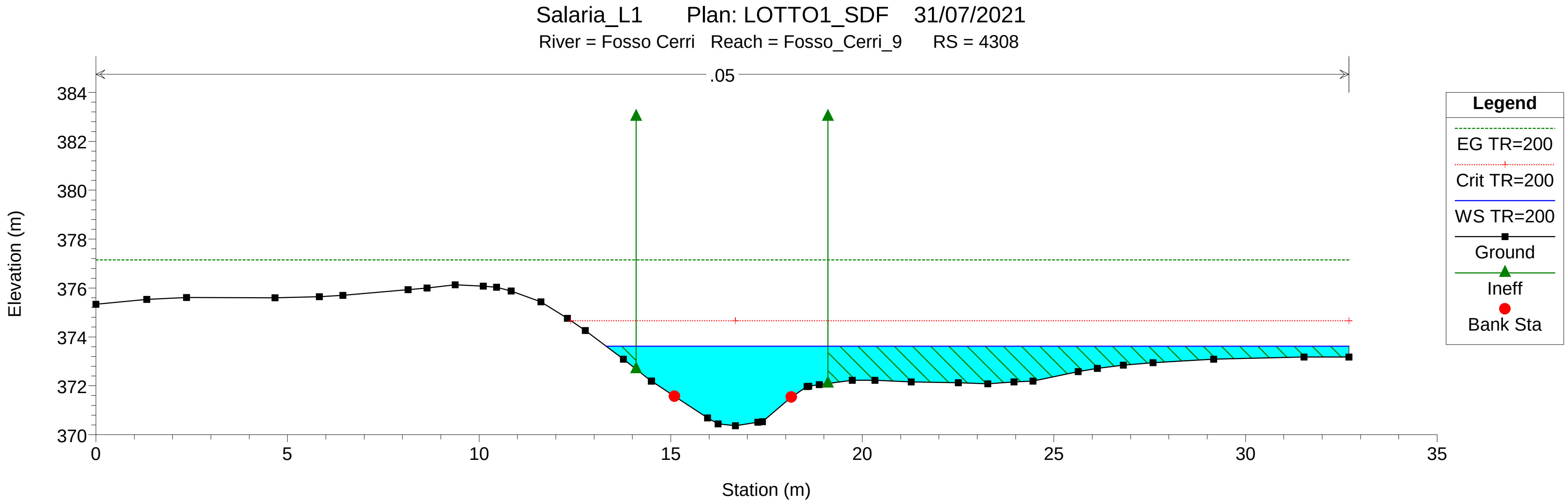

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4555
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

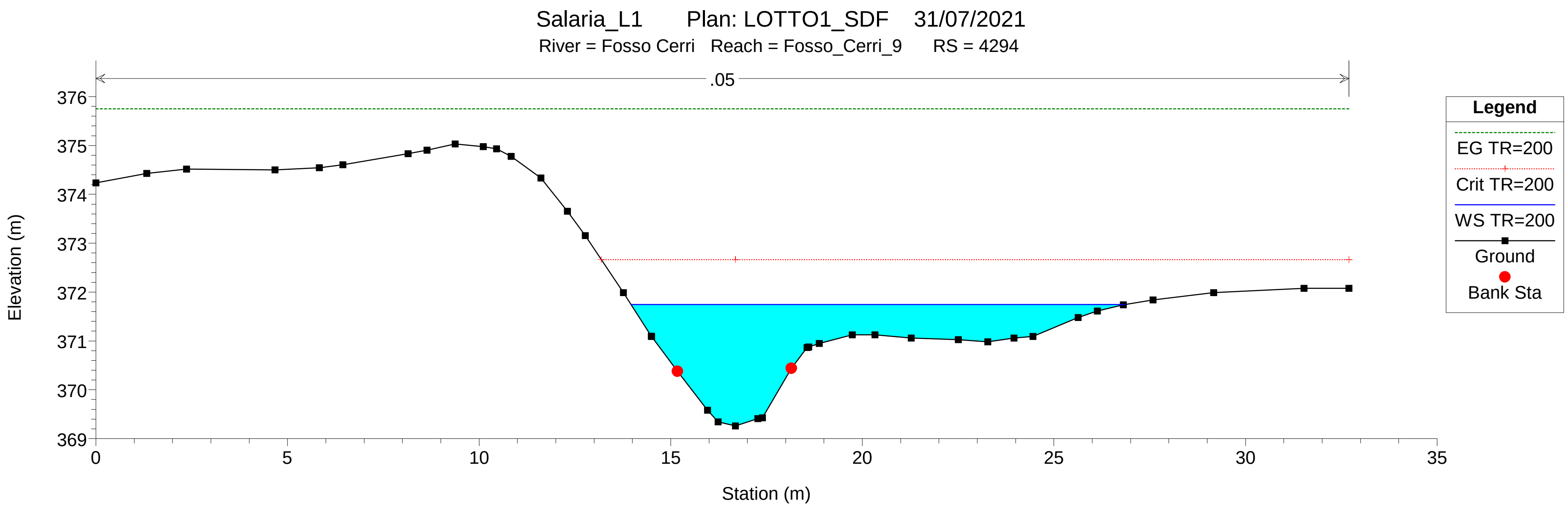

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4491
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

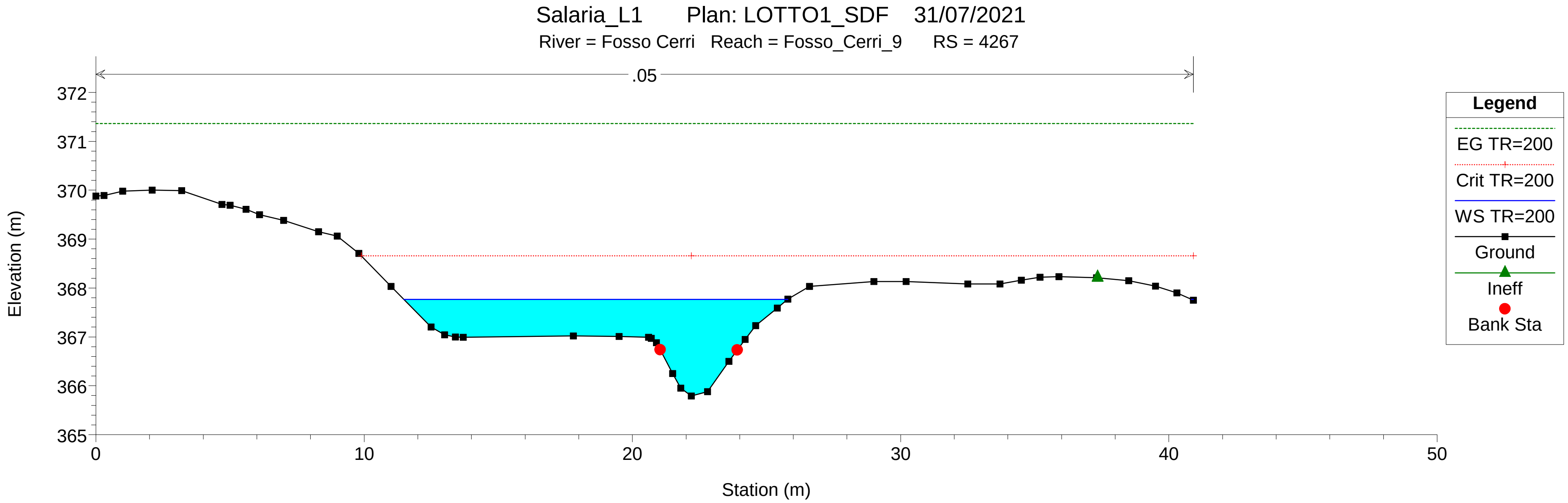

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4351
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

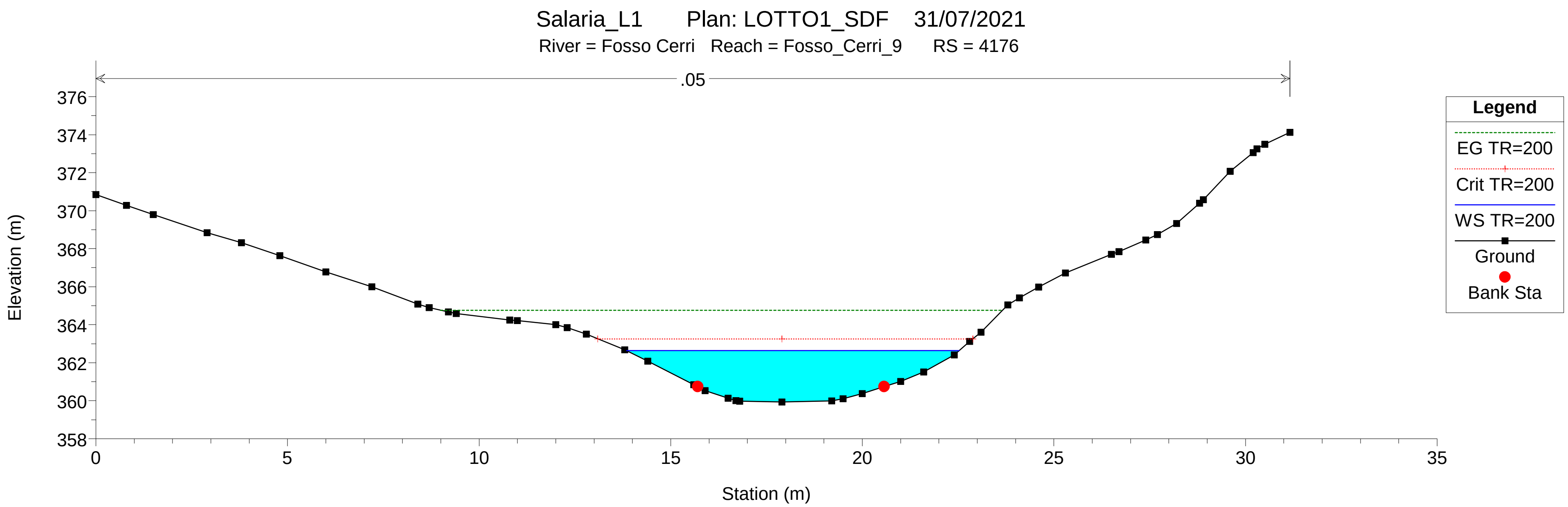

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4329
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

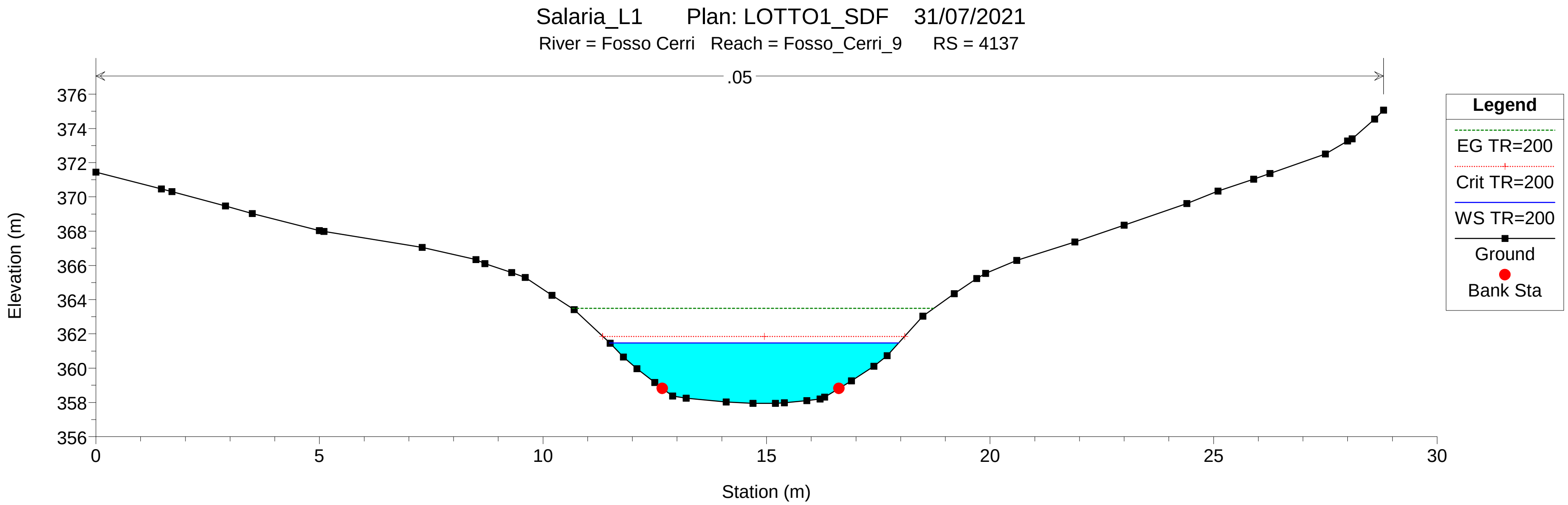

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4322 BR B.109 - Pk 2+425
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

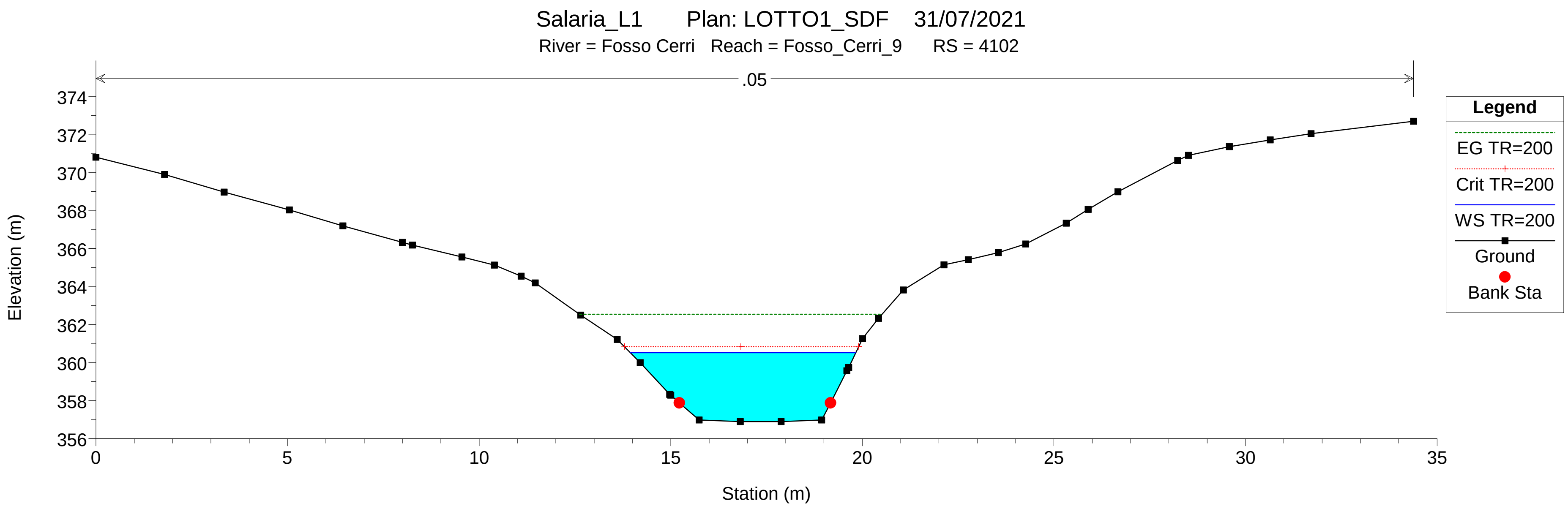

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4308
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

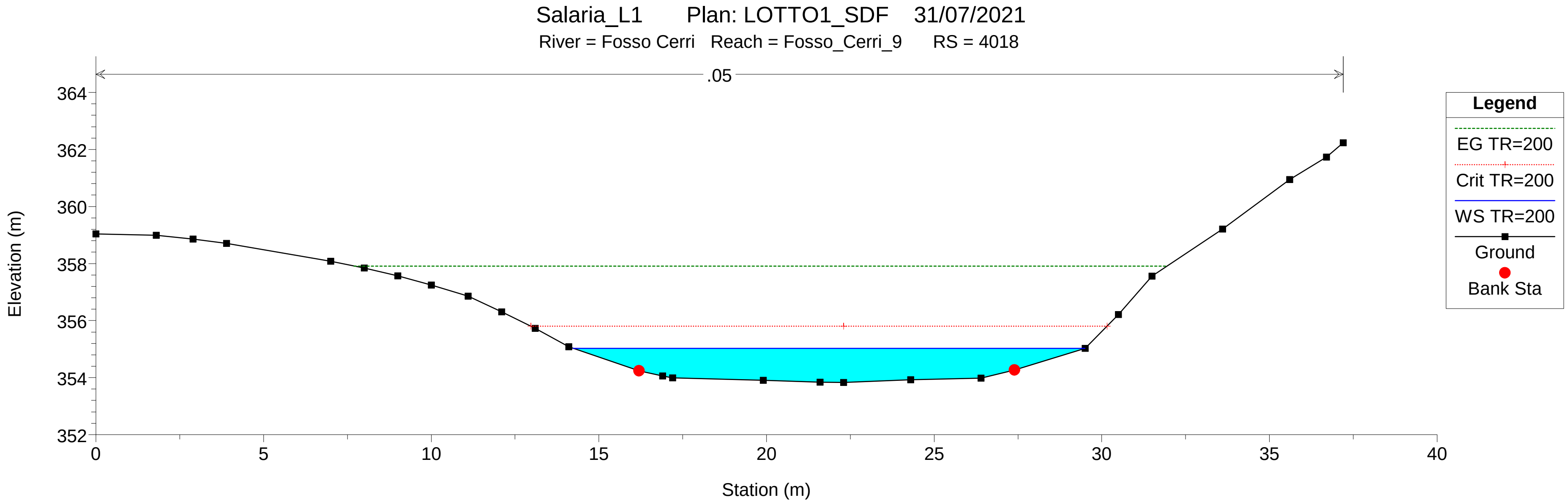

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4294
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

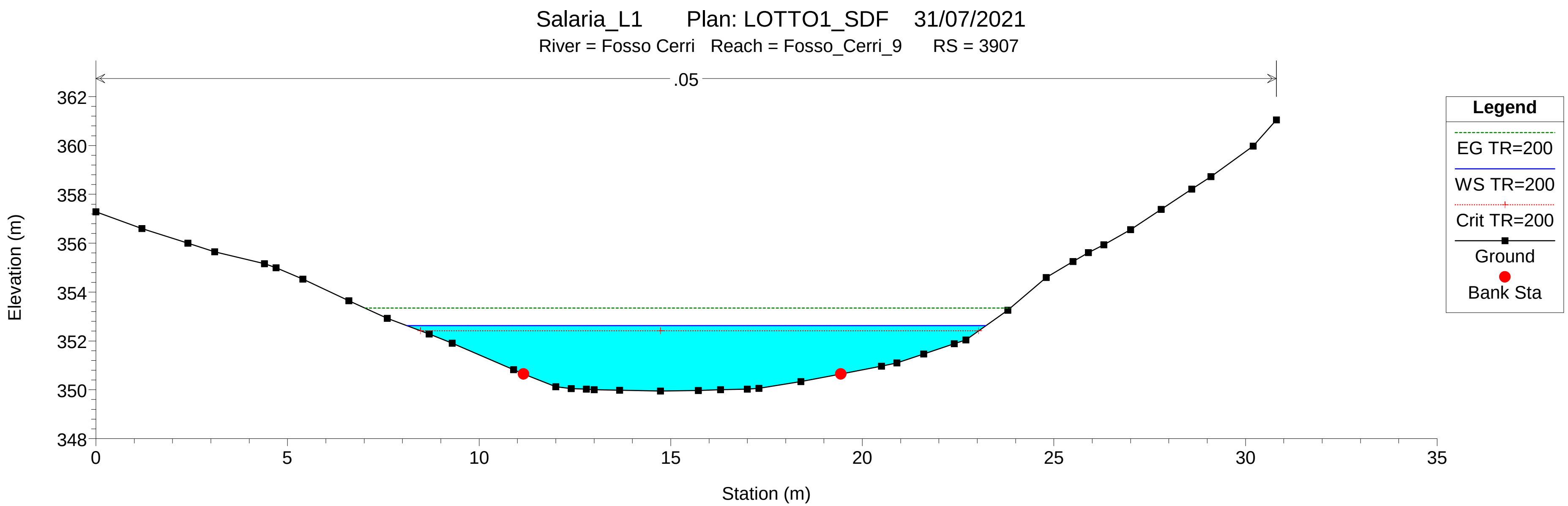

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4267
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

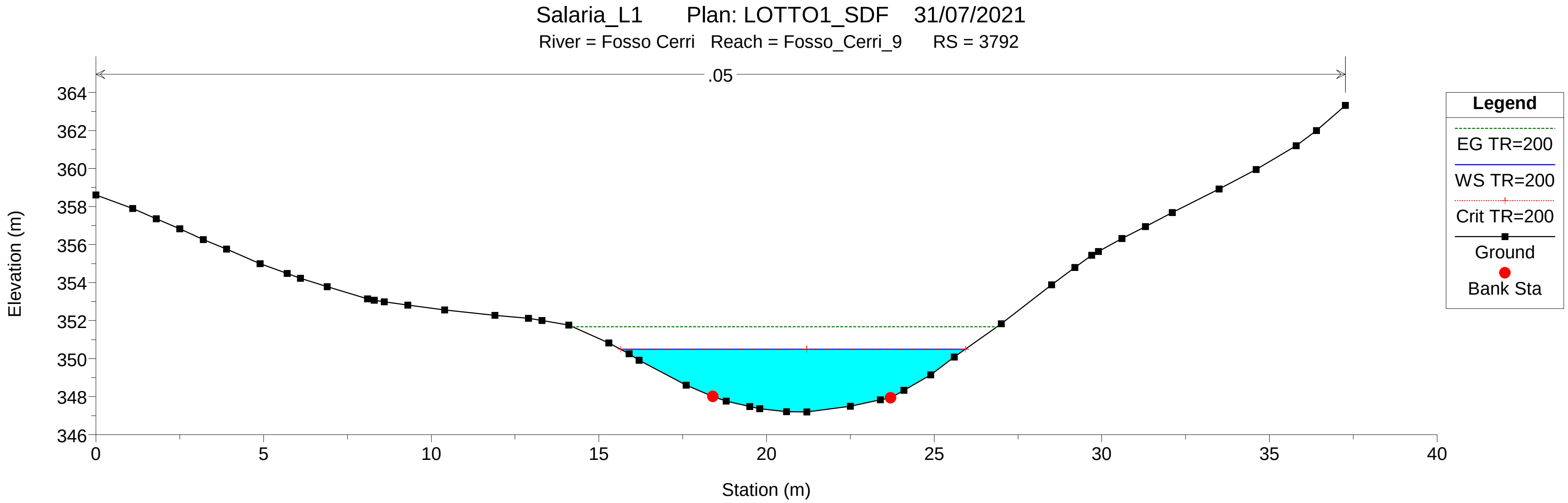

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4176
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

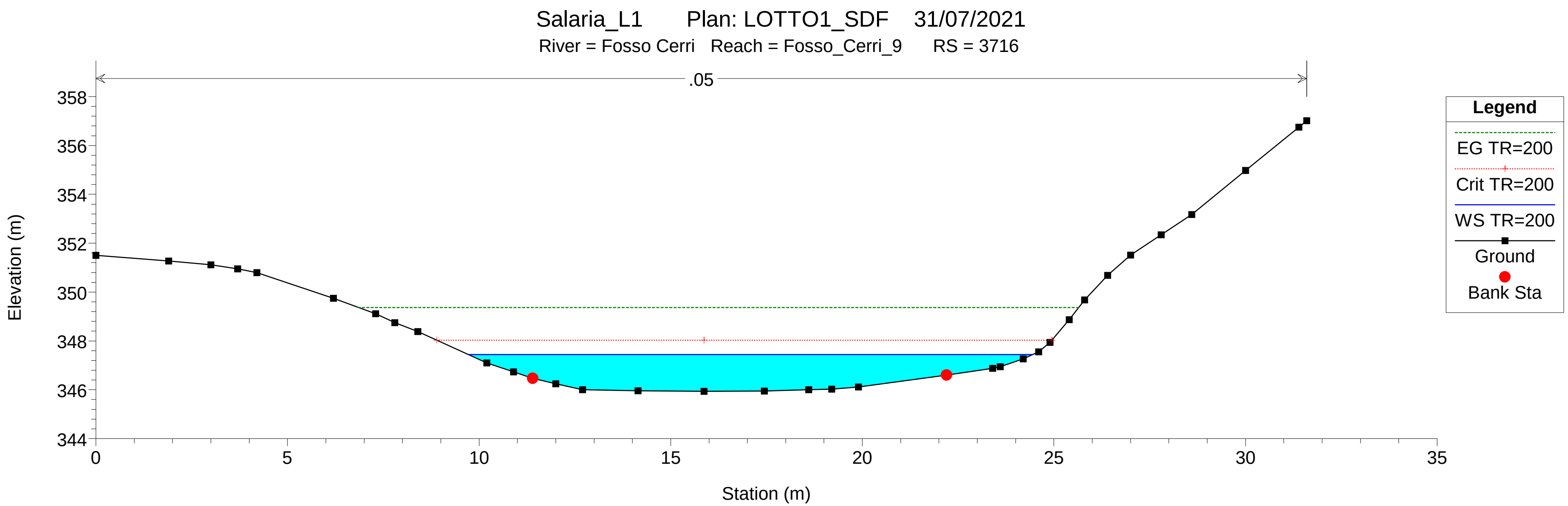

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4137
.05
Elevation (m)
376
374
372
370
368
366
364
362
360
358
356
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

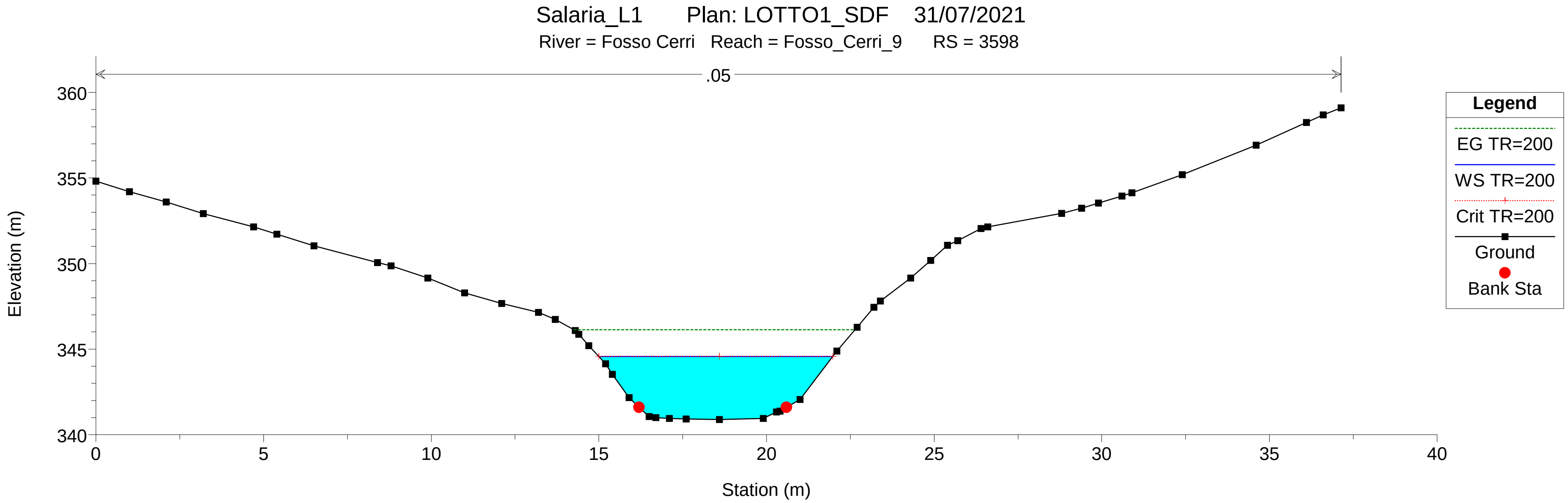

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4102
.05
Elevation (m)
374
372
370
368
366
364
362
360
358
356
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4018
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

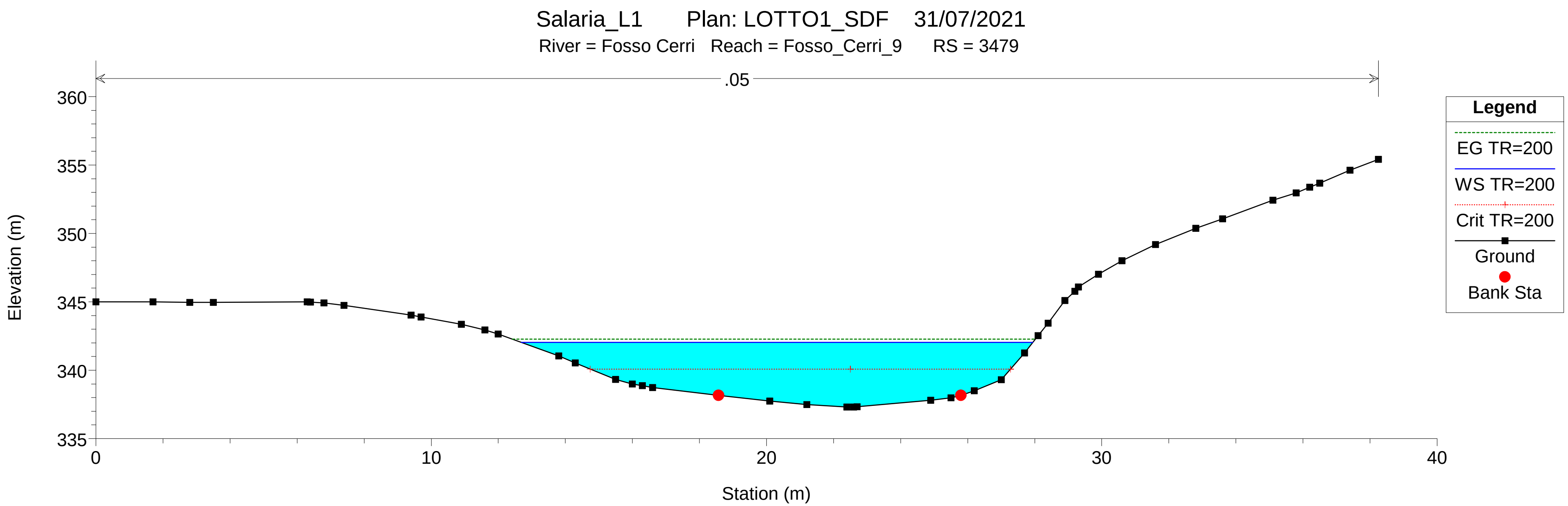

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3907
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3792
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

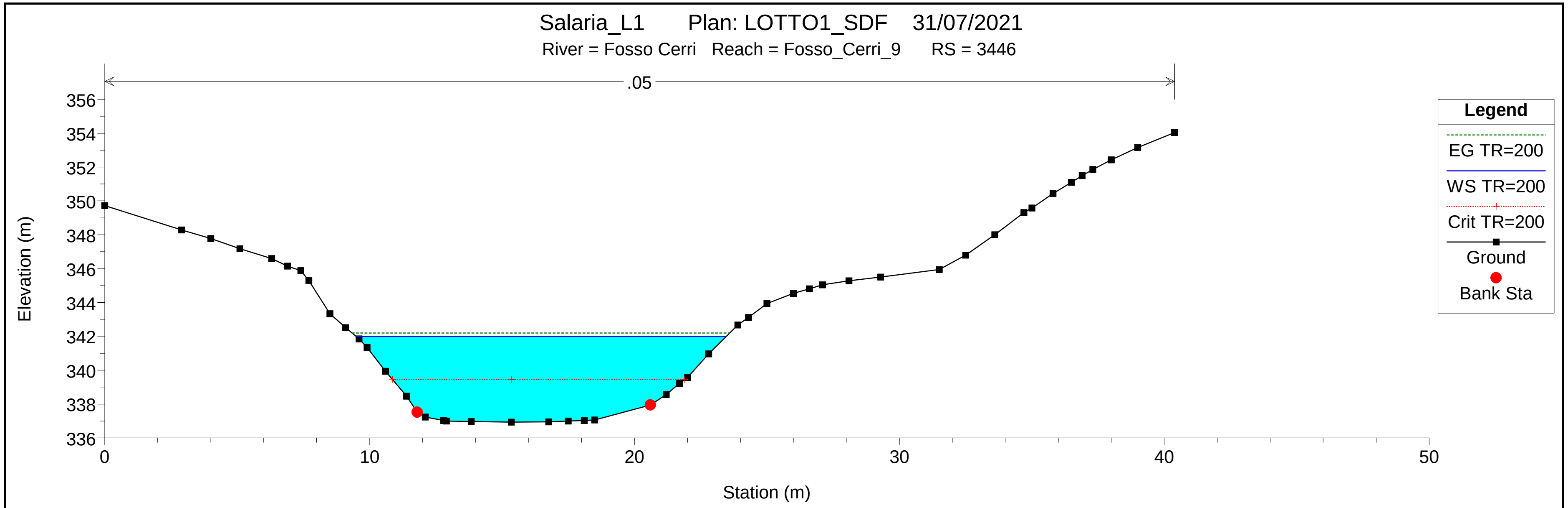

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3716
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

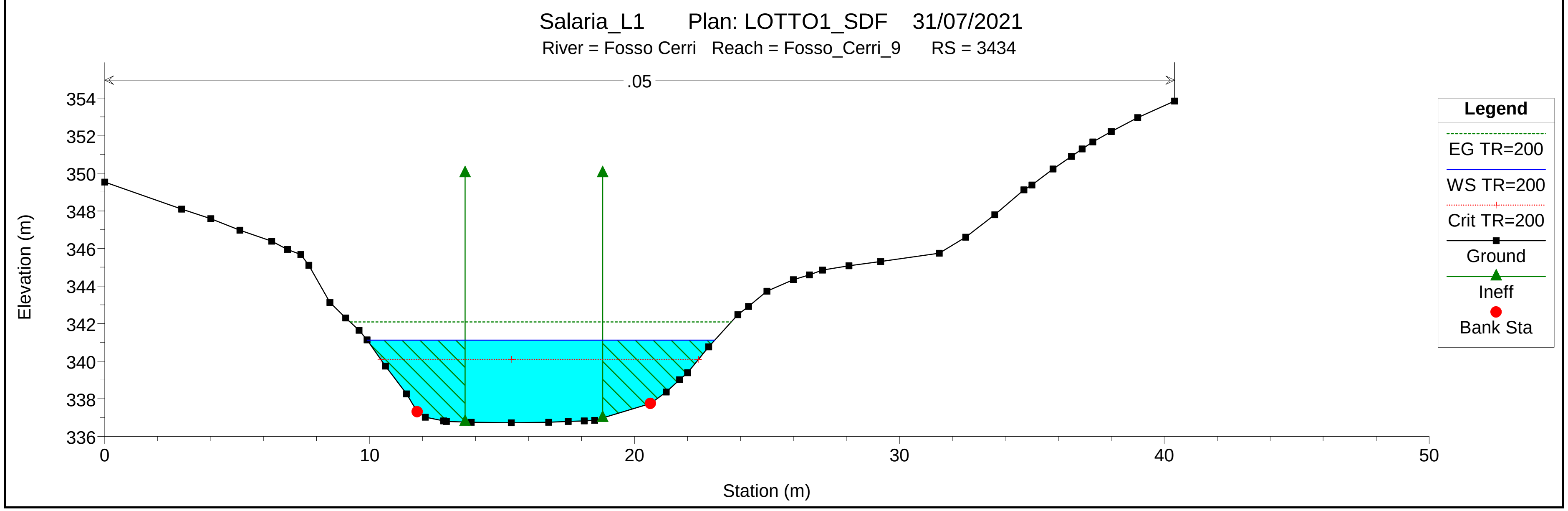


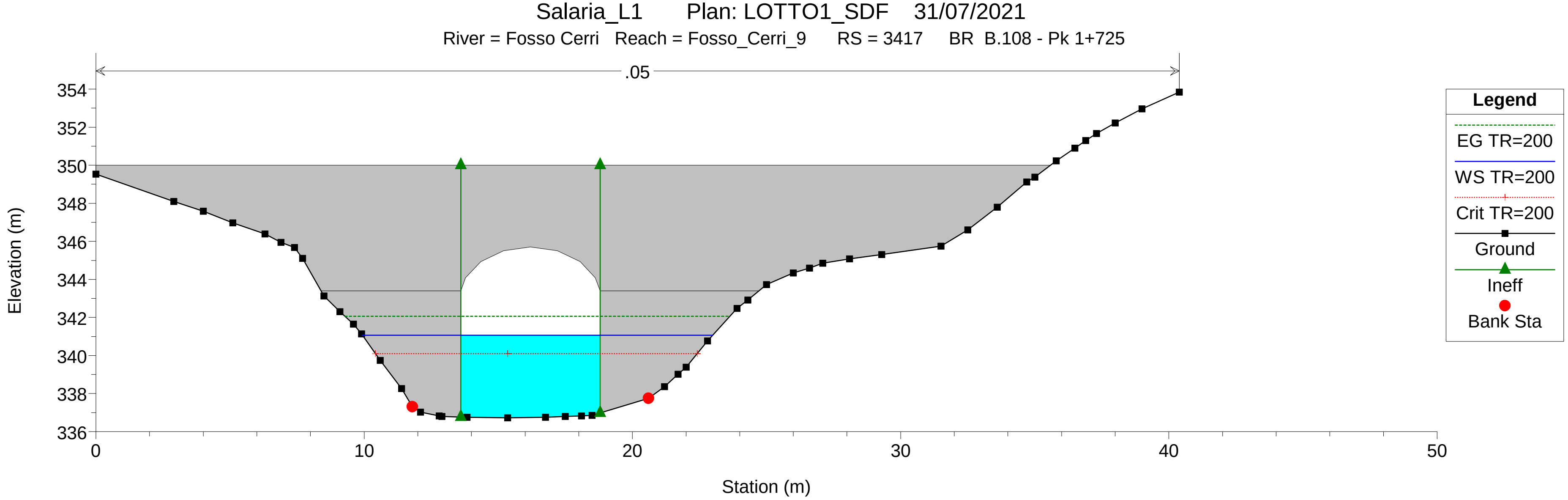
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3598
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta



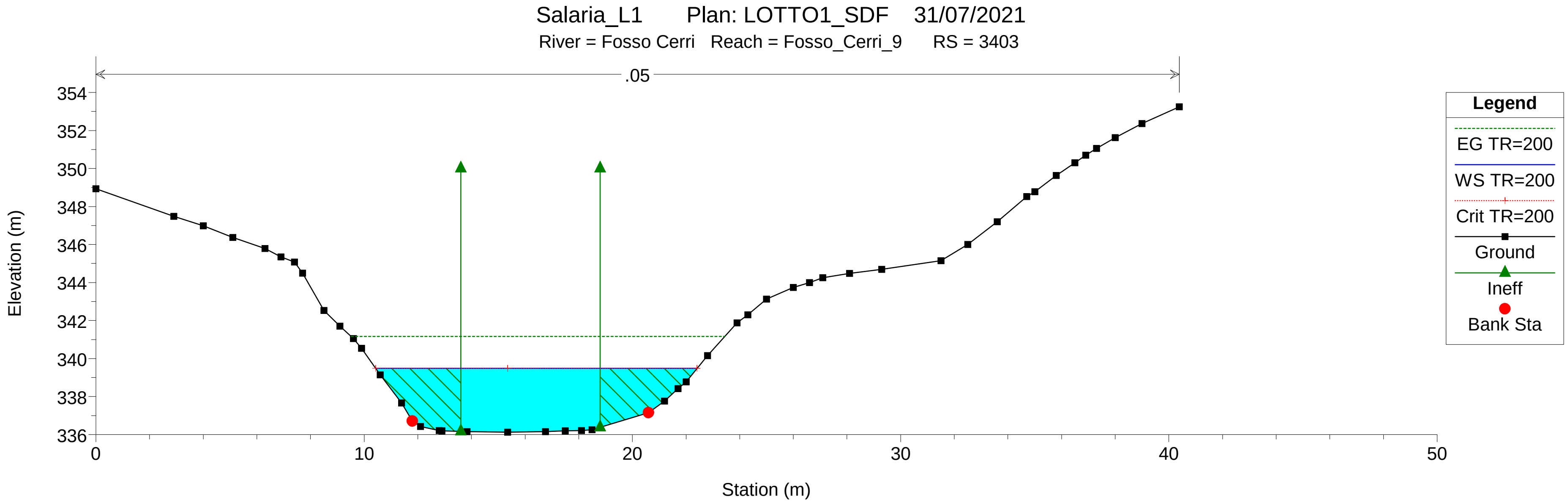
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3479
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3446
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

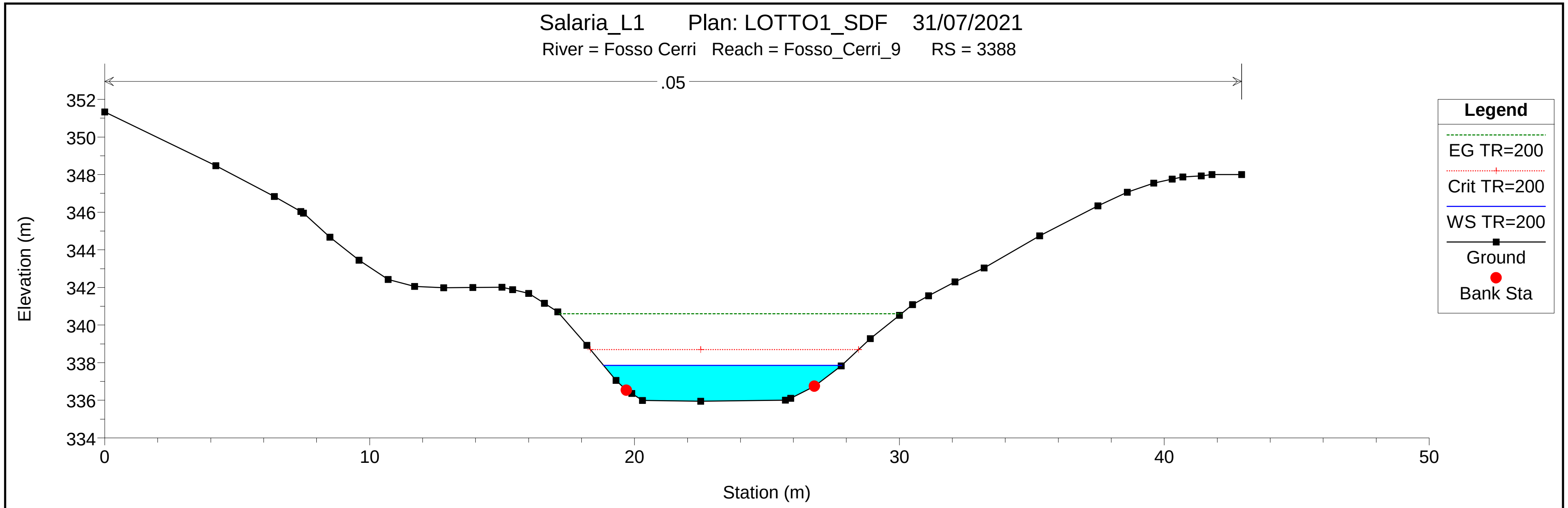

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3434
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



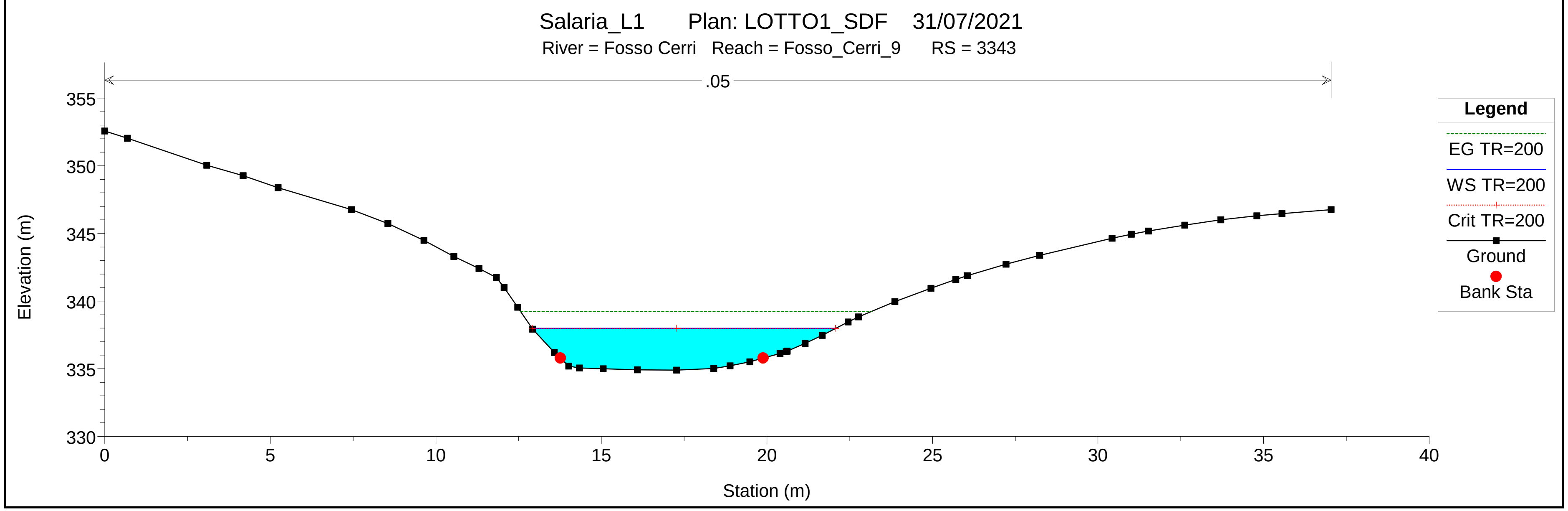
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3417 BR B.108 - Pk 1+725
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



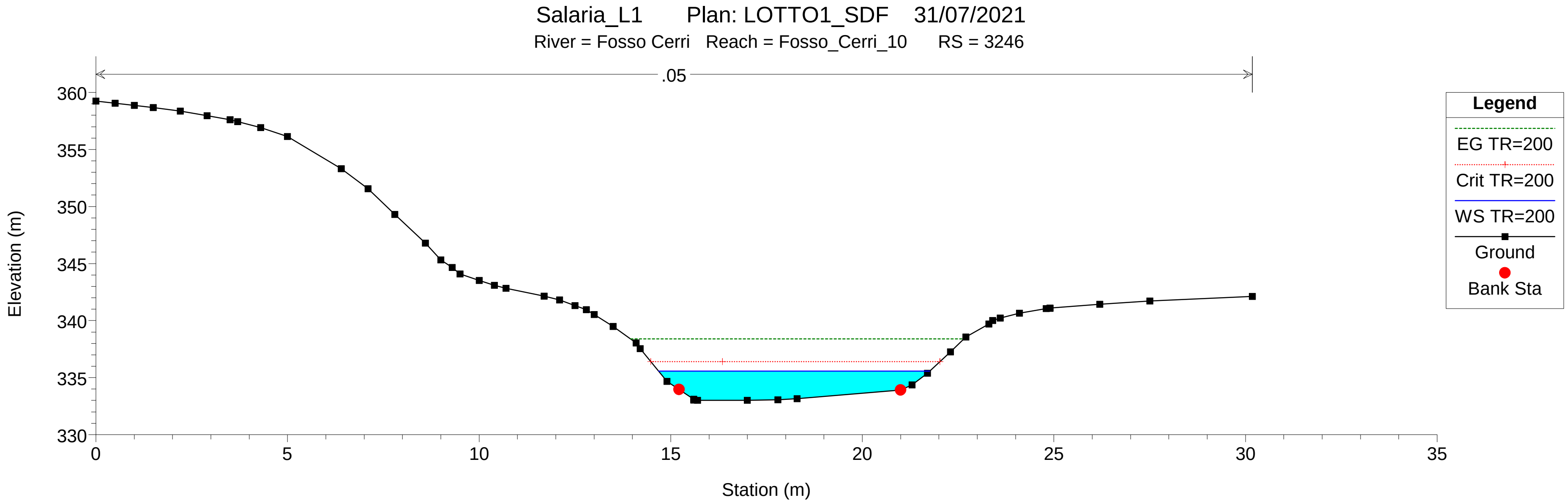
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3403
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



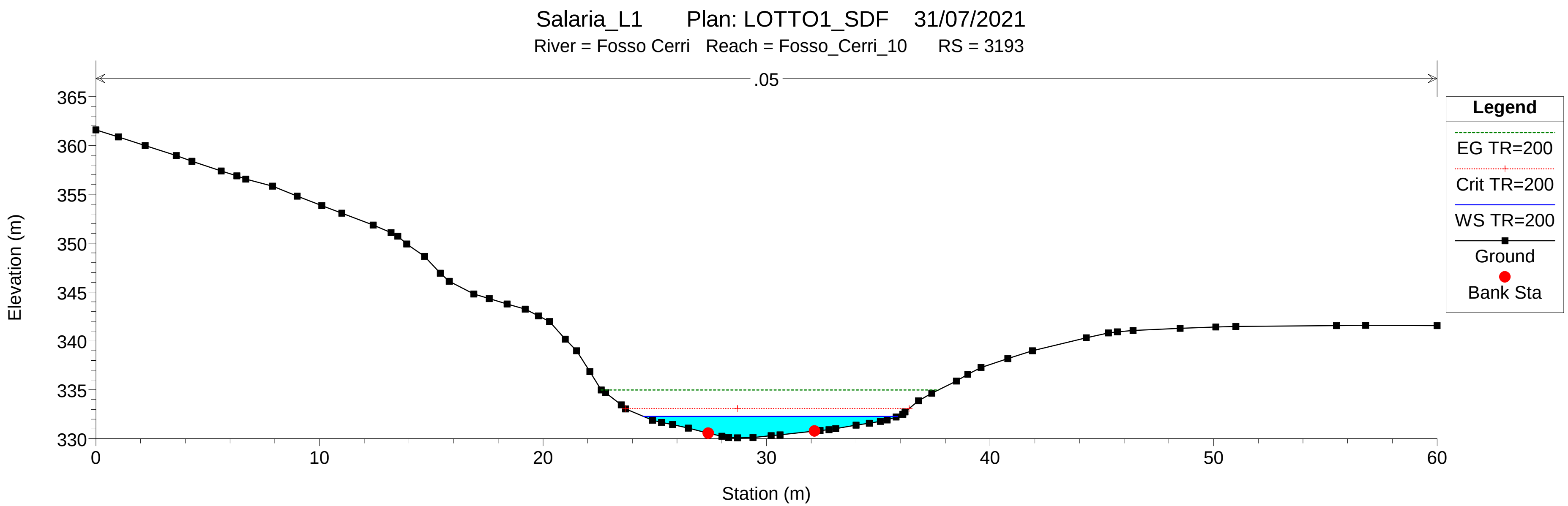
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3388
.05
Elevation (m)
352
350
348
346
344
342
340
338
336
334
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



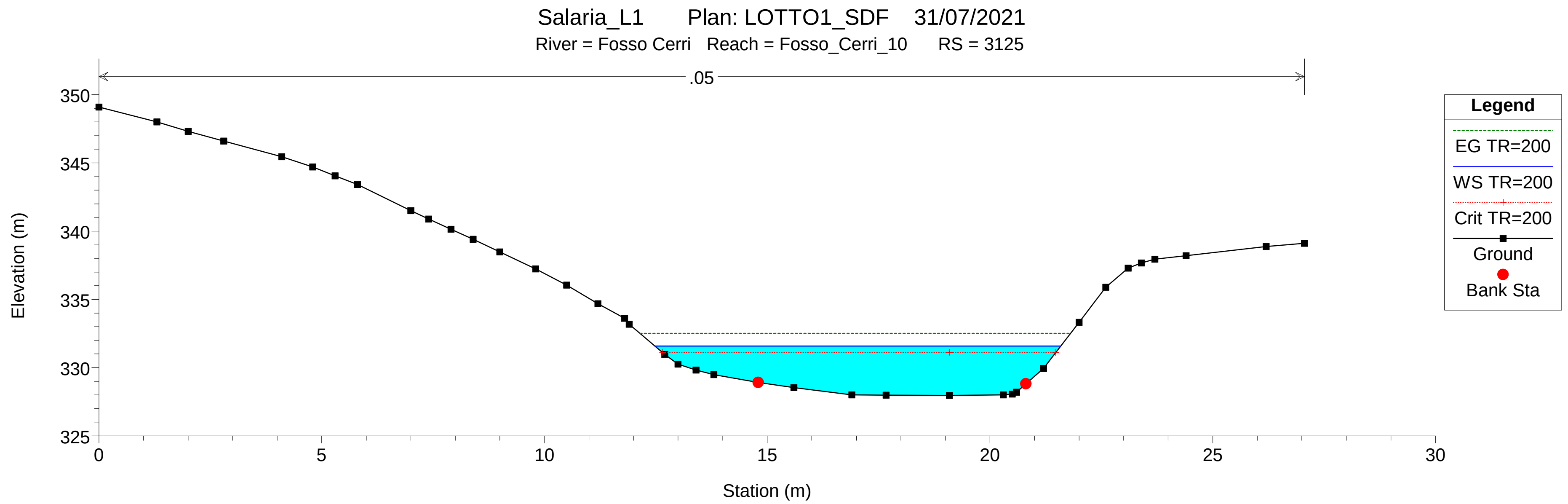
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3343
.05
Elevation (m)
355
350
345
340
335
330
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta



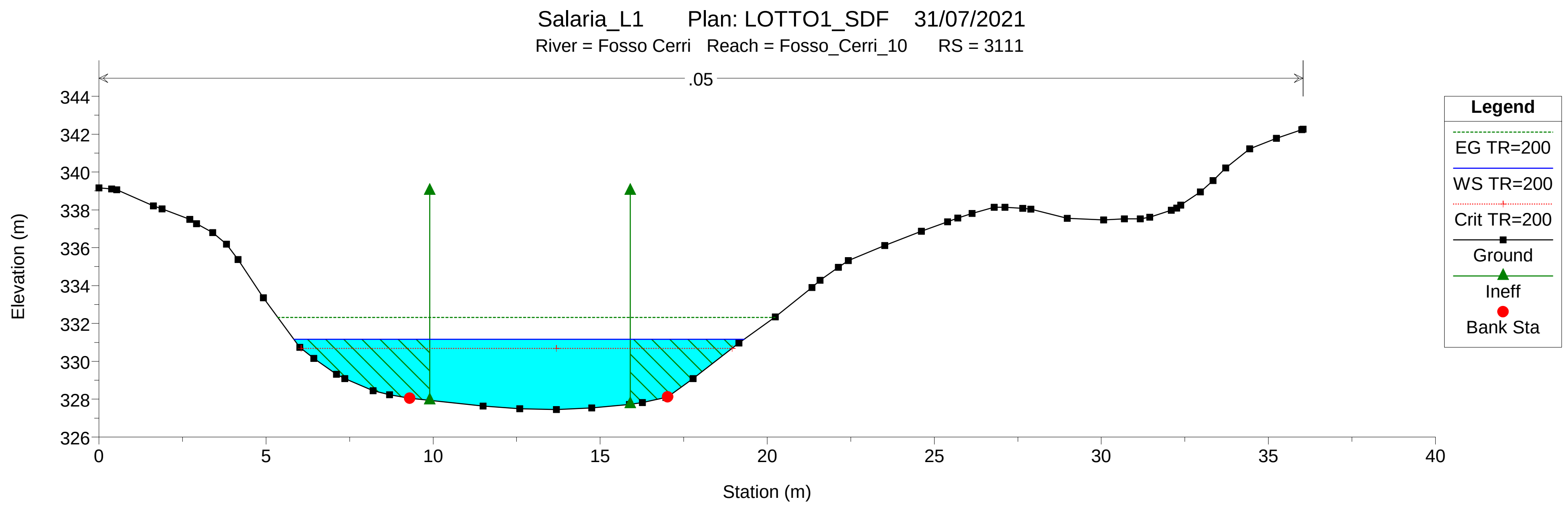
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3246
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



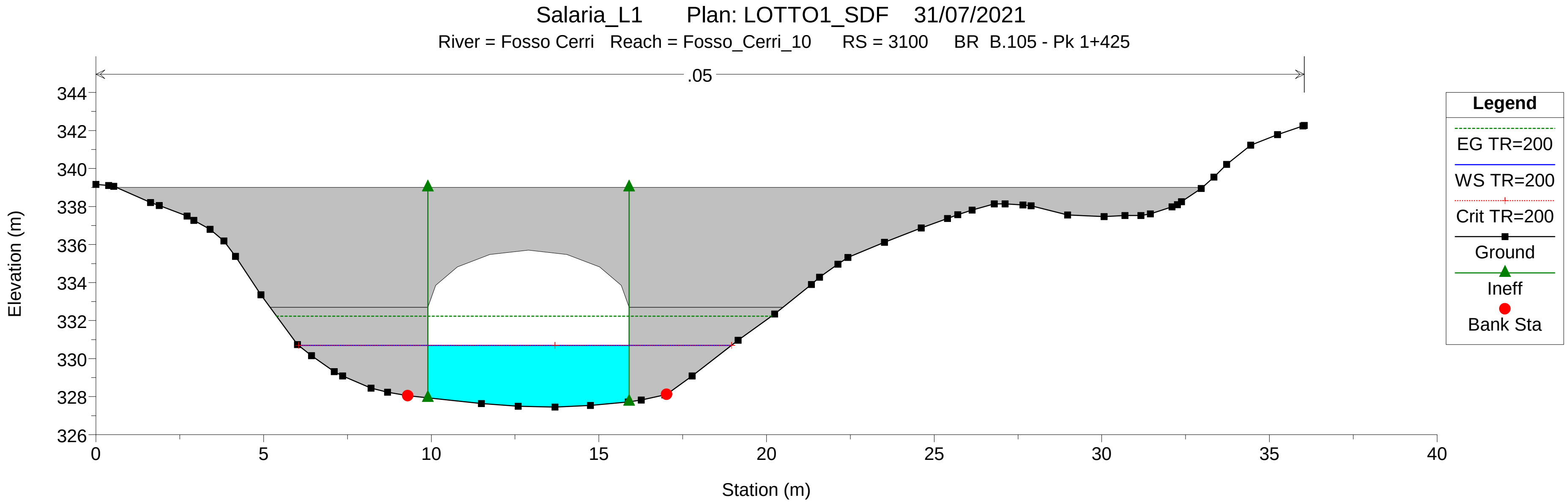
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3193
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

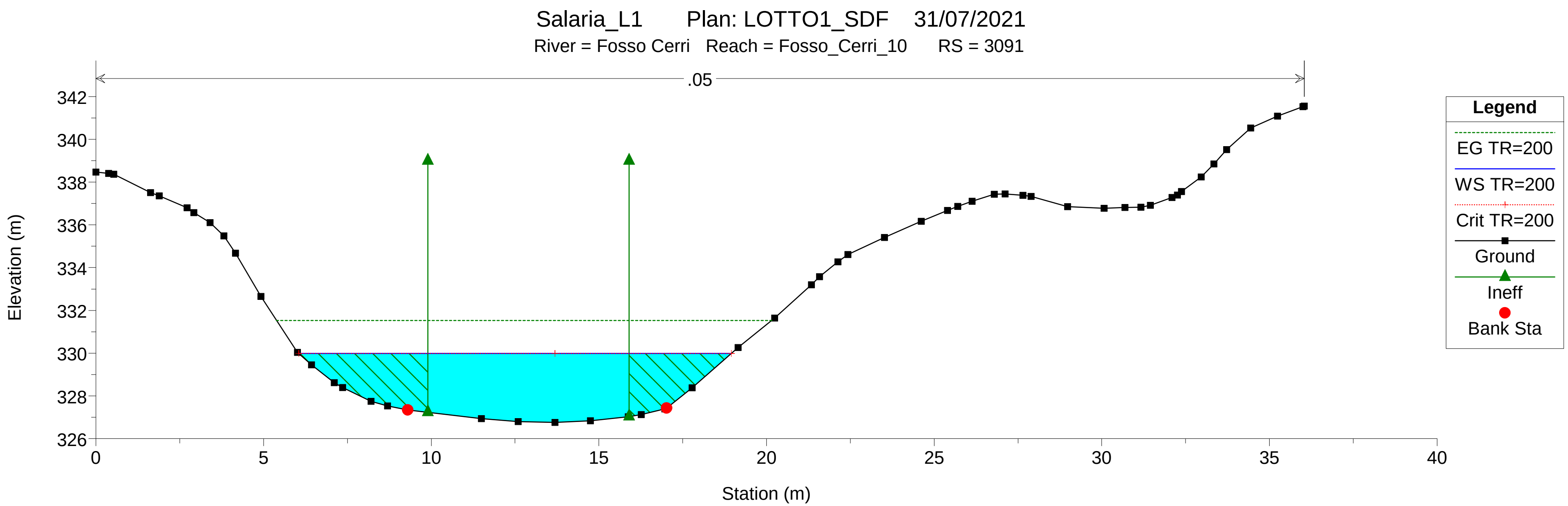


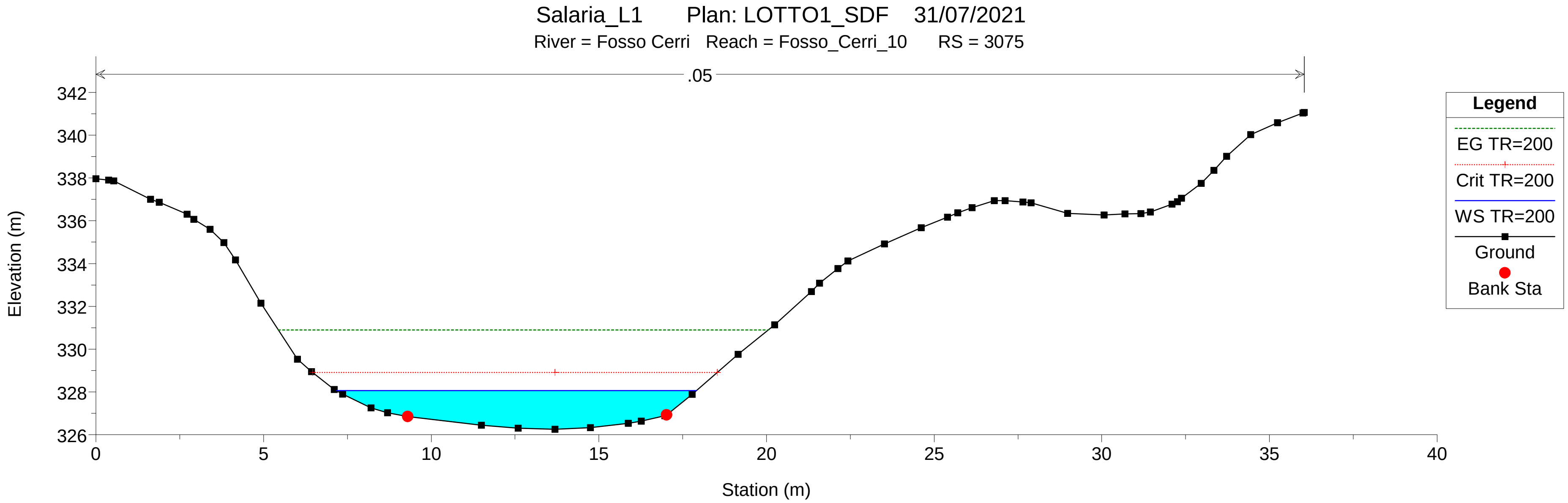
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3125
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

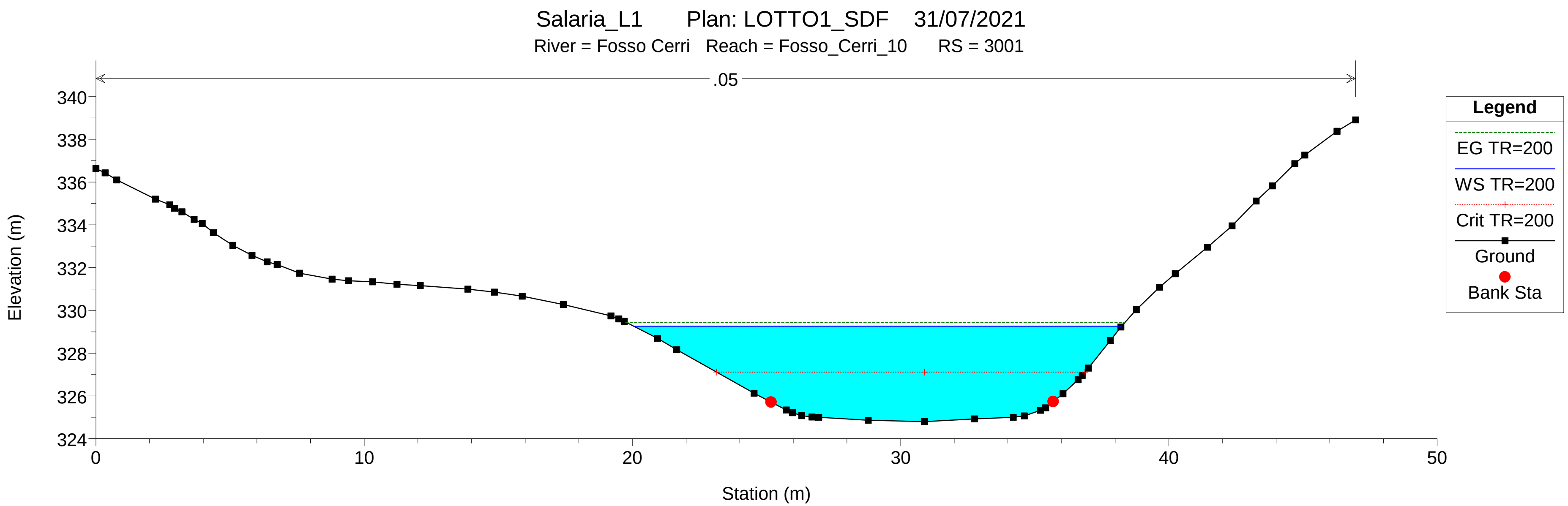


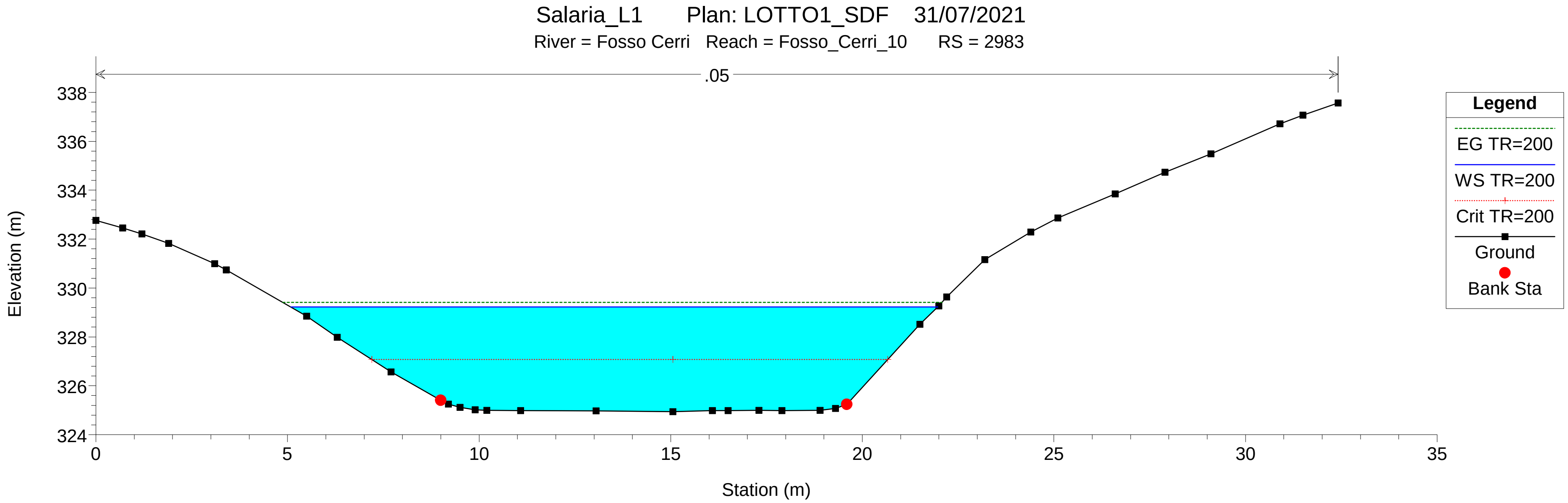
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3111
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

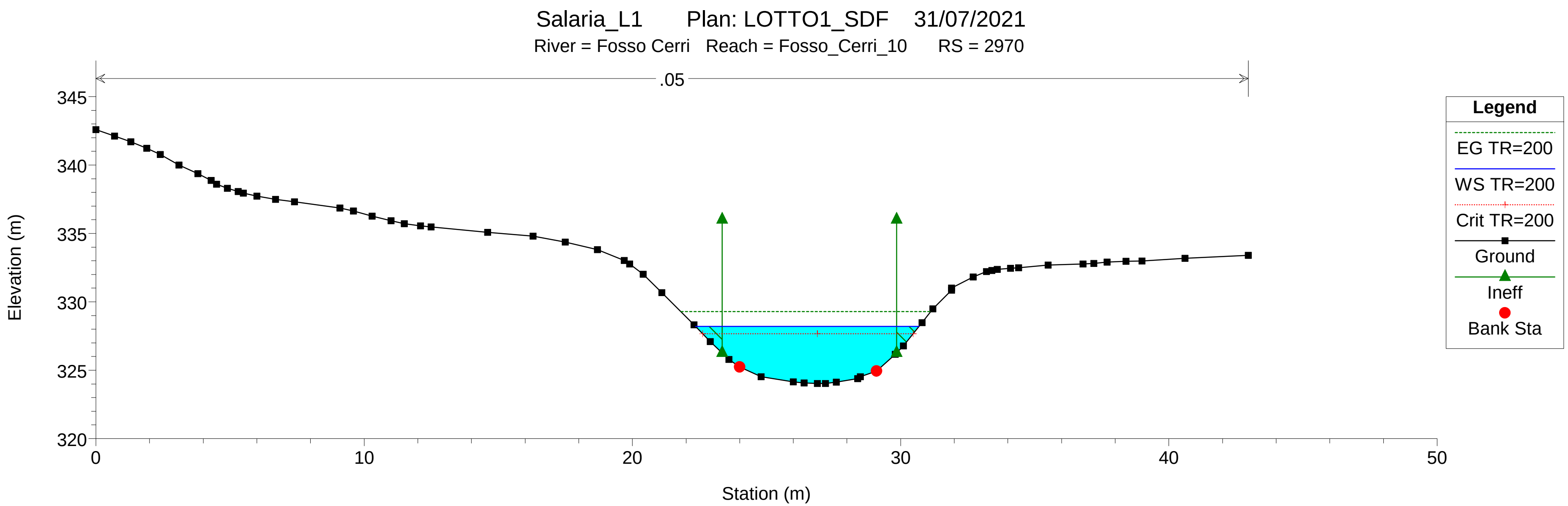

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3100 BR B.105 - Pk 1+425
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

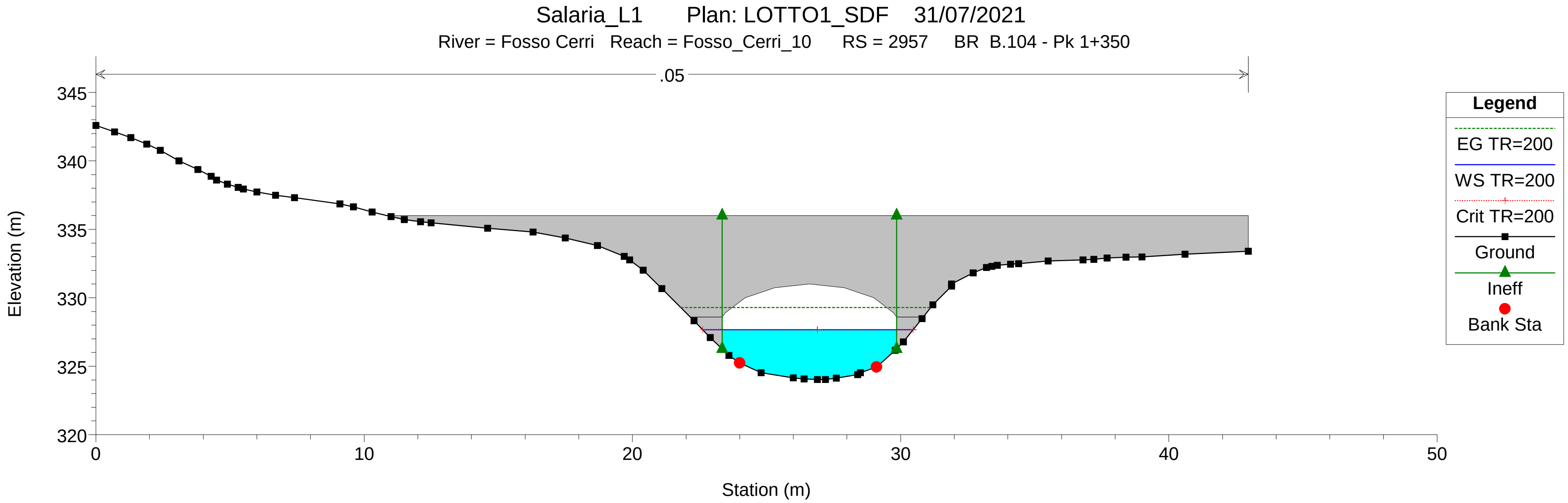

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3091
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3075
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

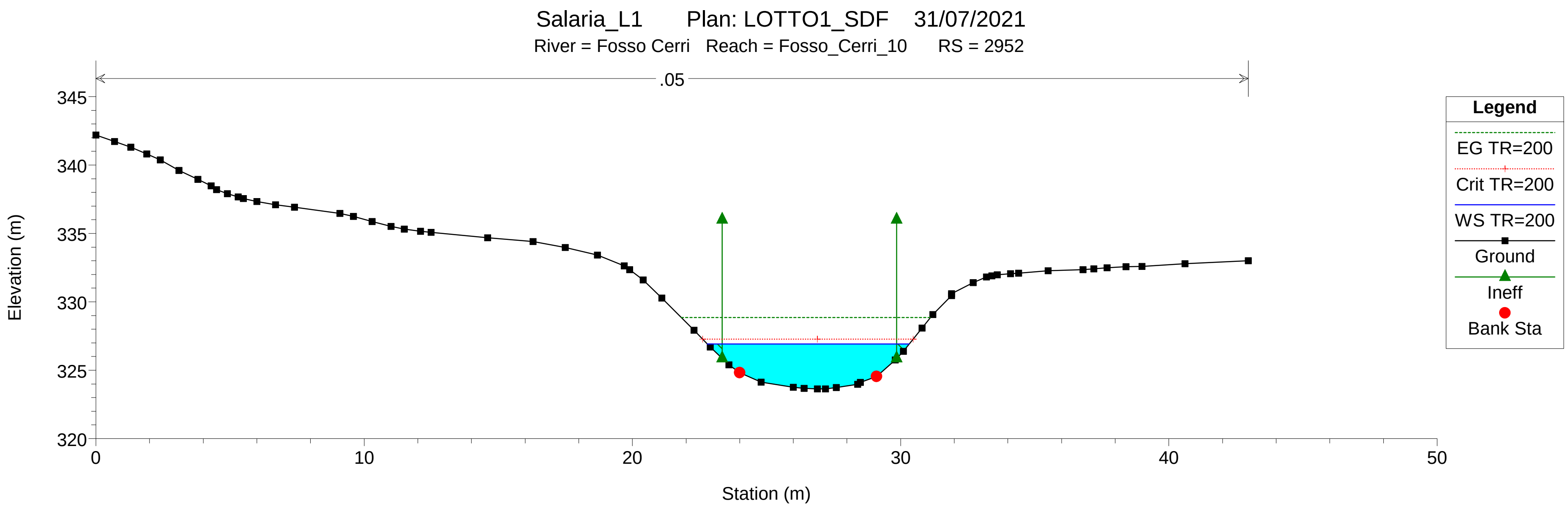

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3001
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2983
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

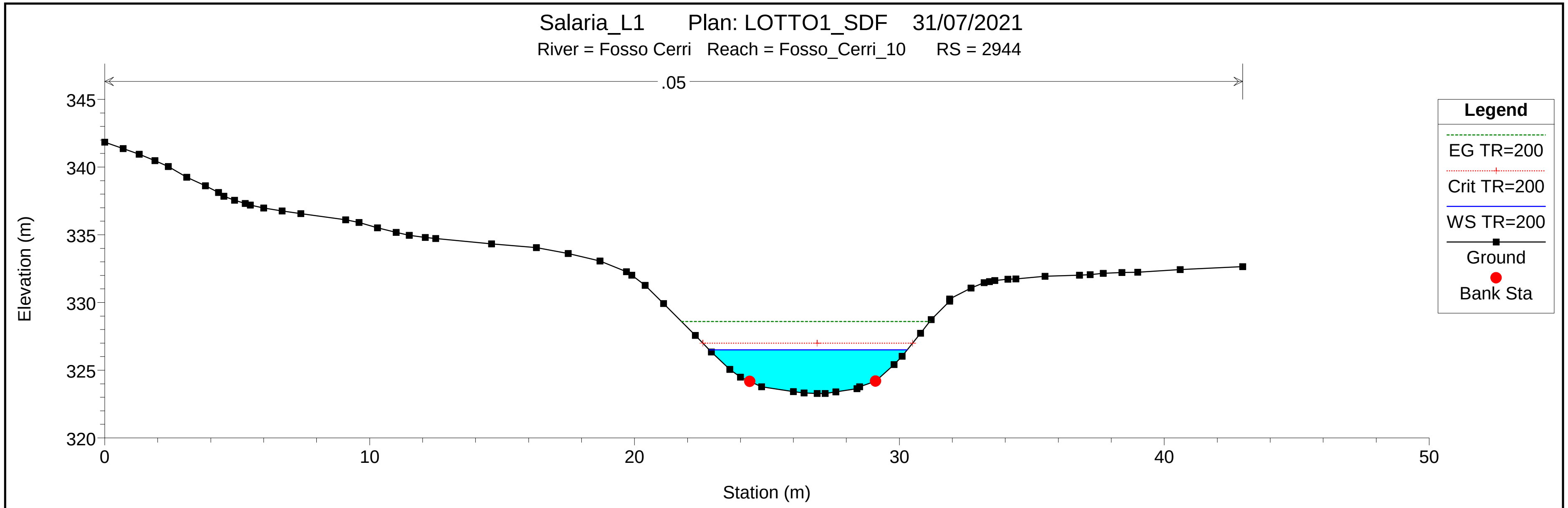

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2970
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



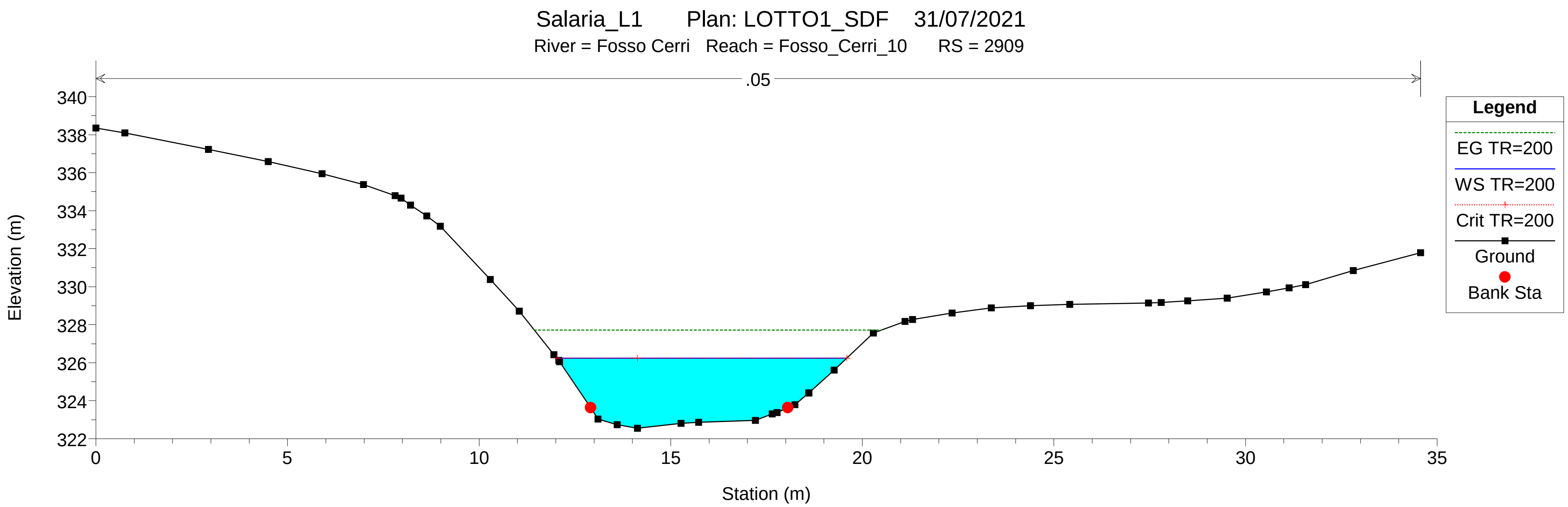
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2957 BR B.104 - Pk 1+350
.05
Elevation (m)
345
340
335
330
325
320
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



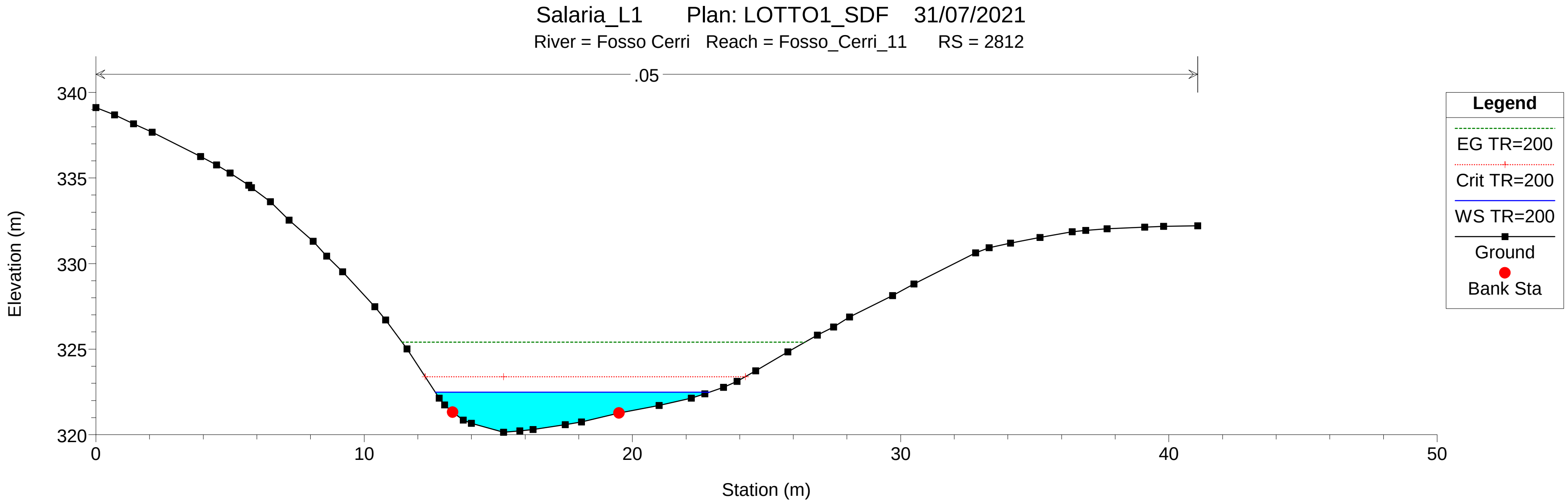
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2952
.05
Elevation (m)
345
340
335
330
325
320
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

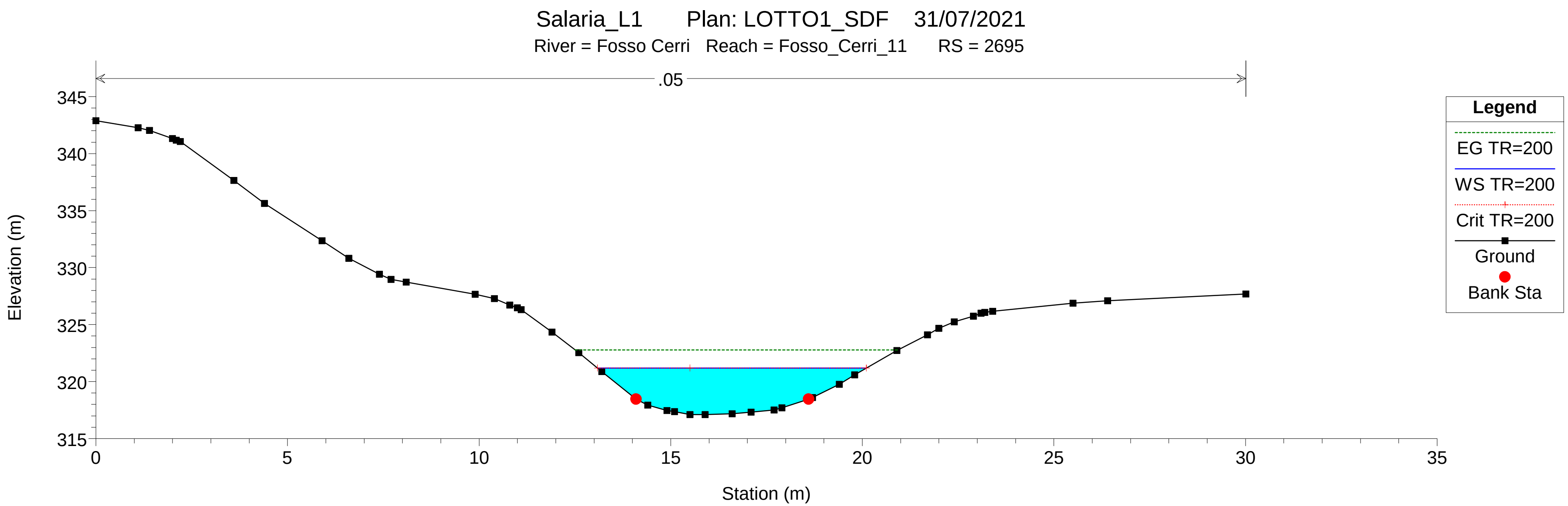


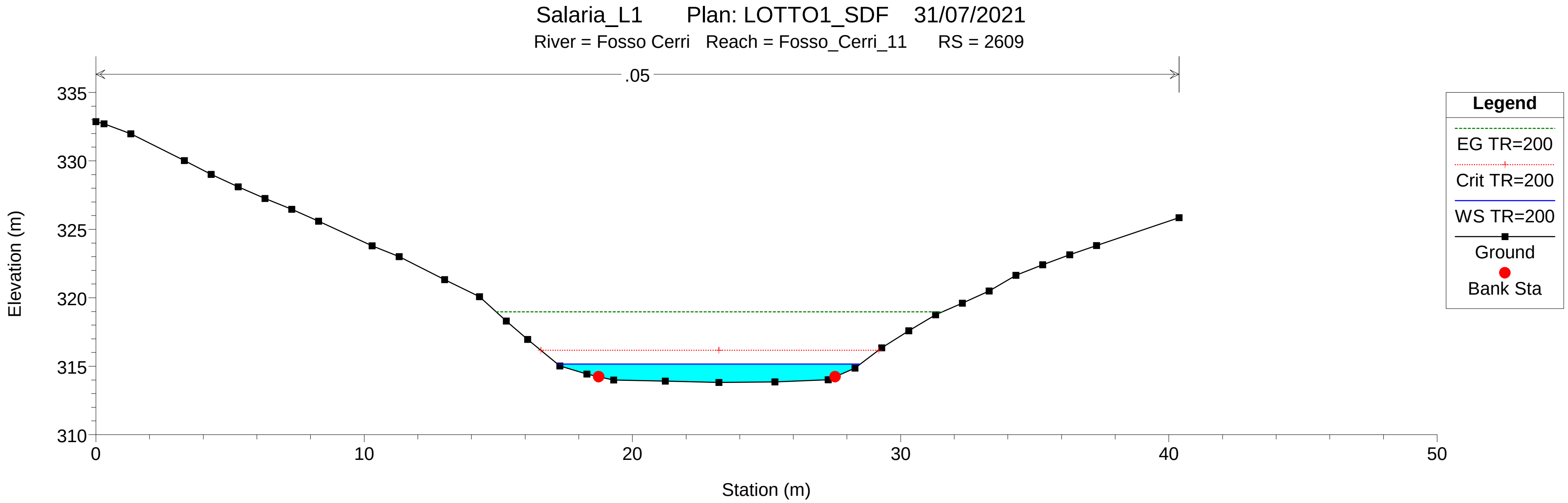
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2944
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



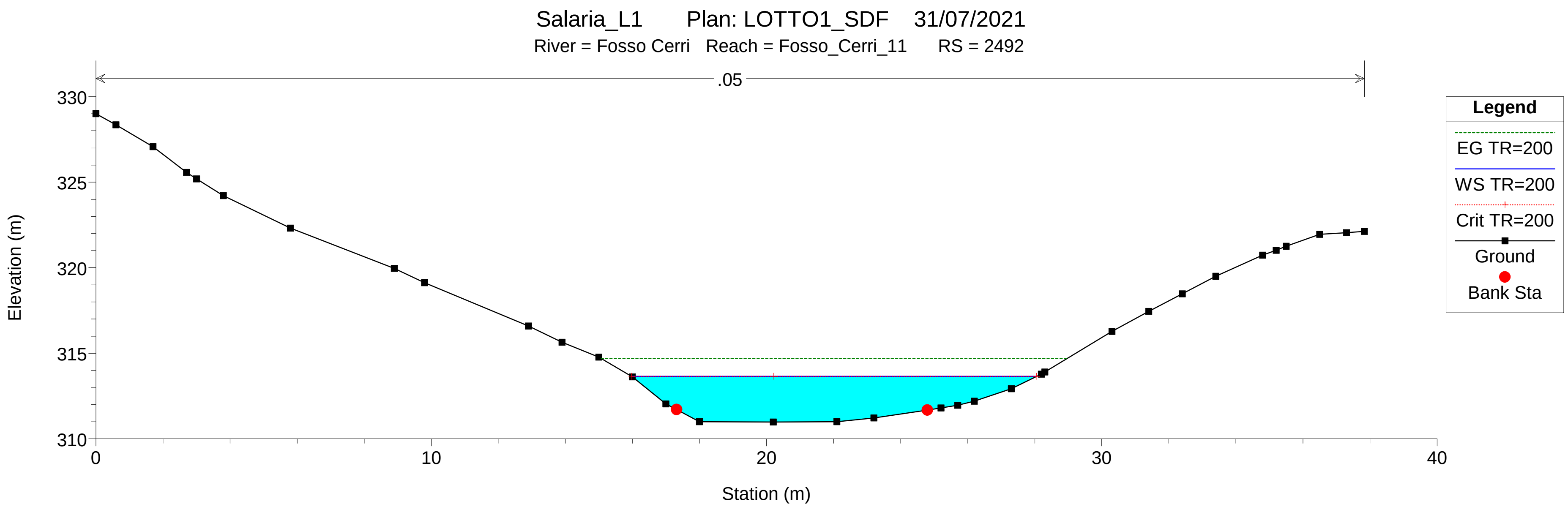
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2909
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2812
.05
Elevation (m)
340
335
330
325
320
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

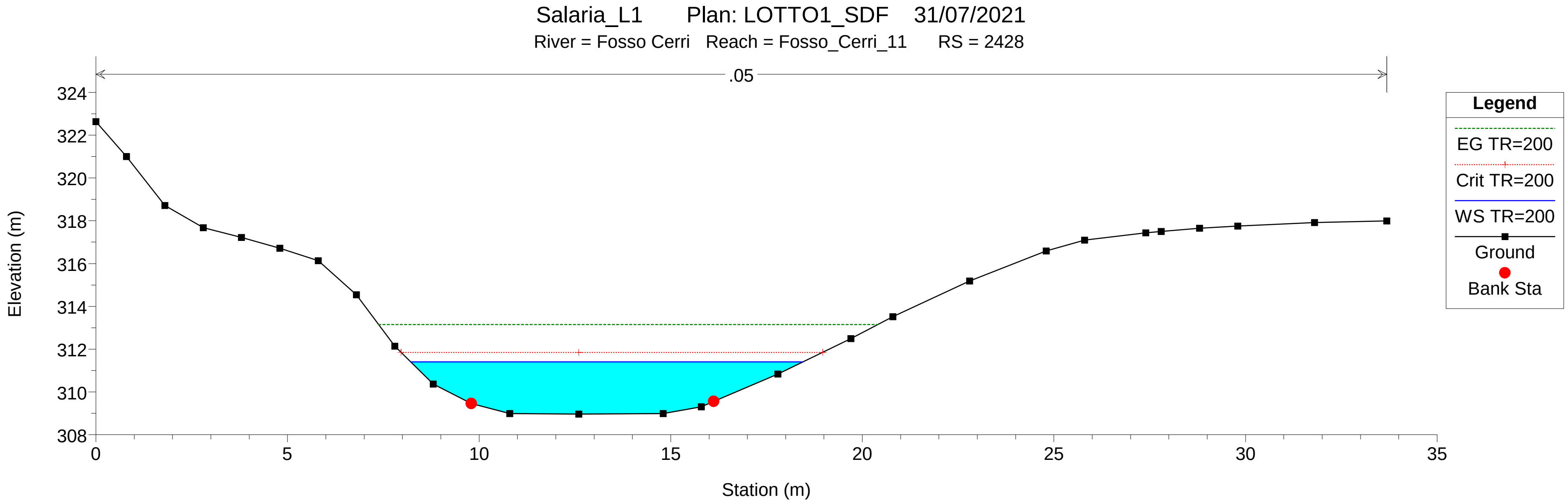

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2695
.05
Elevation (m)
345
340
335
330
325
320
315
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

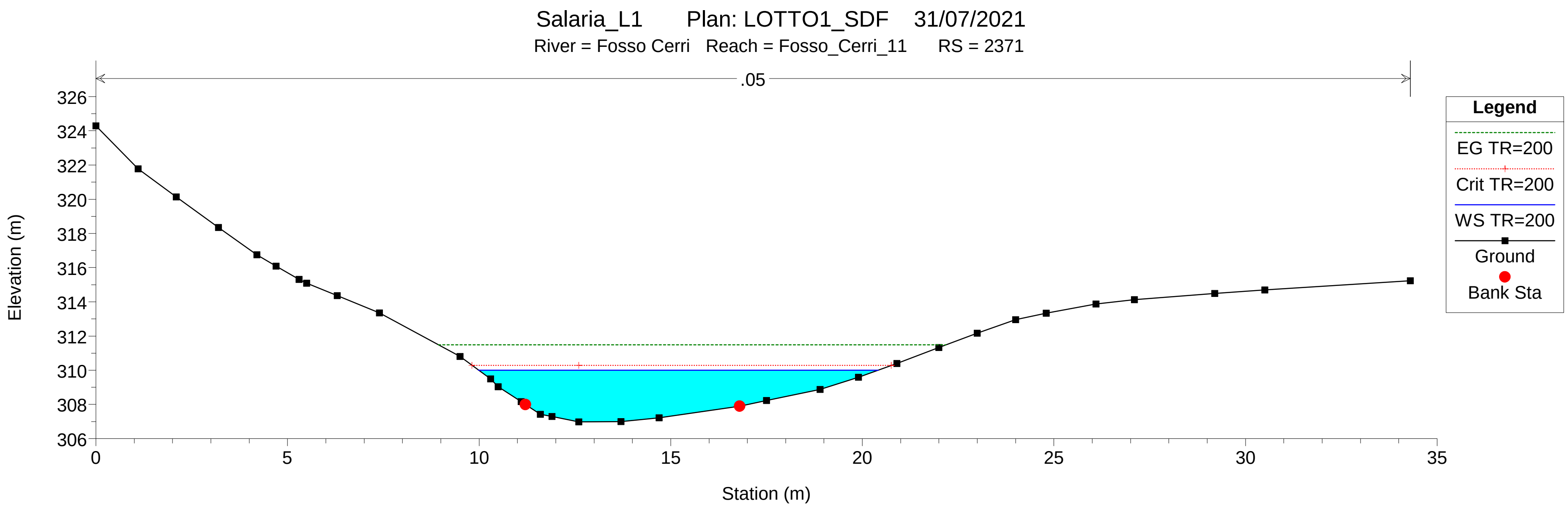


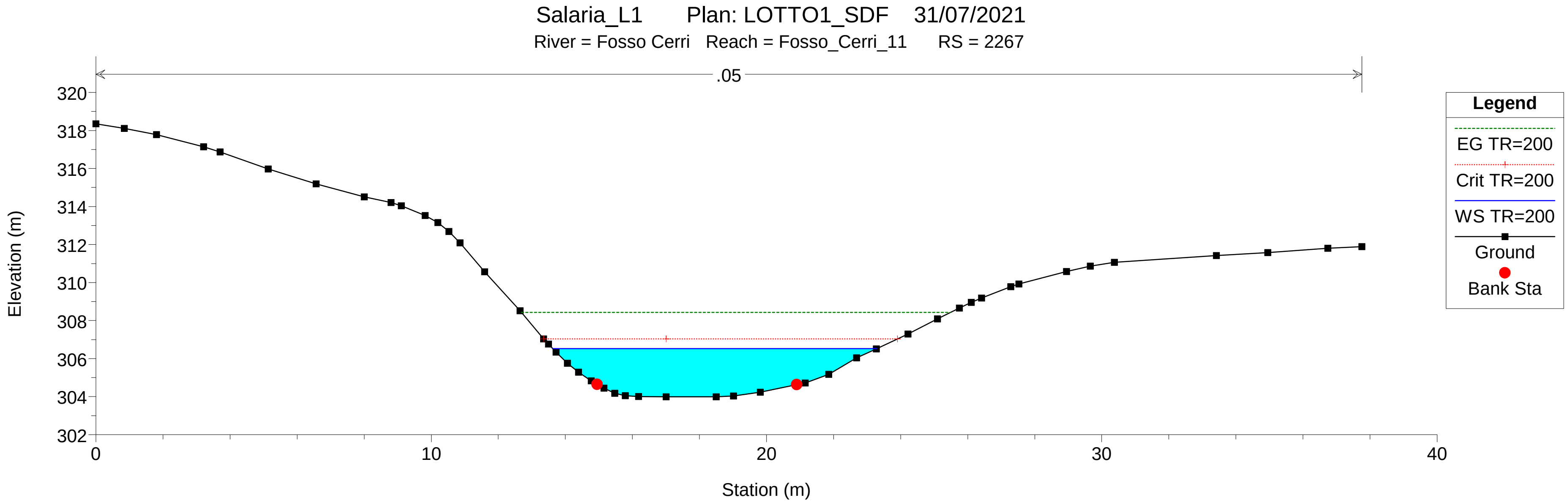
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2609
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

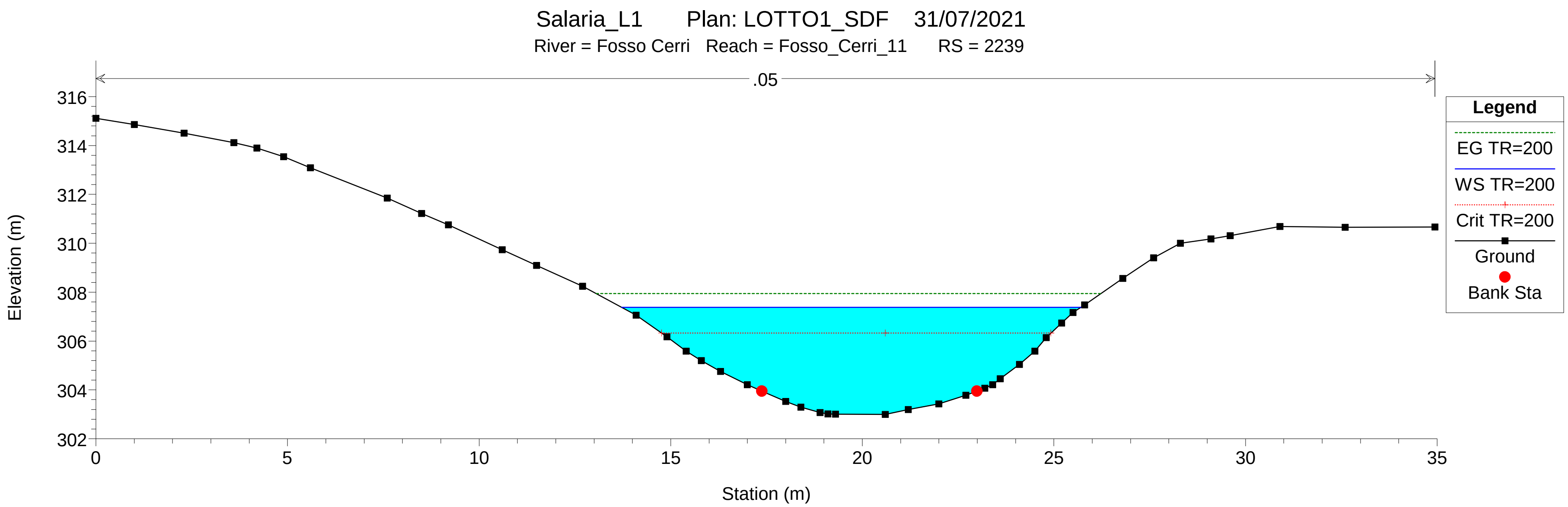


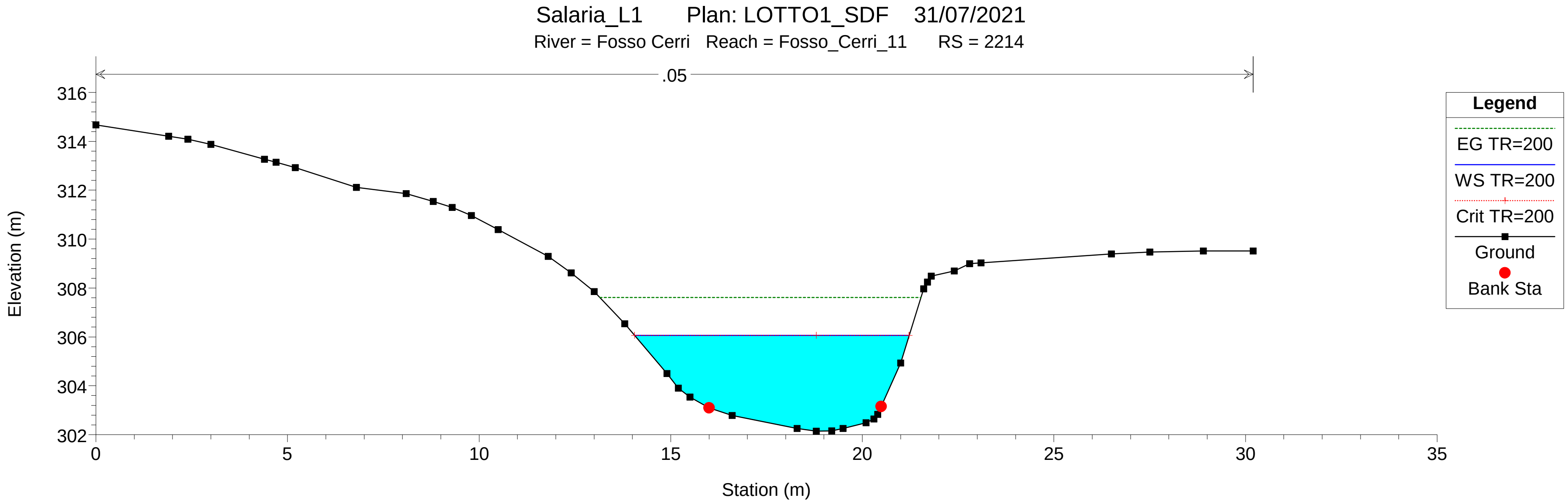
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2492
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

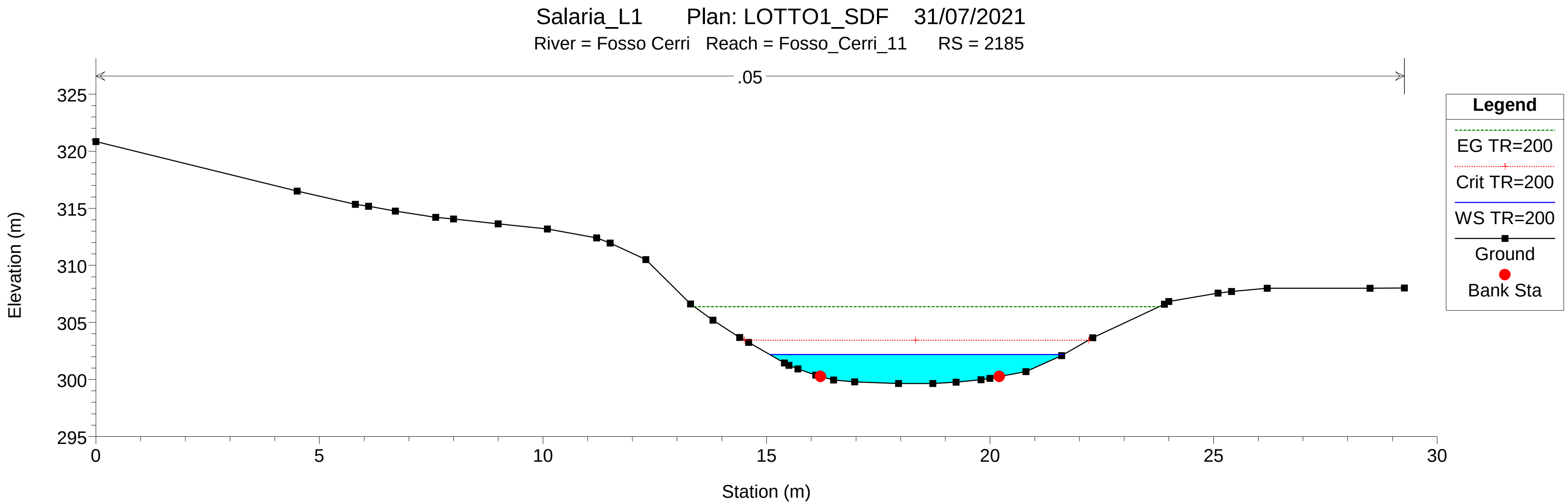

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2428
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

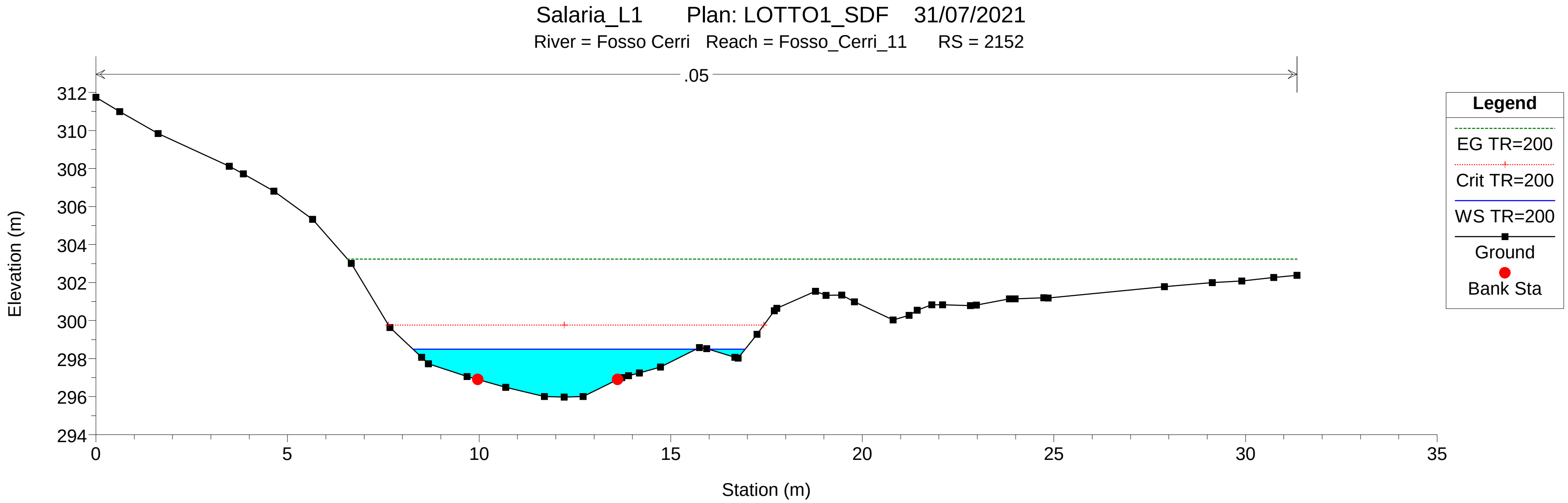

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2371
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

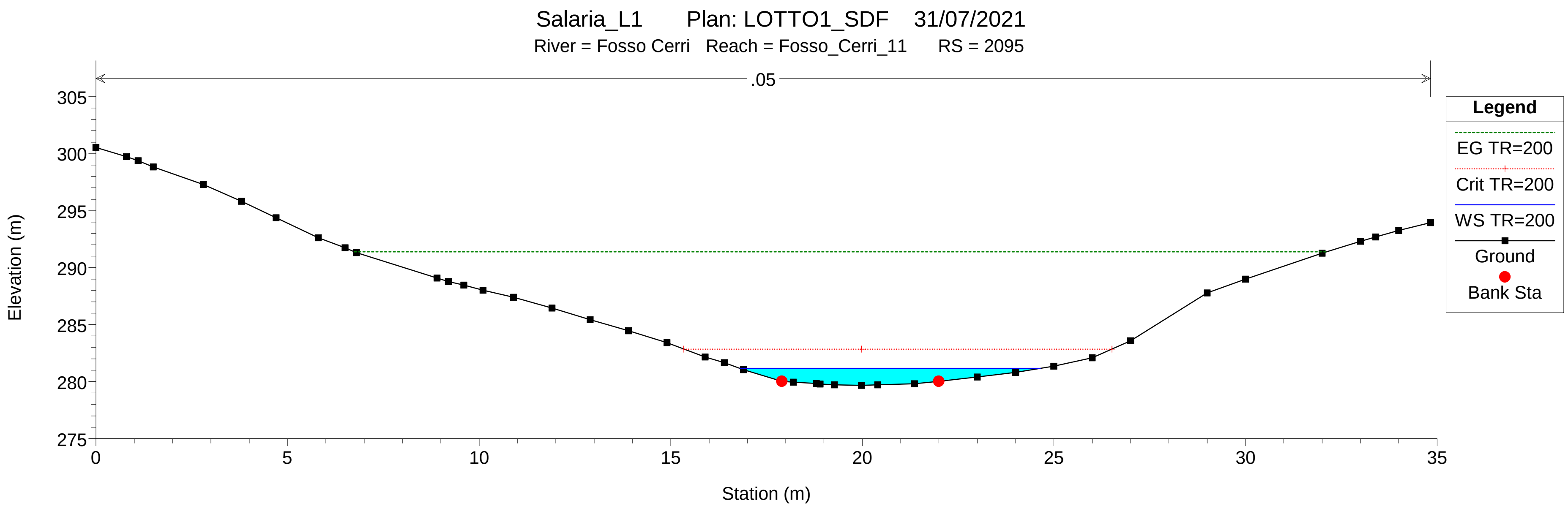

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2267
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

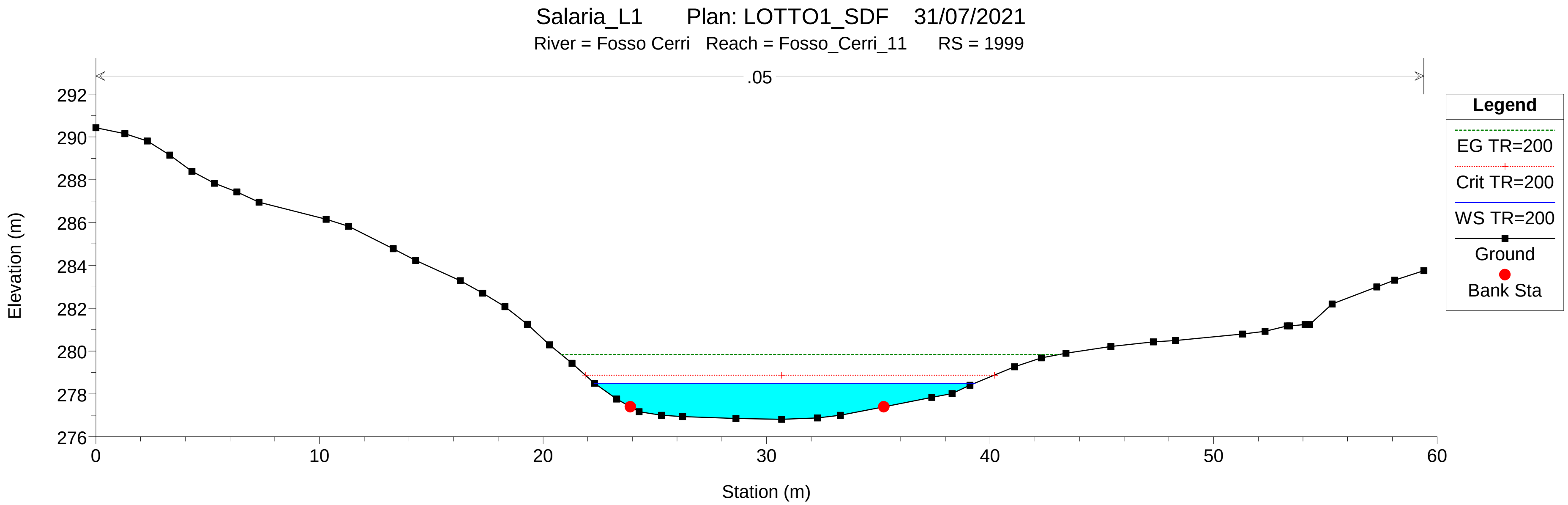

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2239
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

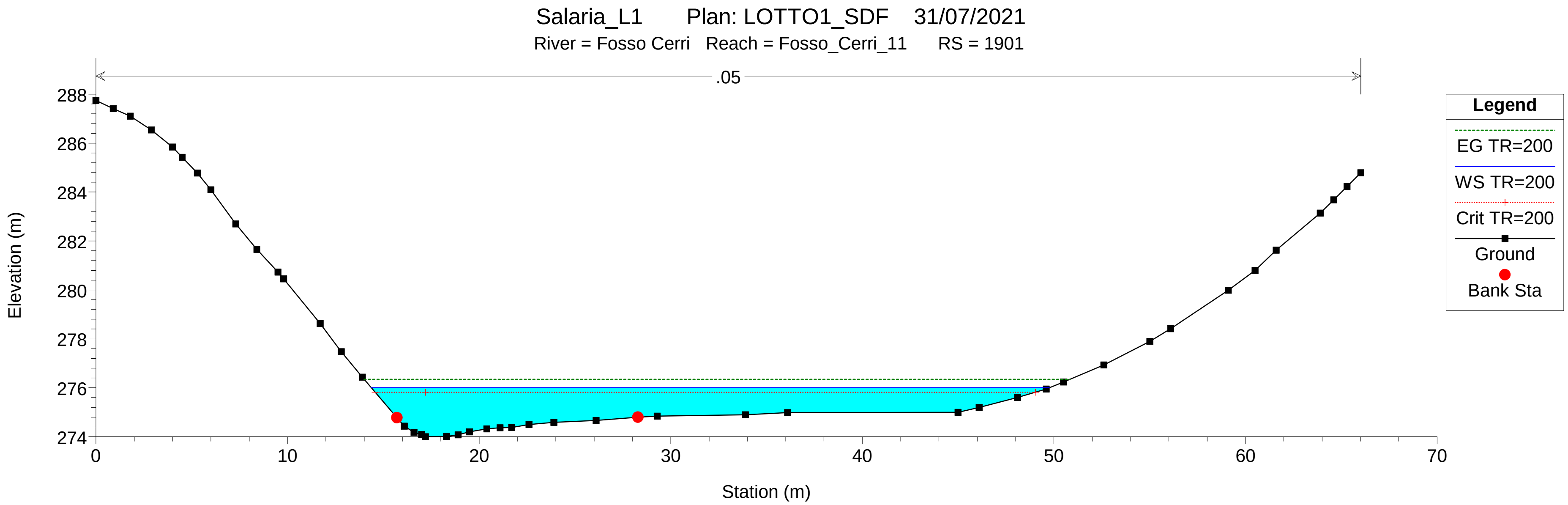

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2214
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

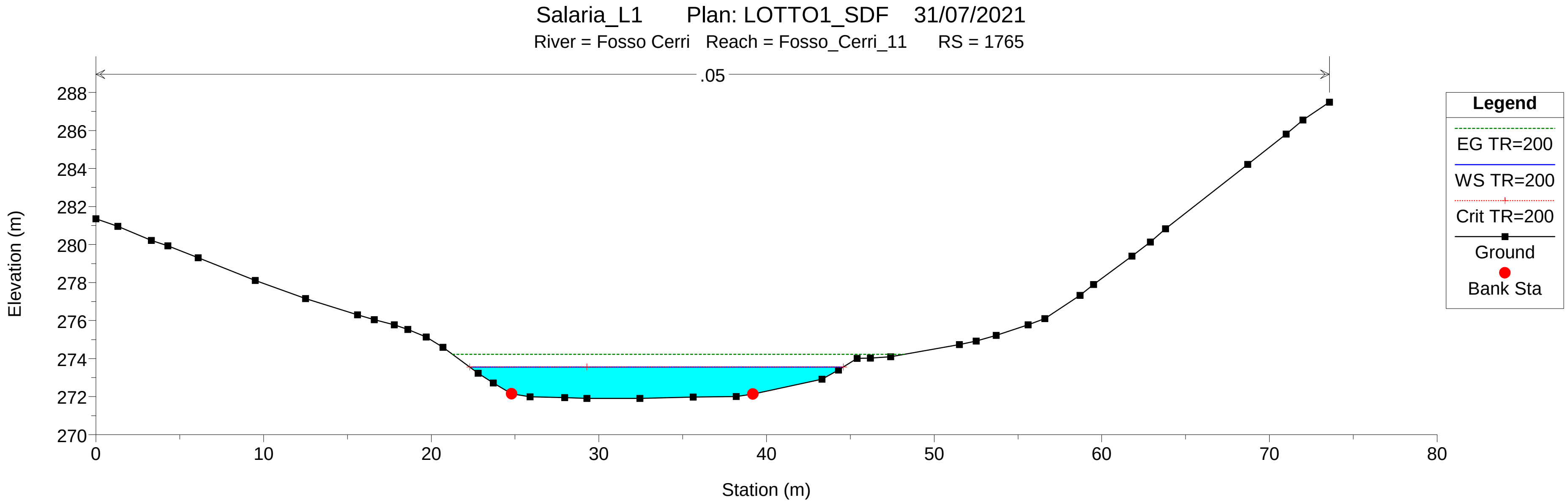

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2185
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2152
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

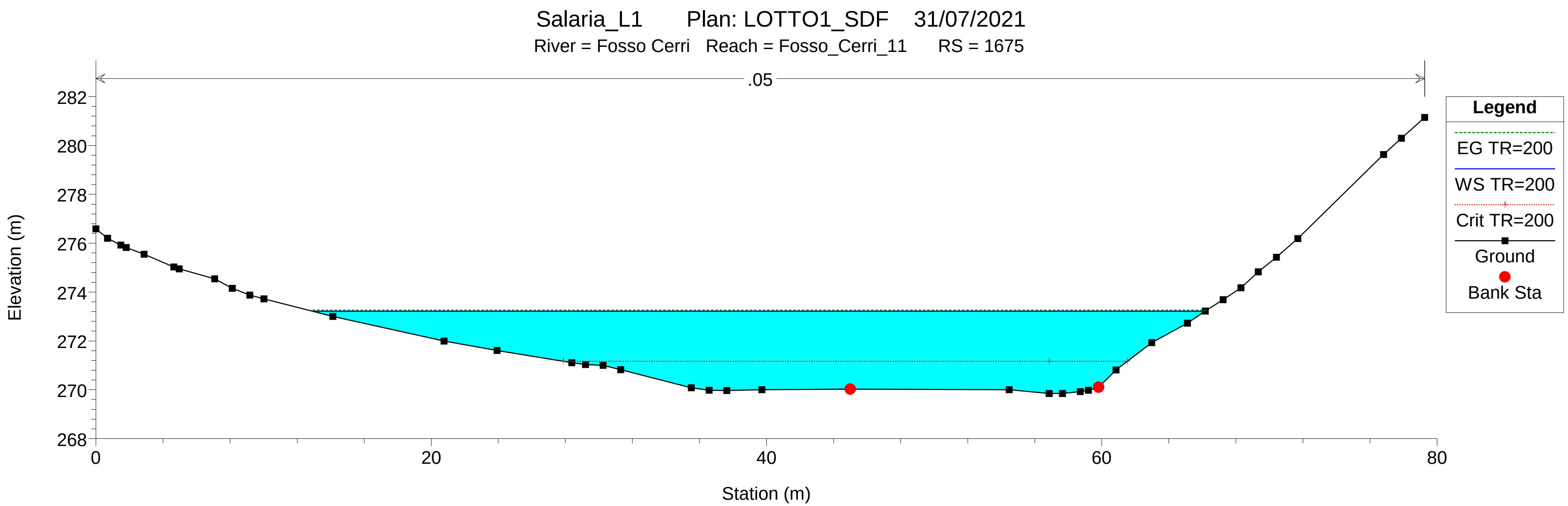

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2095
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1999
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

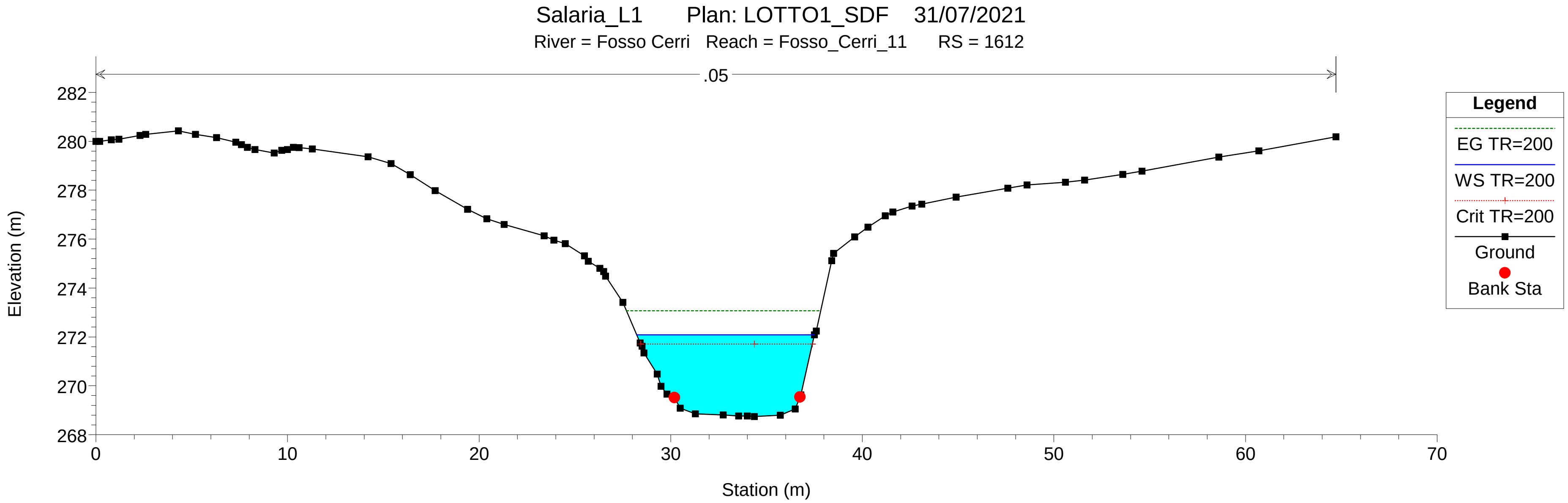

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1901
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta



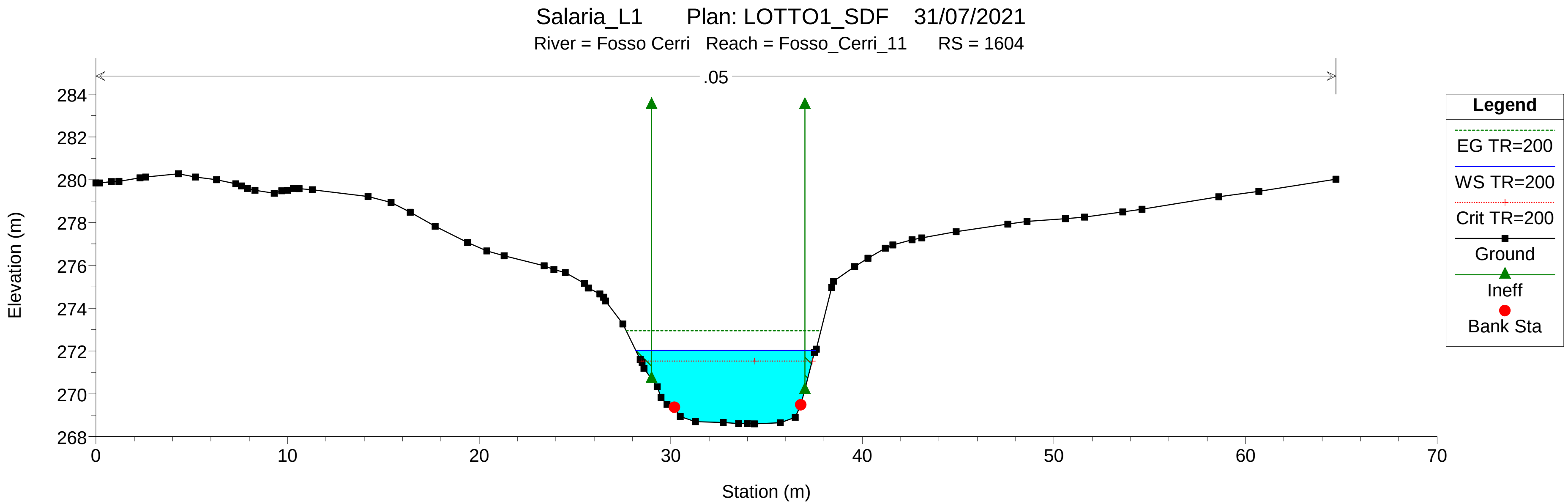
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1765
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta



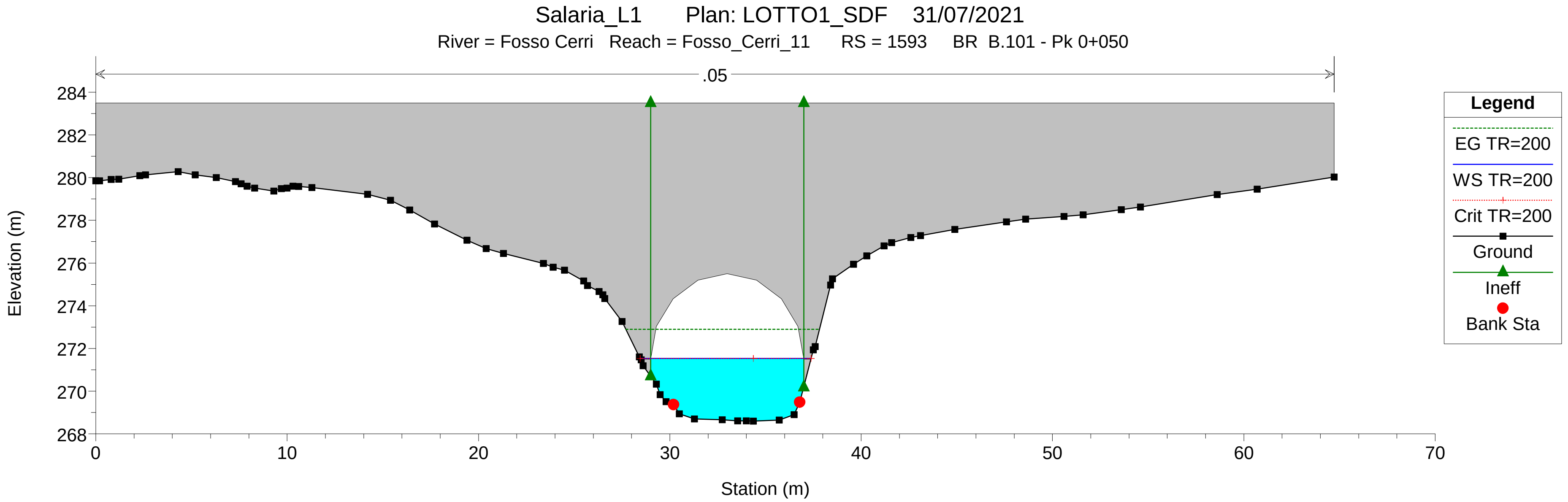
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1675
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

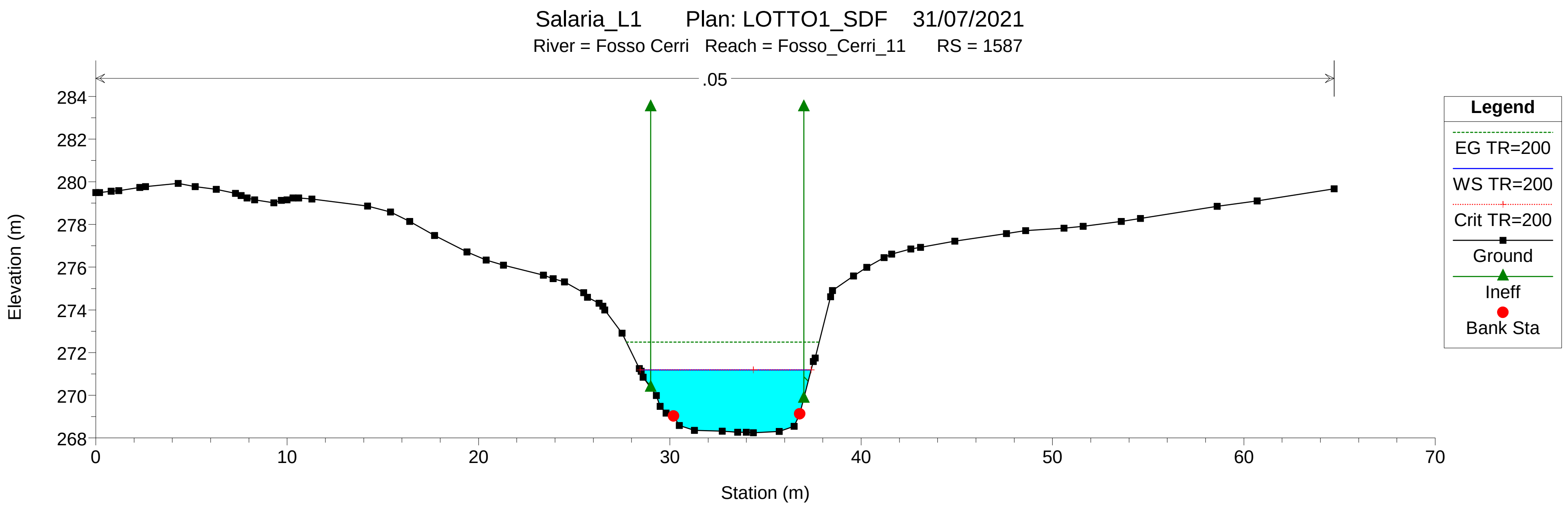


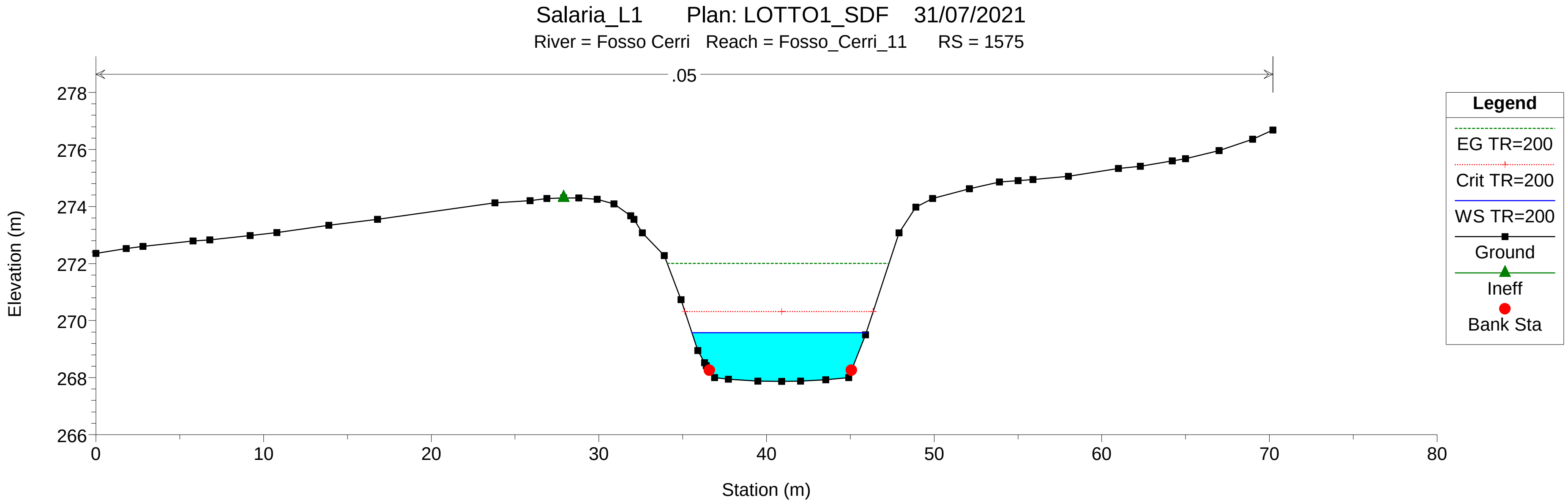
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1612
.05
Elevation (m)
282
280
278
276
274
272
270
268
0
10
20
30
40
50
60
70
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta



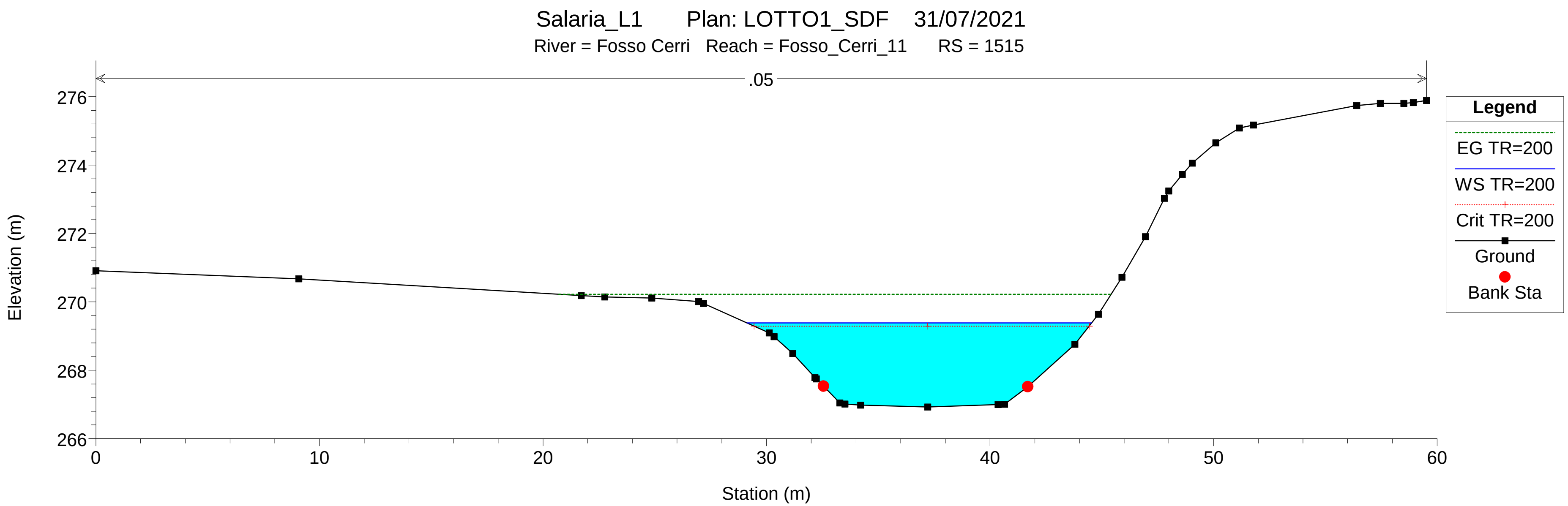
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1604
.05
Elevation (m)
284
282
280
278
276
274
272
270
268
0
10
20
30
40
50
60
70
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1593 BR B.101 - Pk 0+050
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

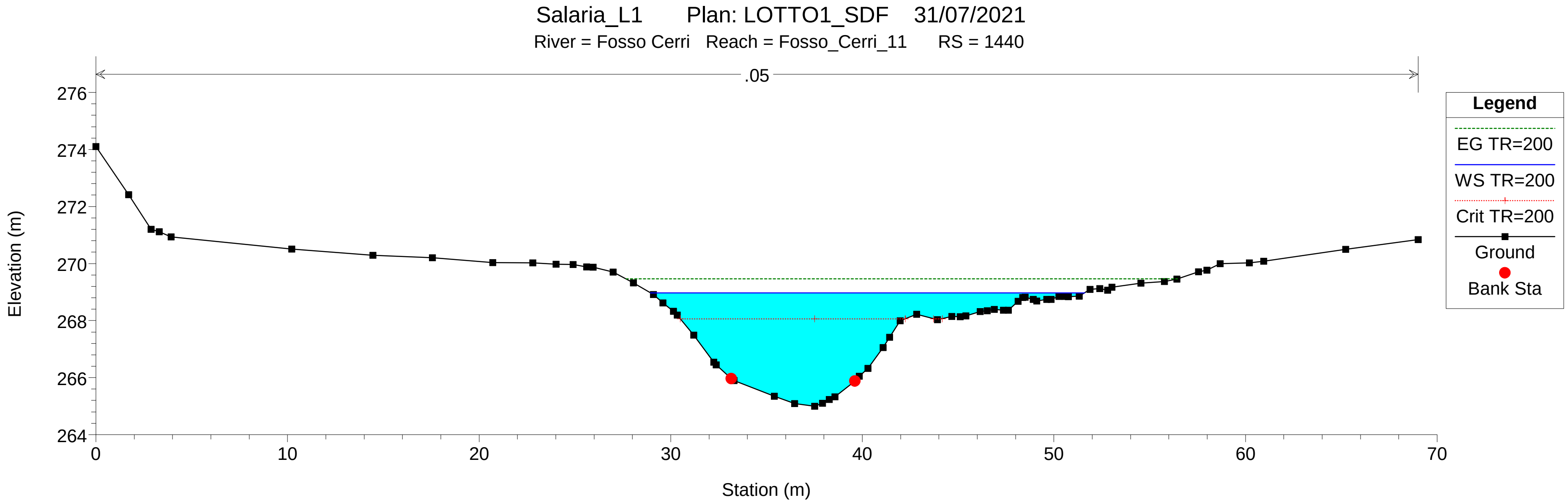

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1587
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

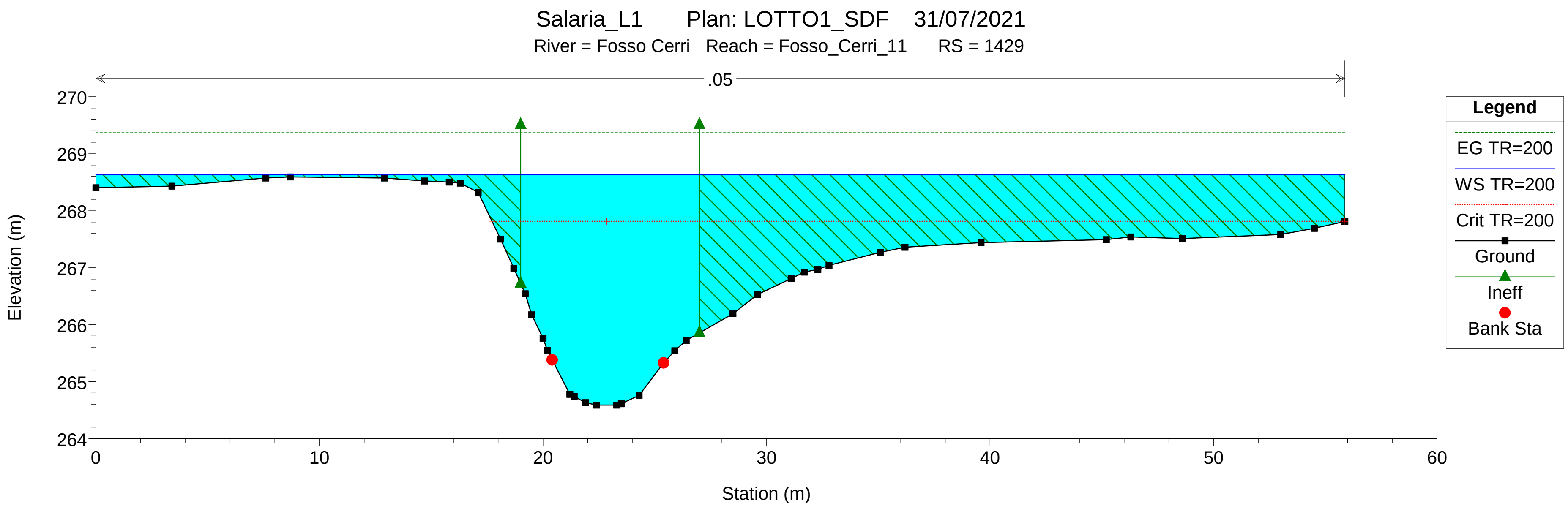


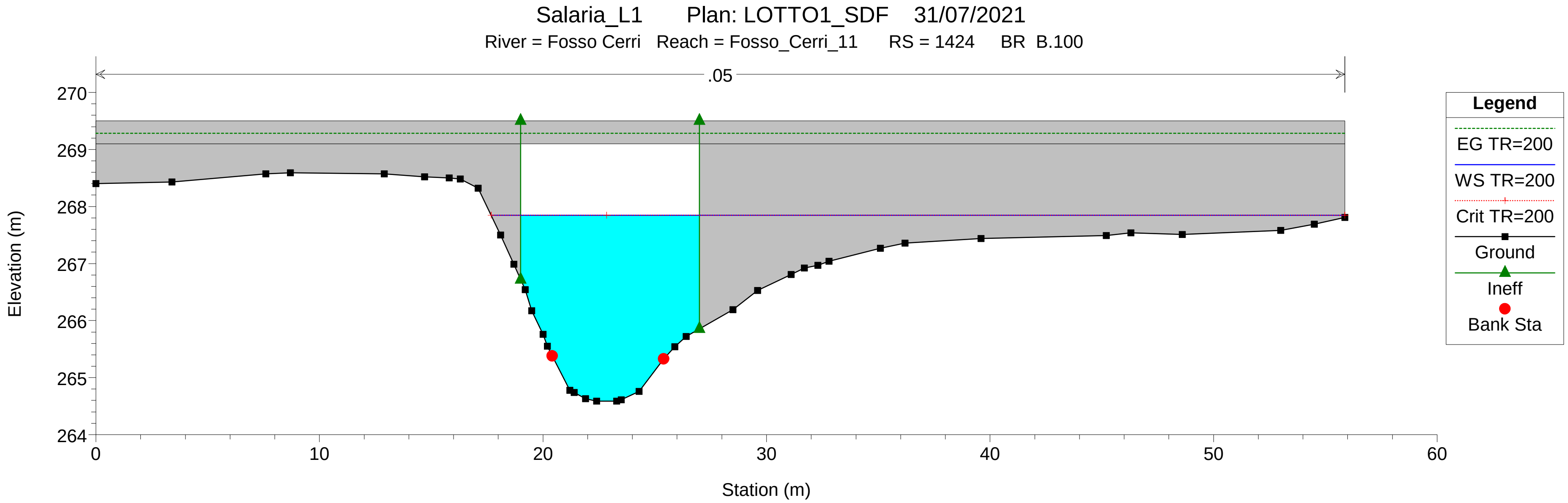
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1575
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

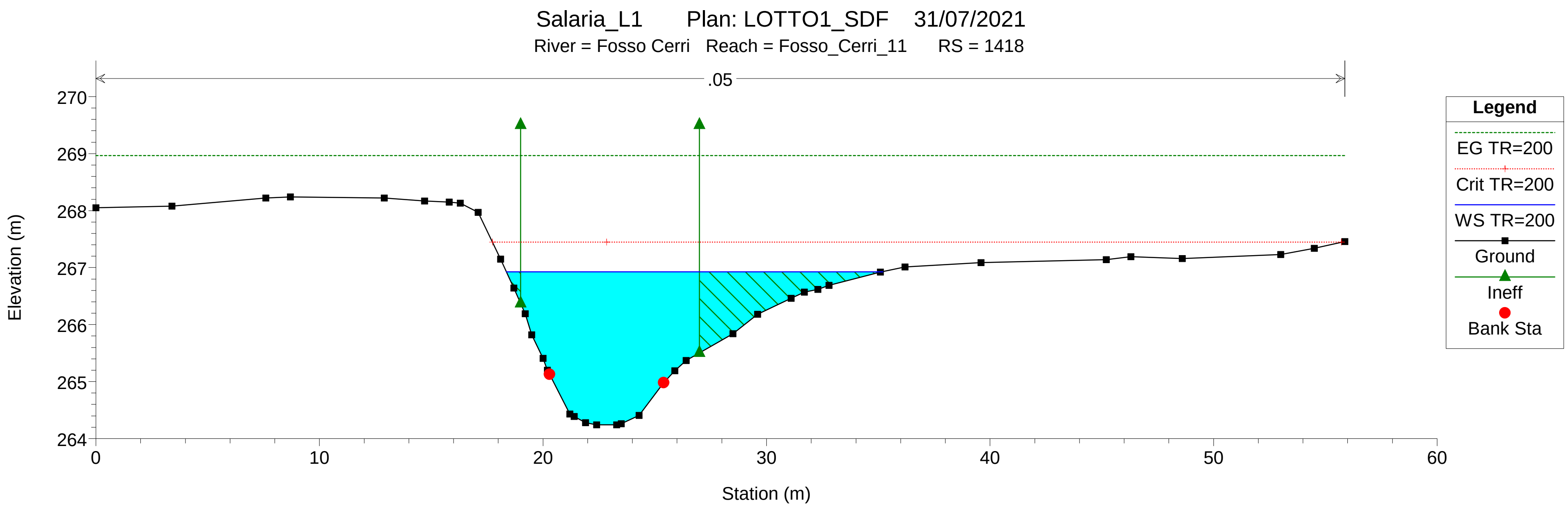


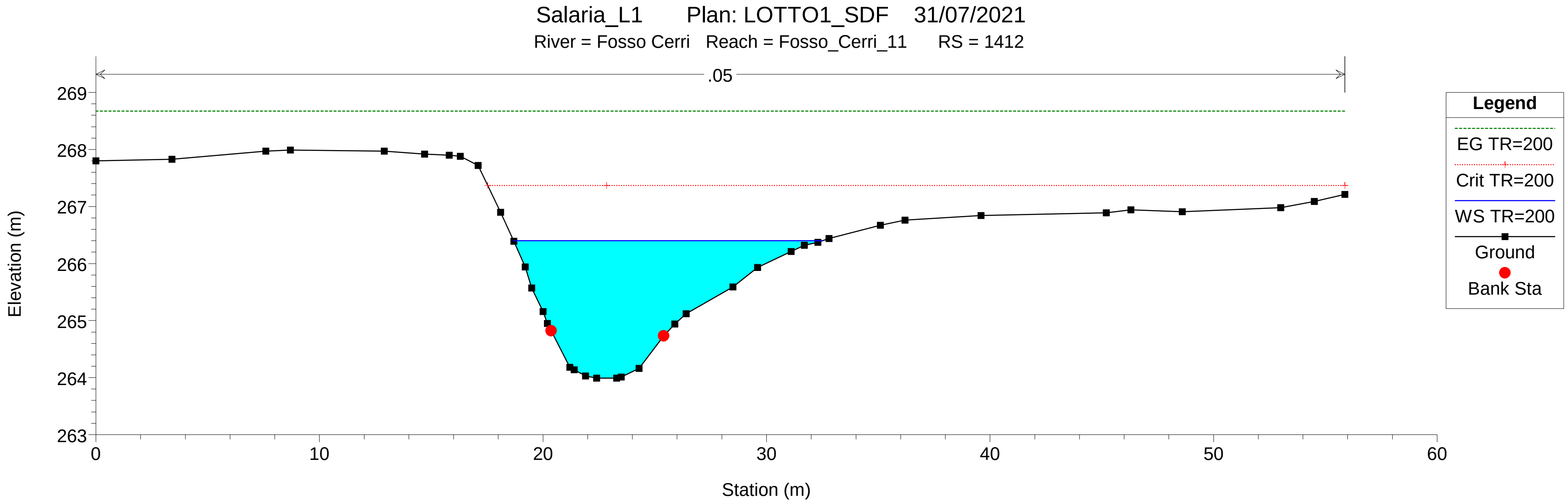
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1515
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

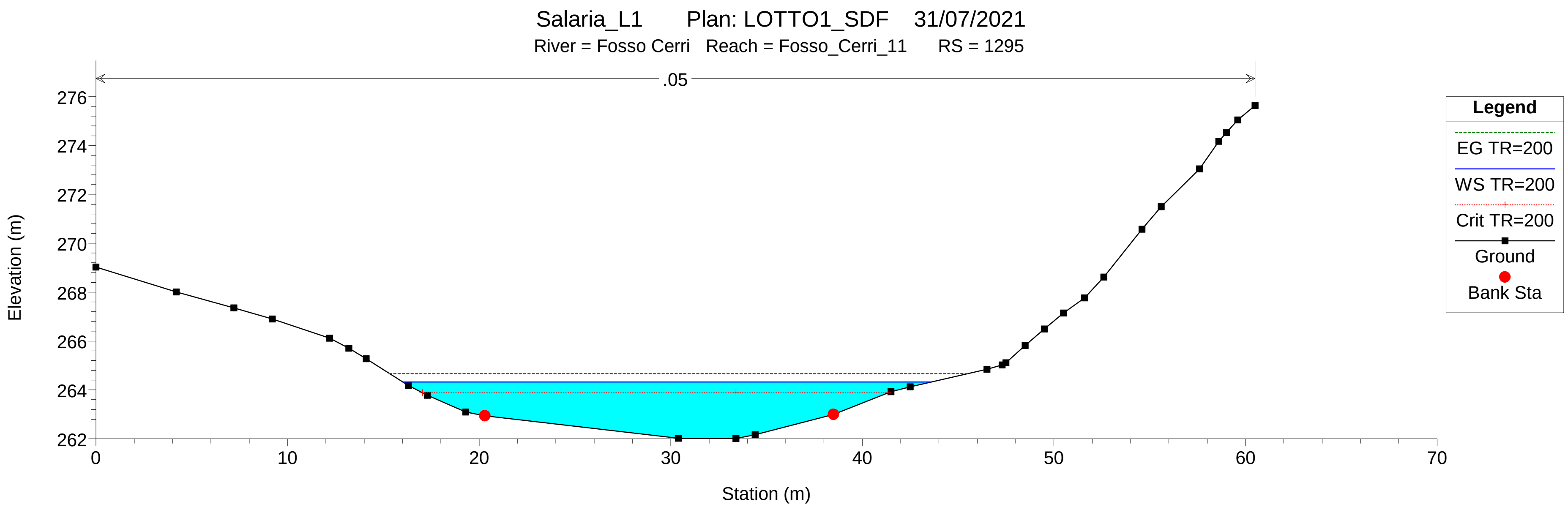

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1440
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

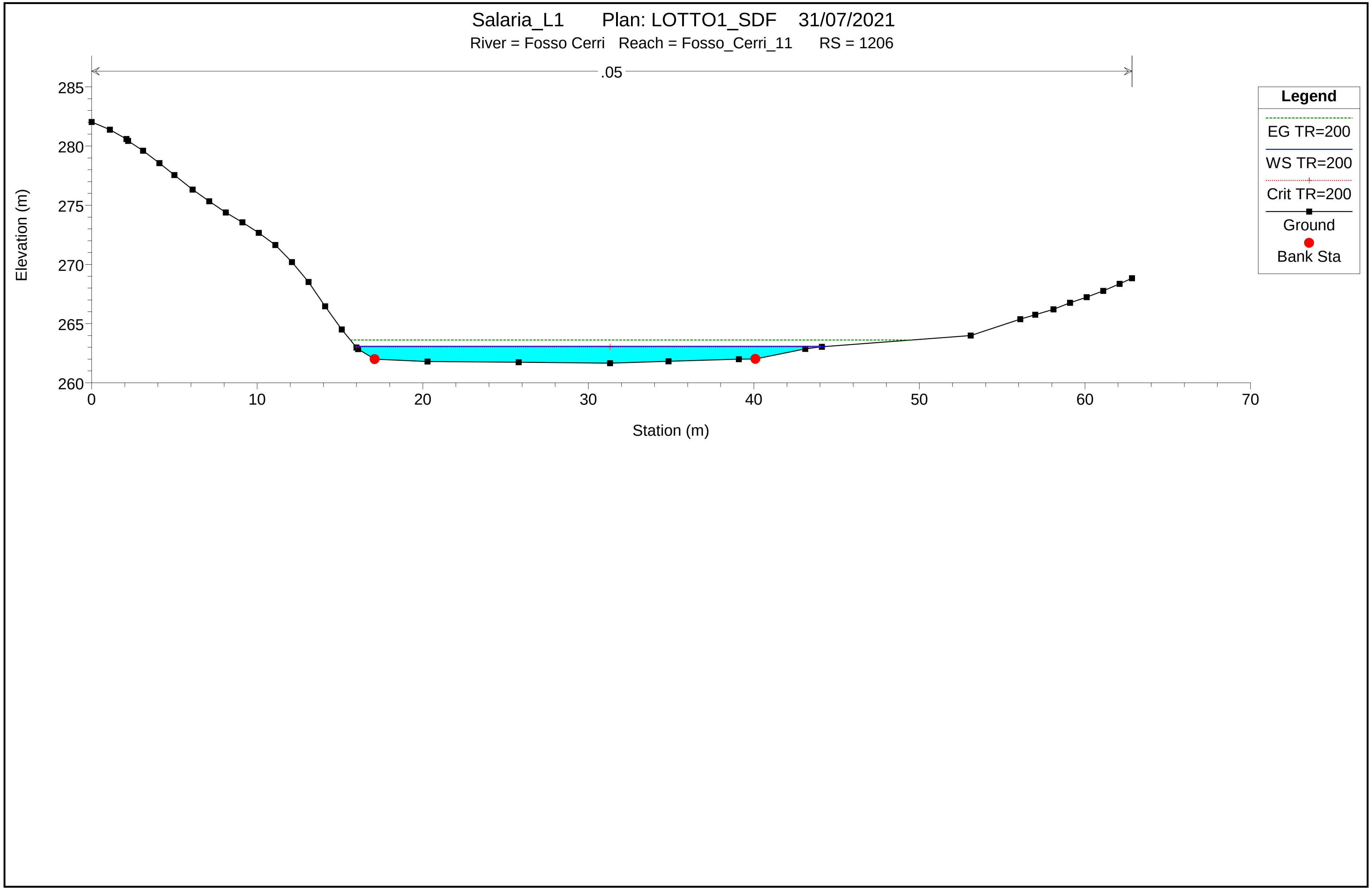

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1429
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1424 BR B.100
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1418
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

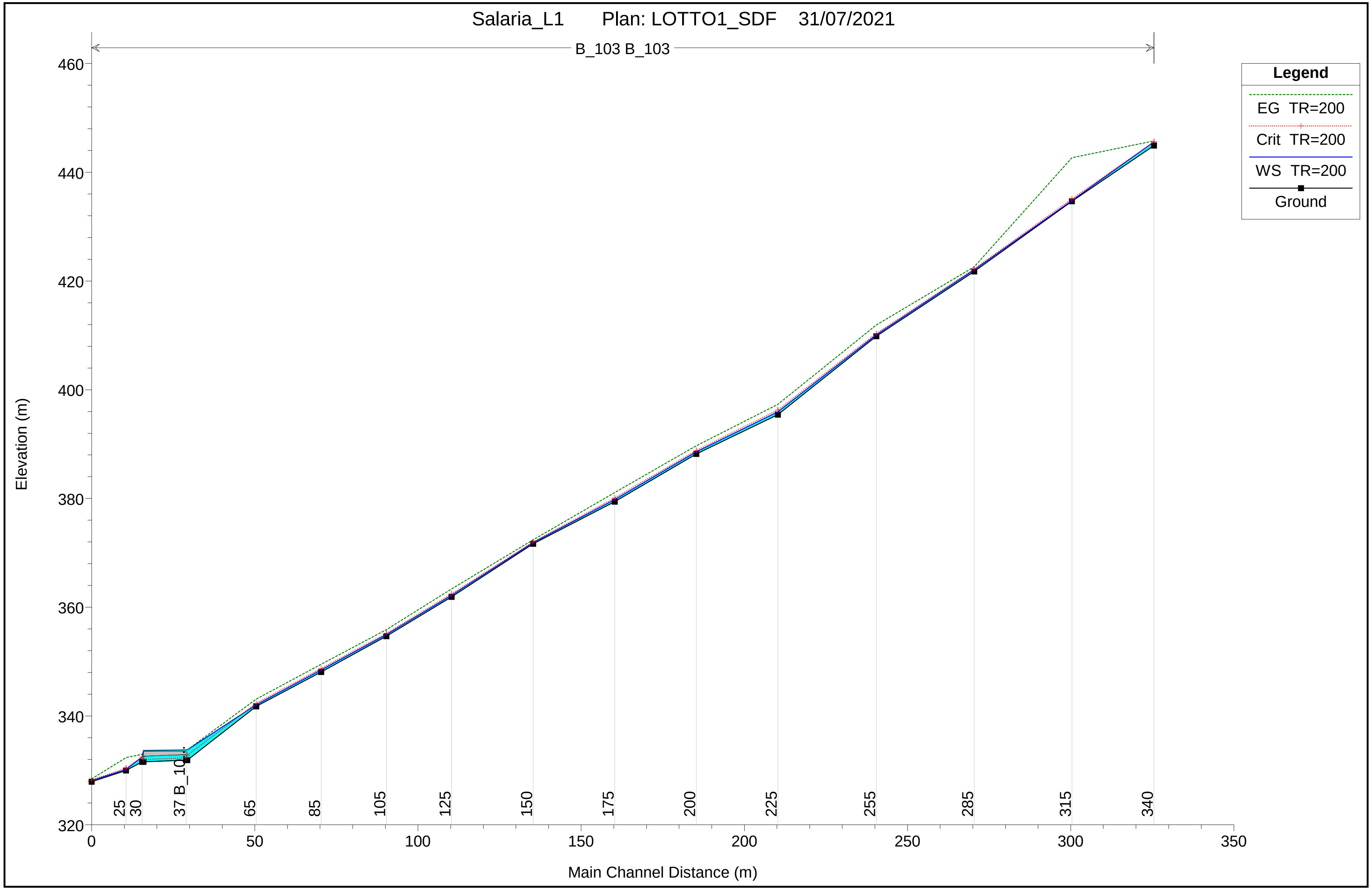

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1412
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1295
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1206
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

2.1.2. STATO DI FATTO

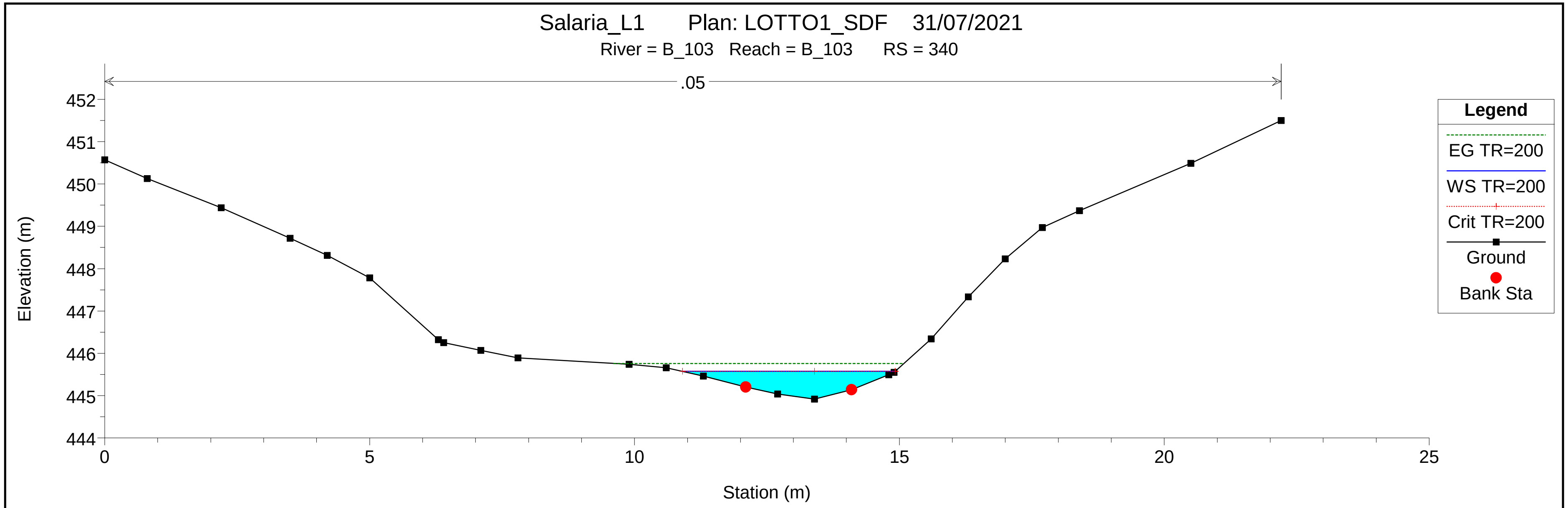
B.103 - Progr.1+267

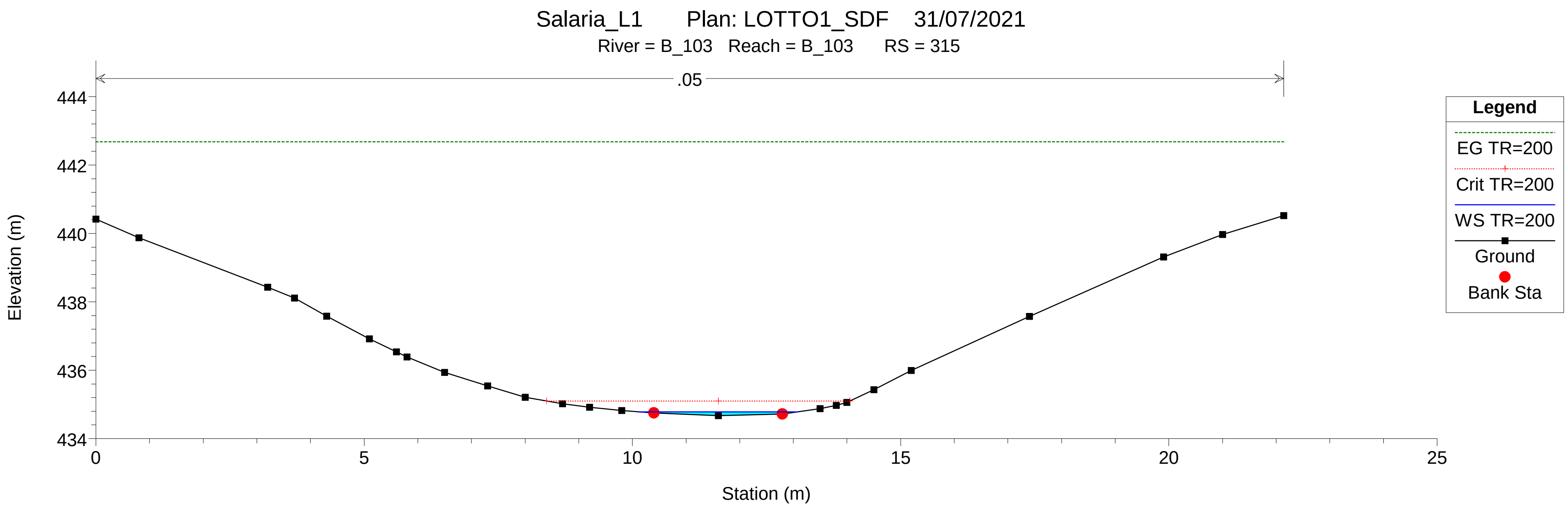


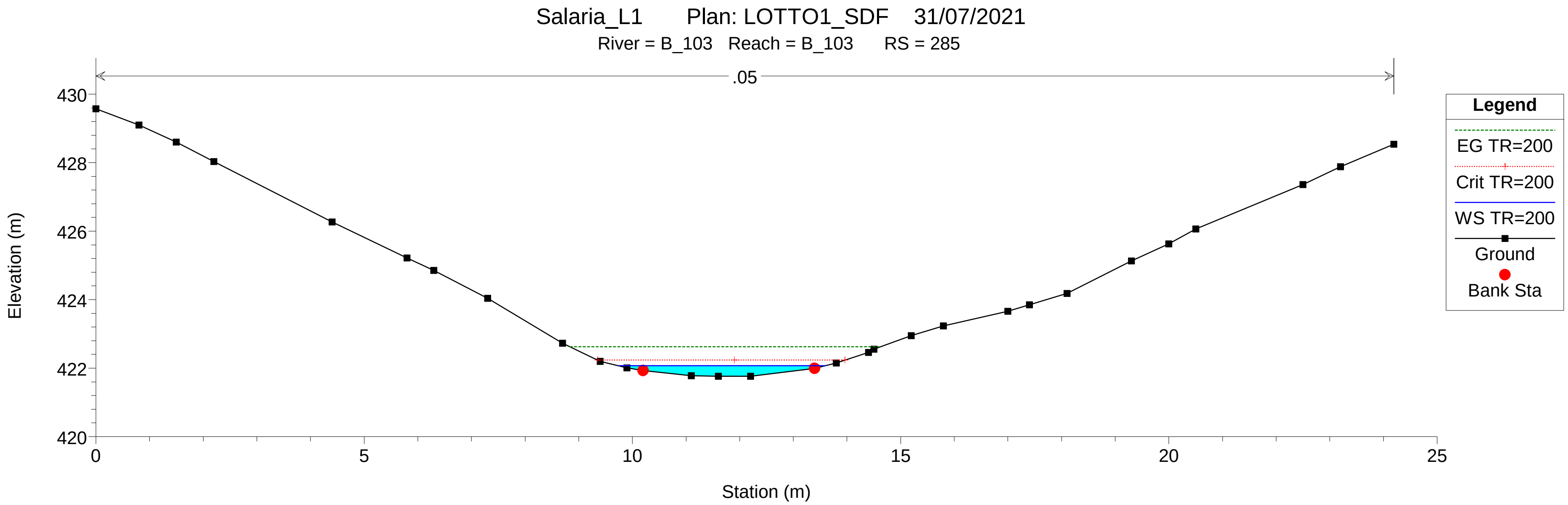
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
B_103 B_103
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
Main Channel Distance (m)
460
440
420
400
380
360
340
320
0
50
100
150
200
250
300
350
25
30
37 B_10
65
85
105
125
150
175
200
225
255
285
315
340

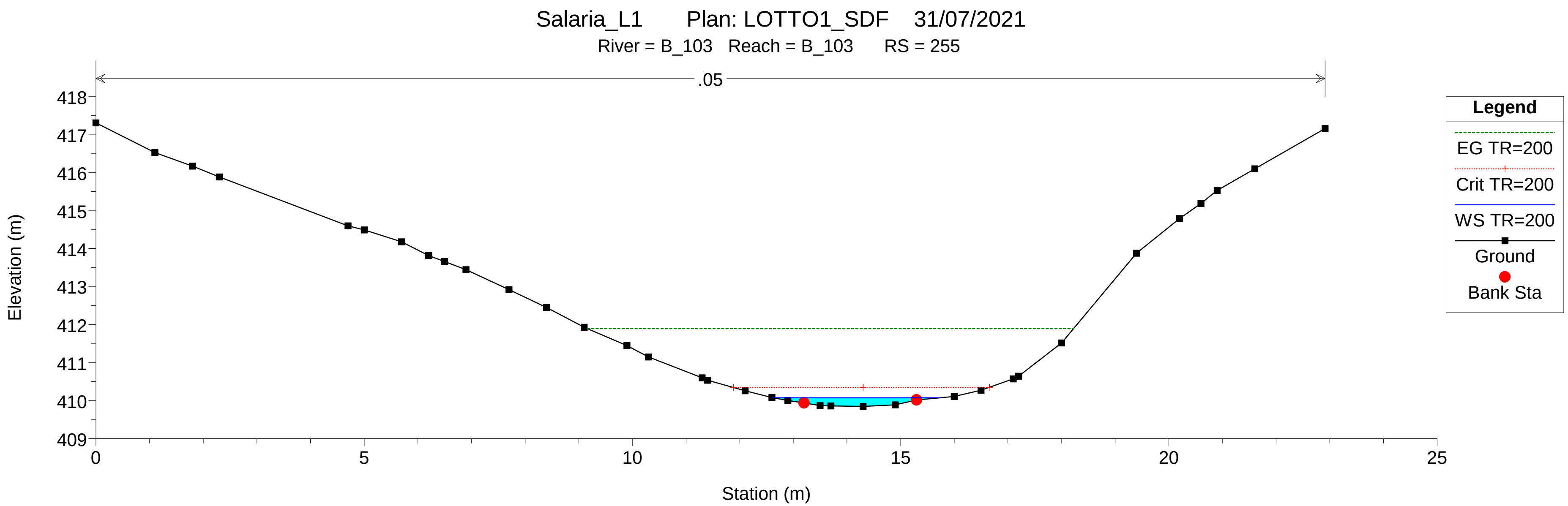
HEC-RAS Plan: L1_SDF River: B_103 Reach: B_103 Profile: TR=200

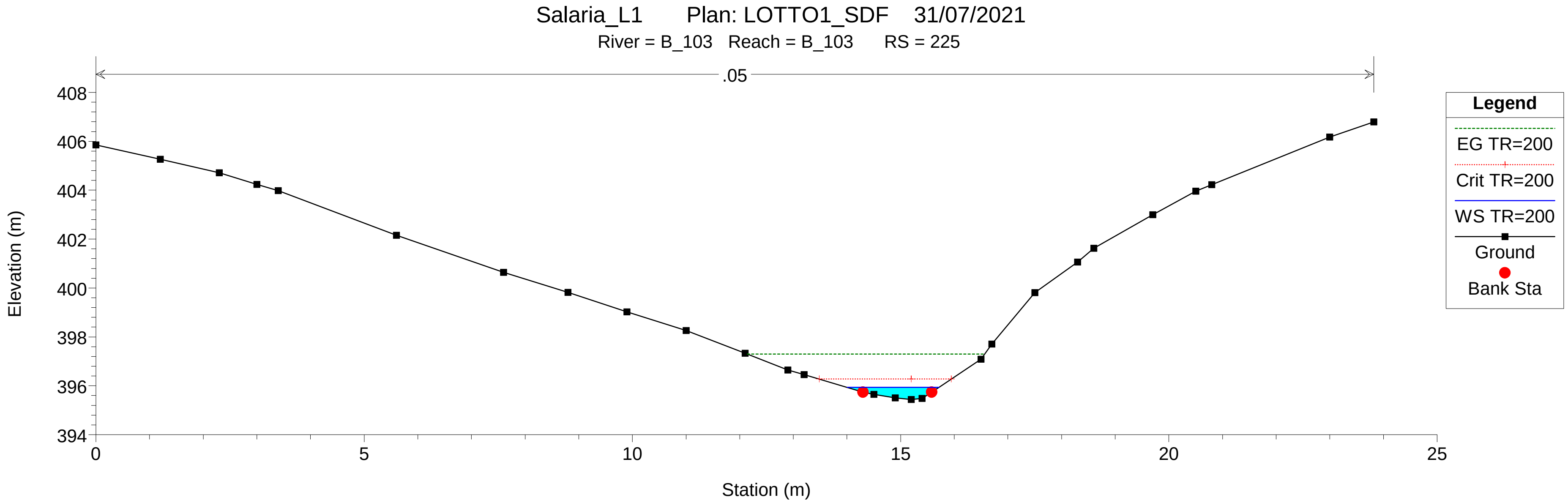
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_103	340	TR=200	2.60	444.92	0.65	445.57	445.57	0.00	0.90	445.76	2.05	1.77	0.52	128.35	0.37
B_103	315	TR=200	2.60	434.67	0.12	434.79	435.10	-0.31	13.96	442.68	12.60	12.14	0.08	8928.92	0.07
B_103	285	TR=200	2.60	421.76	0.31	422.07	422.23	-0.16	2.18	422.62	3.33	3.23	0.24	440.17	0.21
B_103	255	TR=200	2.60	409.85	0.23	410.08	410.35	-0.27	4.48	411.89	6.11	5.72	0.19	1599.89	0.15
B_103	225	TR=200	2.60	395.44	0.49	395.93	396.27	-0.34	2.72	397.29	5.23	4.97	0.33	974.32	0.31
B_103	200	TR=200	2.60	388.21	0.36	388.57	388.84	-0.27	2.83	389.70	4.93	4.43	0.30	888.13	0.23
B_103	175	TR=200	2.60	379.40	0.40	379.80	380.10	-0.30	3.13	381.10	5.07	4.94	0.25	994.63	0.23
B_103	150	TR=200	2.60	371.69	0.21	371.90	372.04	-0.14	2.52	372.40	3.15	3.13	0.16	449.44	0.15
B_103	125	TR=200	2.60	361.92	0.28	362.20	362.45	-0.25	3.34	363.37	4.92	4.58	0.22	983.68	0.18
B_103	105	TR=200	2.60	354.67	0.33	355.00	355.21	-0.21	2.75	355.87	4.21	4.06	0.23	704.13	0.21
B_103	85	TR=200	2.60	348.10	0.37	348.47	348.72	-0.25	2.87	349.52	4.59	4.40	0.25	815.78	0.22
B_103	65	TR=200	2.60	341.75	0.31	342.06	342.31	-0.25	2.87	343.11	4.72	4.30	0.27	842.41	0.21
B_103	44	TR=200	2.60	331.89	1.86	333.75	332.79	0.96	0.32	333.77	0.79	0.64	0.62	17.88	0.39
B_103	37		Culvert												
B_103	30	TR=200	2.60	331.59	0.90	332.49	332.49	0.00	1.00	332.93	2.95	2.95	0.88	223.20	0.88
B_103	25	TR=200	2.60	330.00	0.17	330.17	330.42	-0.25	5.94	332.35	6.69	6.32	0.13	2173.67	0.11
B_103	15	TR=200	2.60	327.90	0.24	328.14	328.23	-0.09	1.77	328.42	2.55	2.16	0.21	267.73	0.14

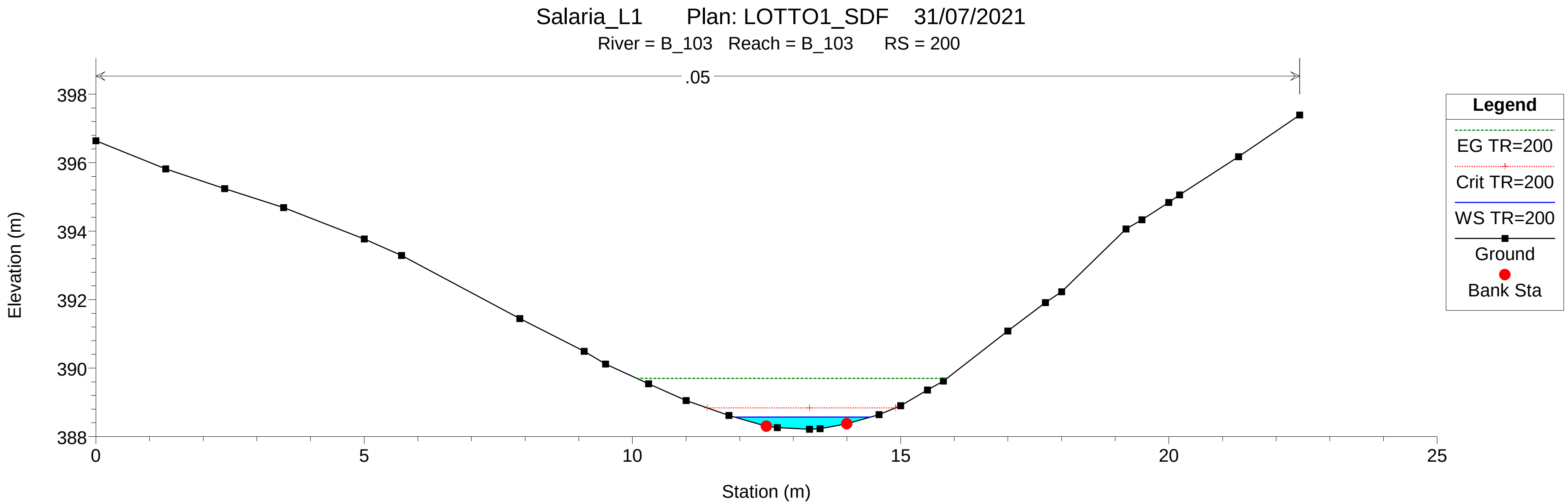

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 340
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

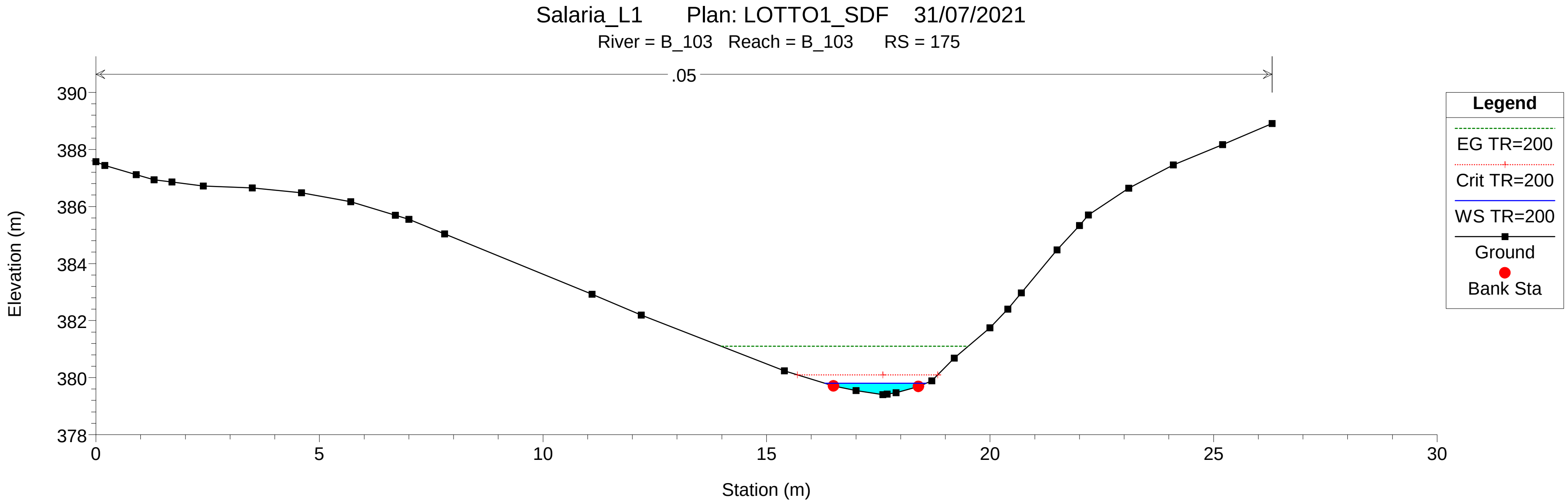

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 315
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

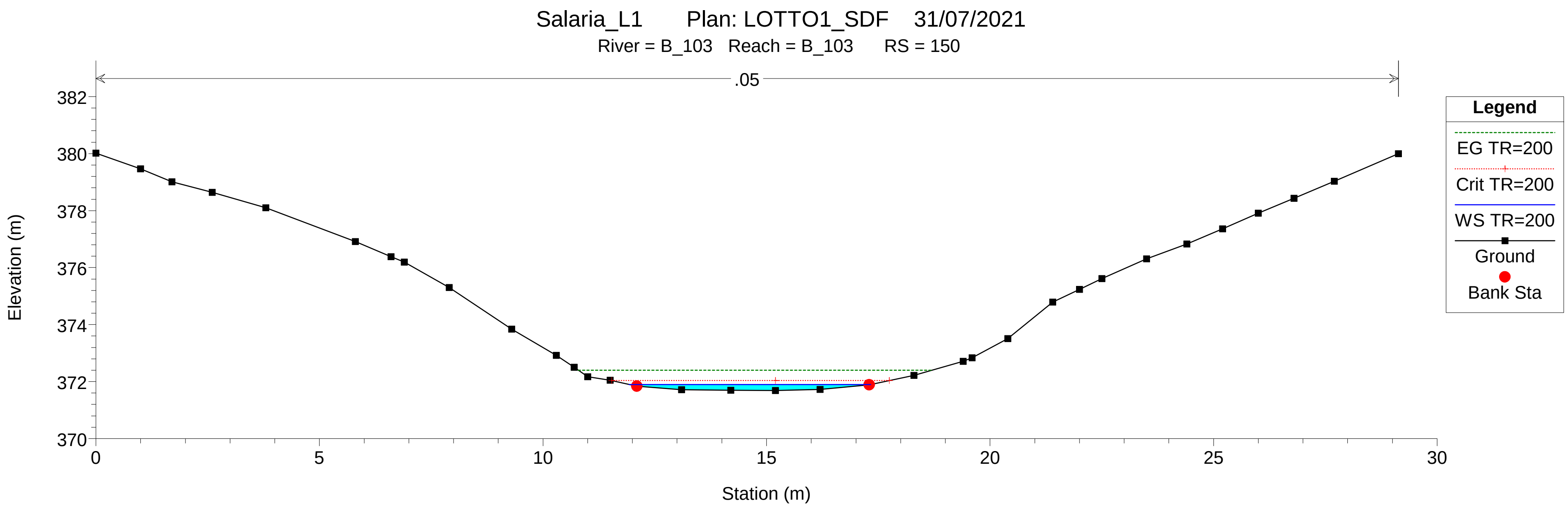

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 285
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

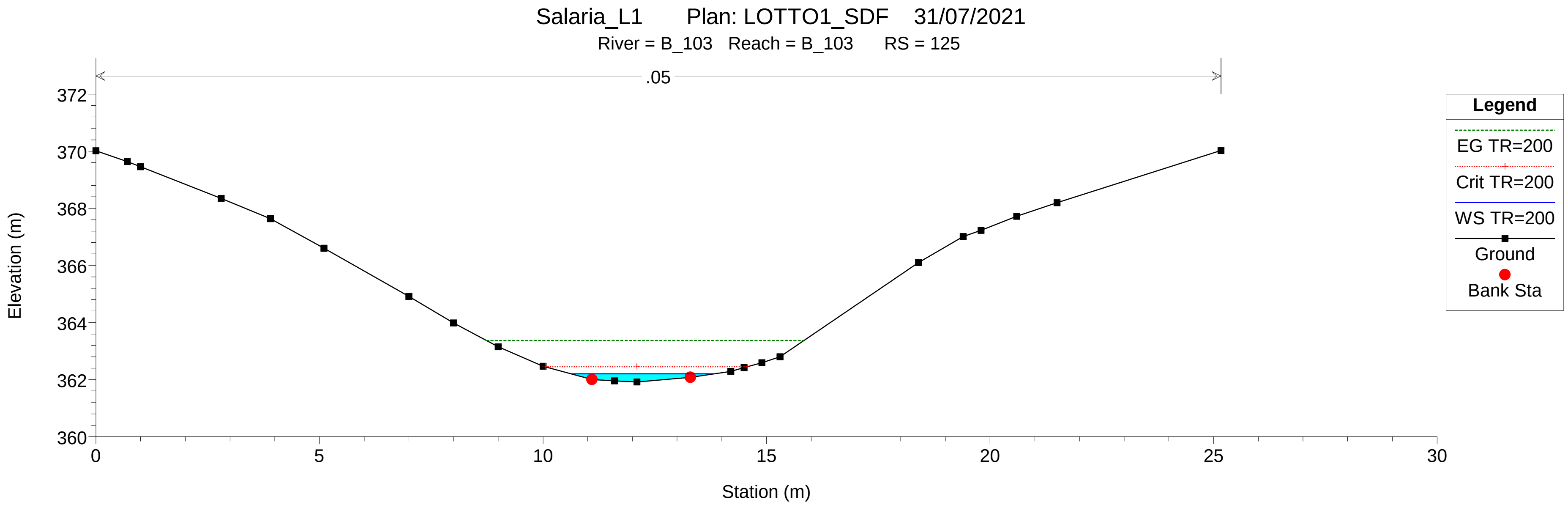

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 255
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 225
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

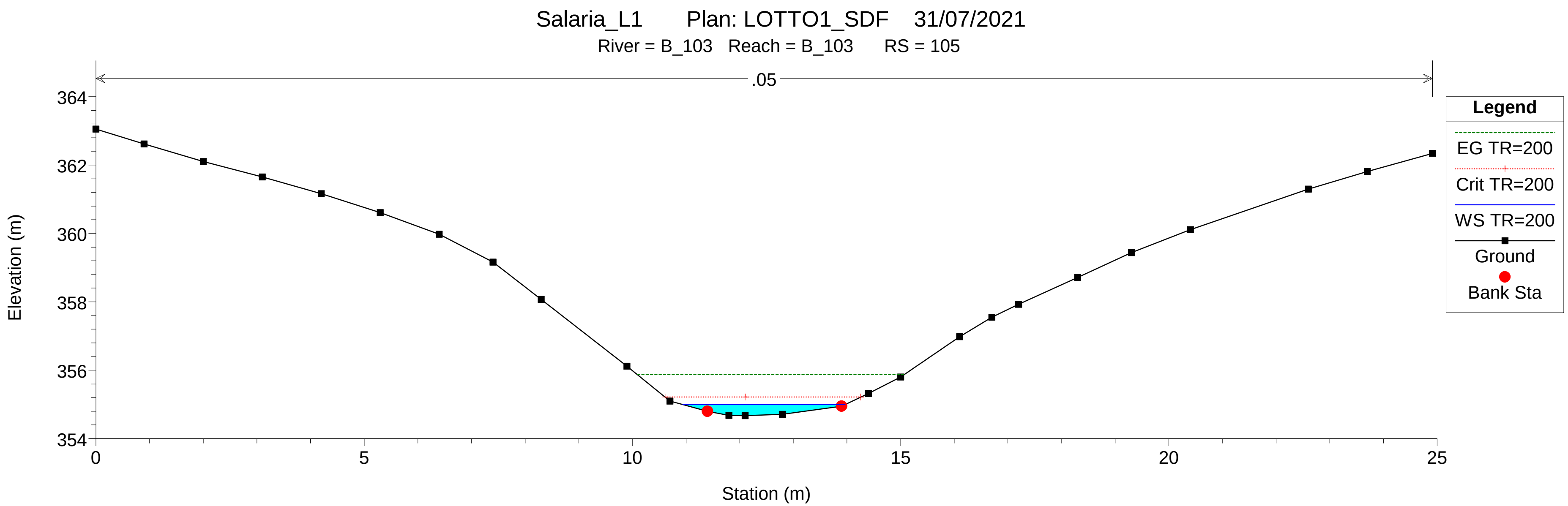

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 200
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 175
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

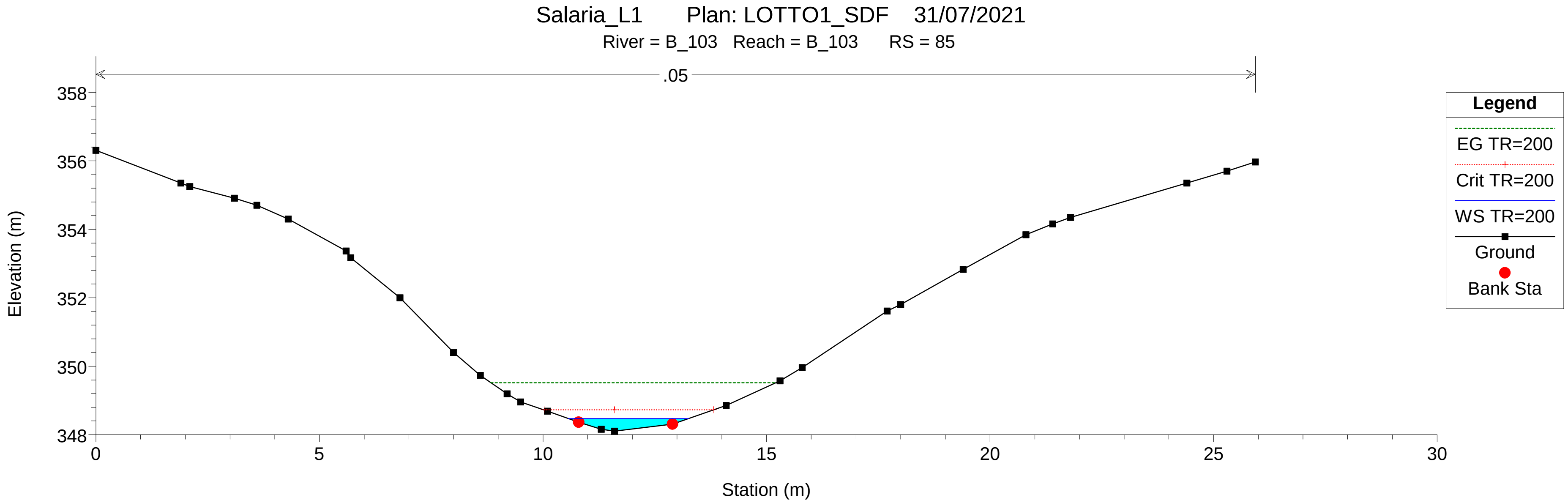

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 150
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

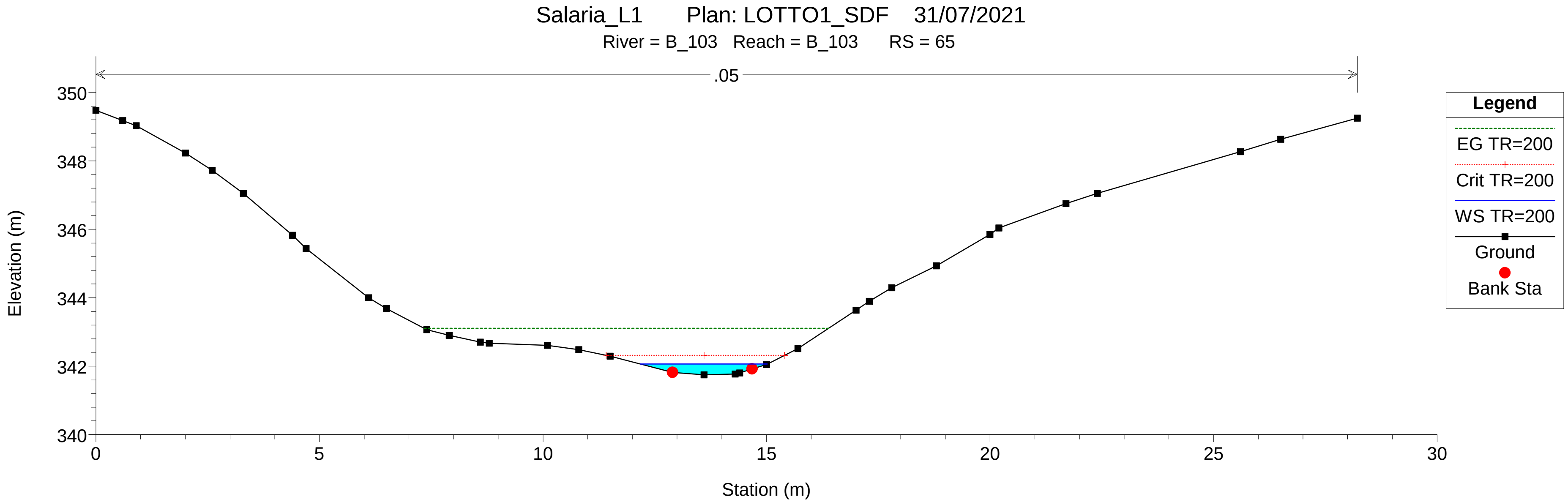


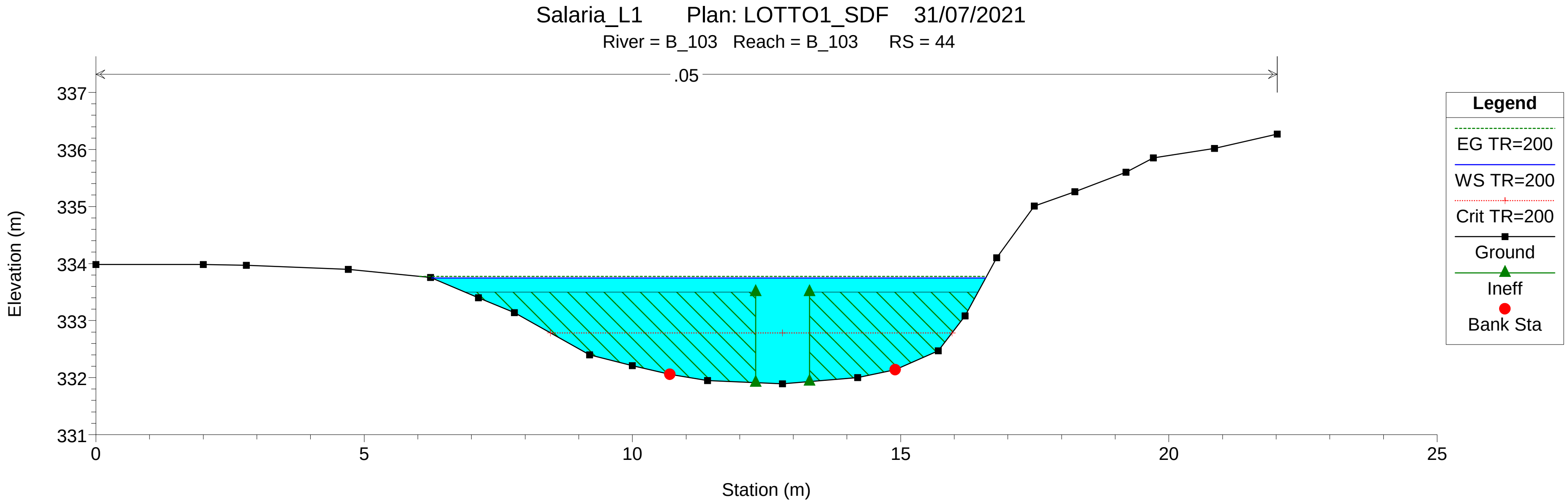
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 125
.05
Elevation (m)
372
370
368
366
364
362
360
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

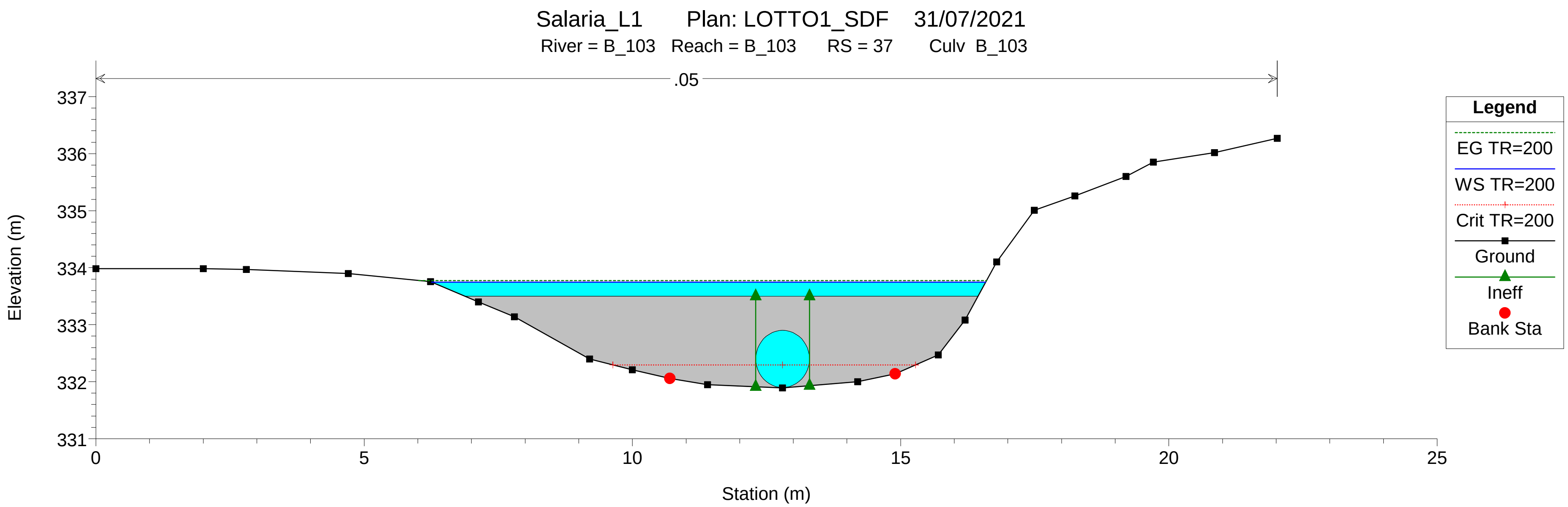


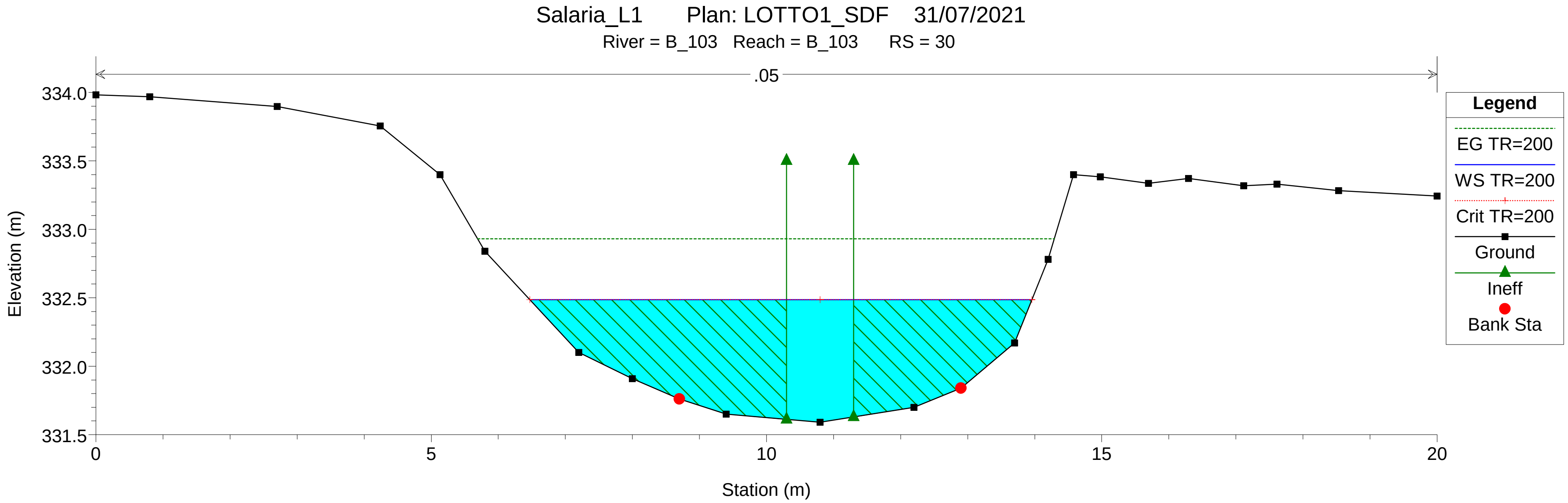
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 105
.05
Elevation (m)
364
362
360
358
356
354
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

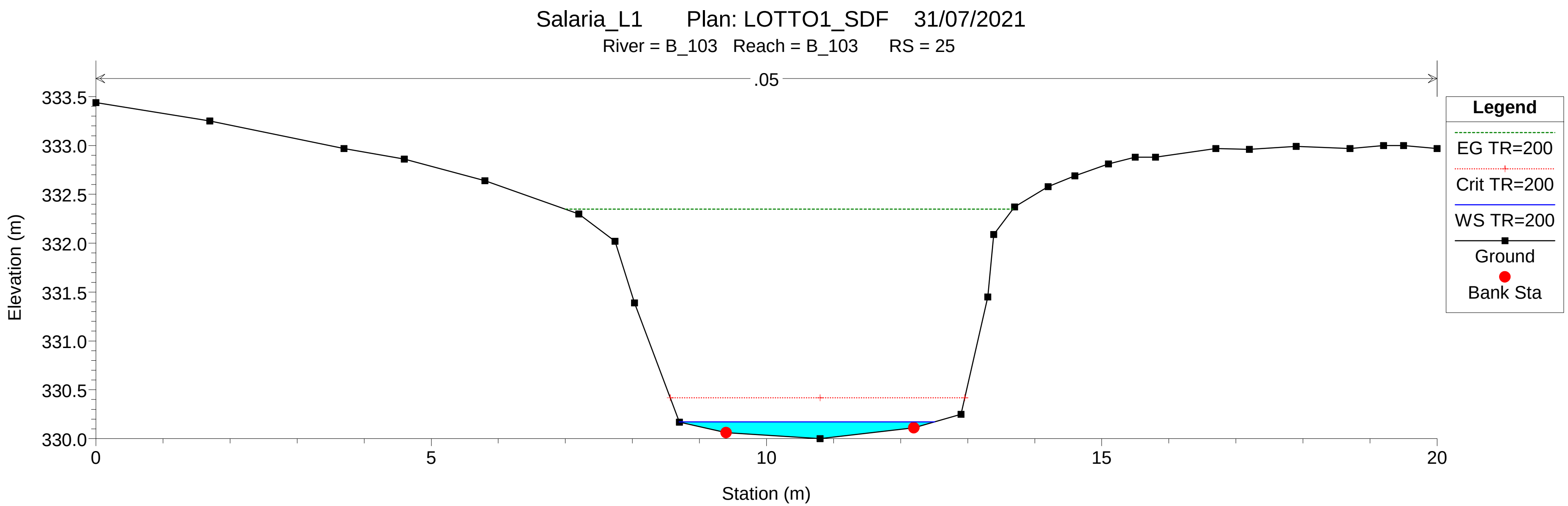

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 85
.05
Elevation (m)
358
356
354
352
350
348
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

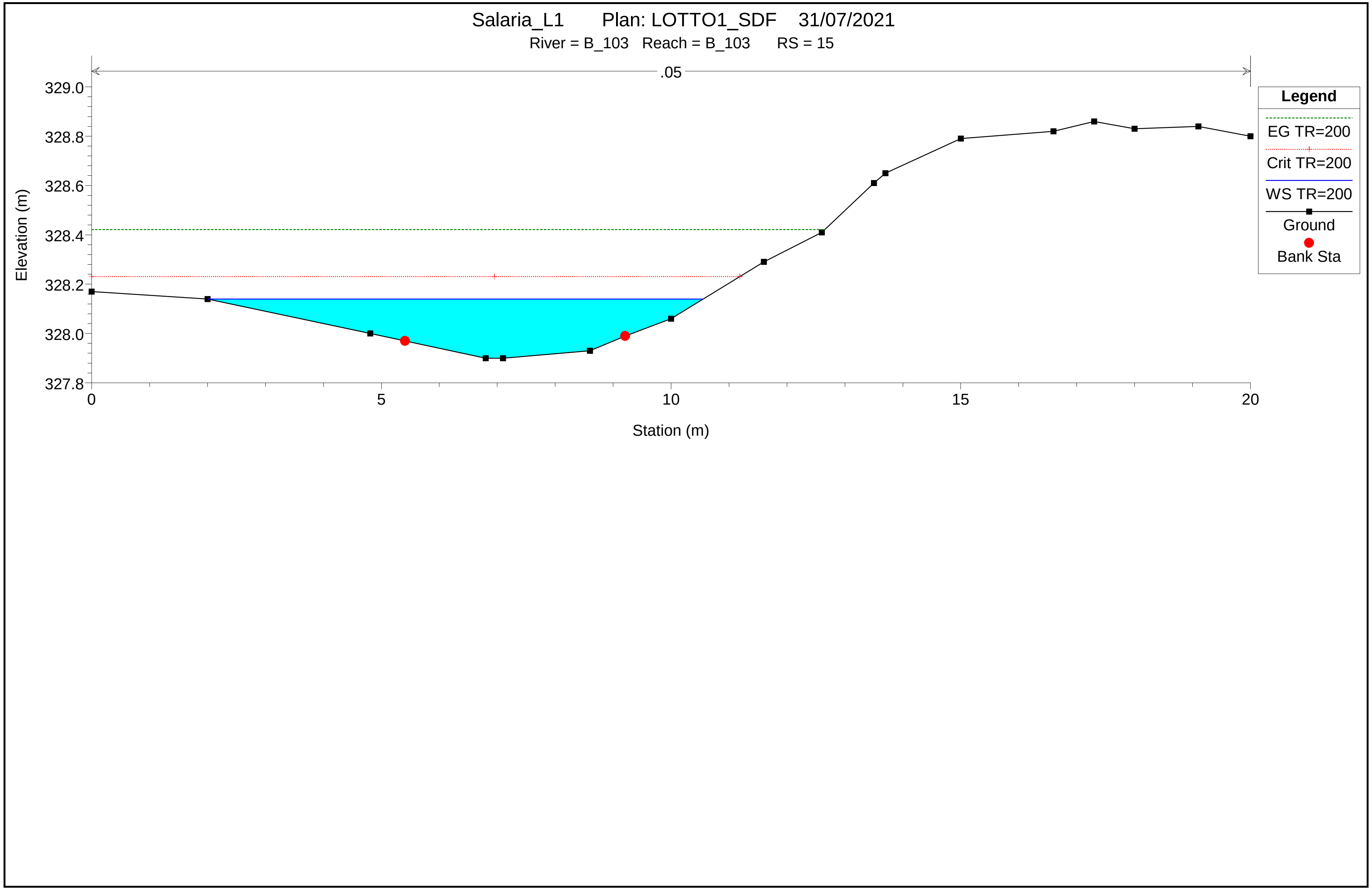

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 65
.05
Elevation (m)
350
348
346
344
342
340
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 44
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 37 Culv B_103
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

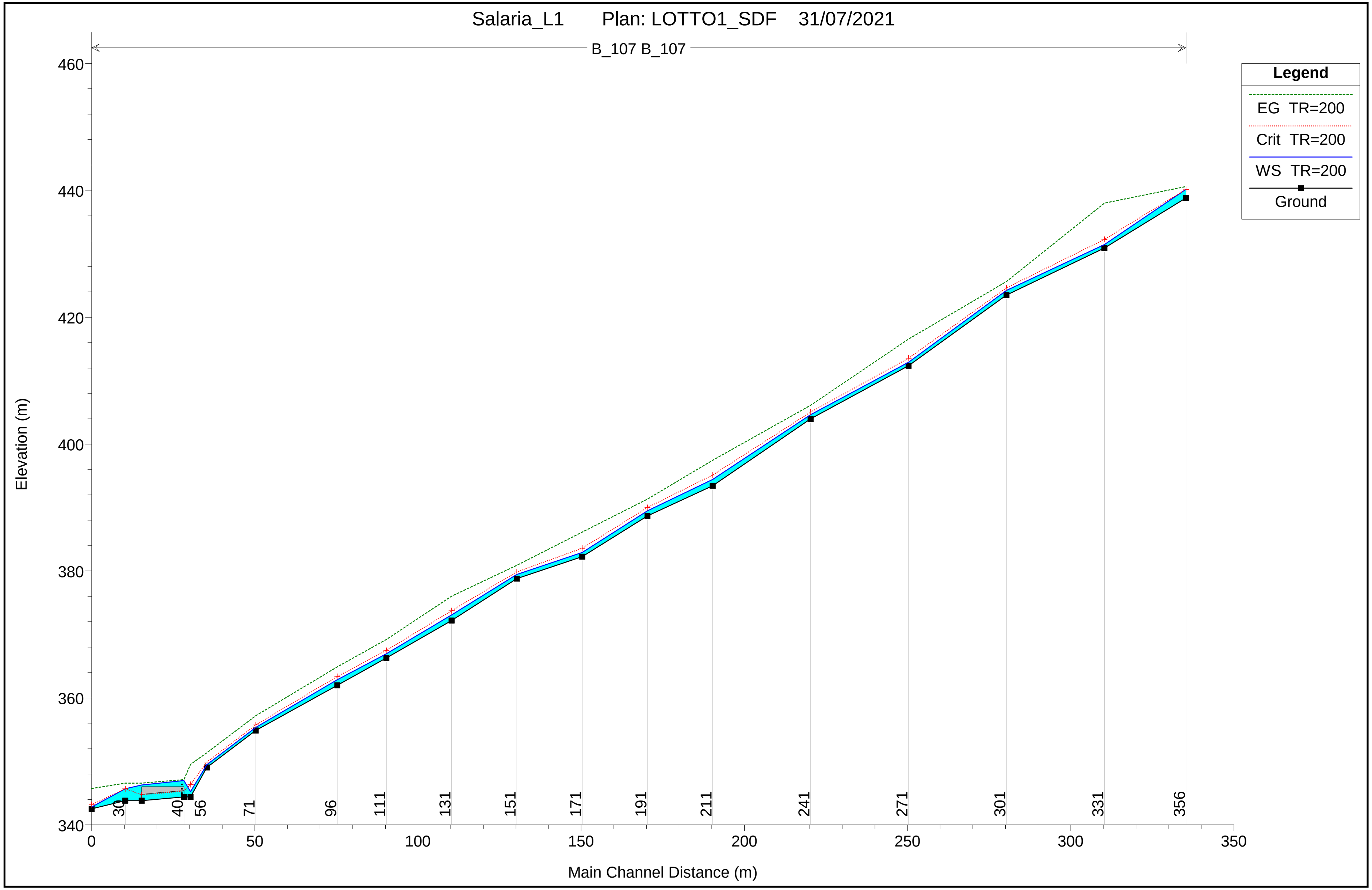

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 30
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 25
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_103 Reach = B_103 RS = 15
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
329.0
328.8
328.6
328.4
328.2
328.0
327.8
0
5
10
15
20

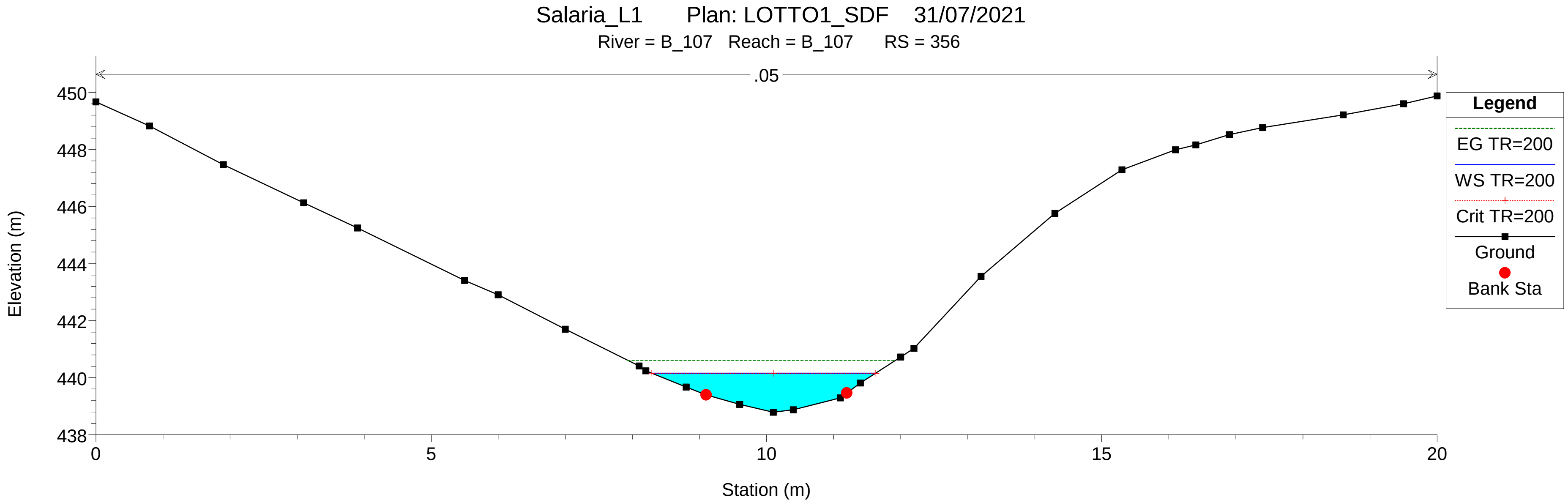
2.1.3. STATO DI FATTO

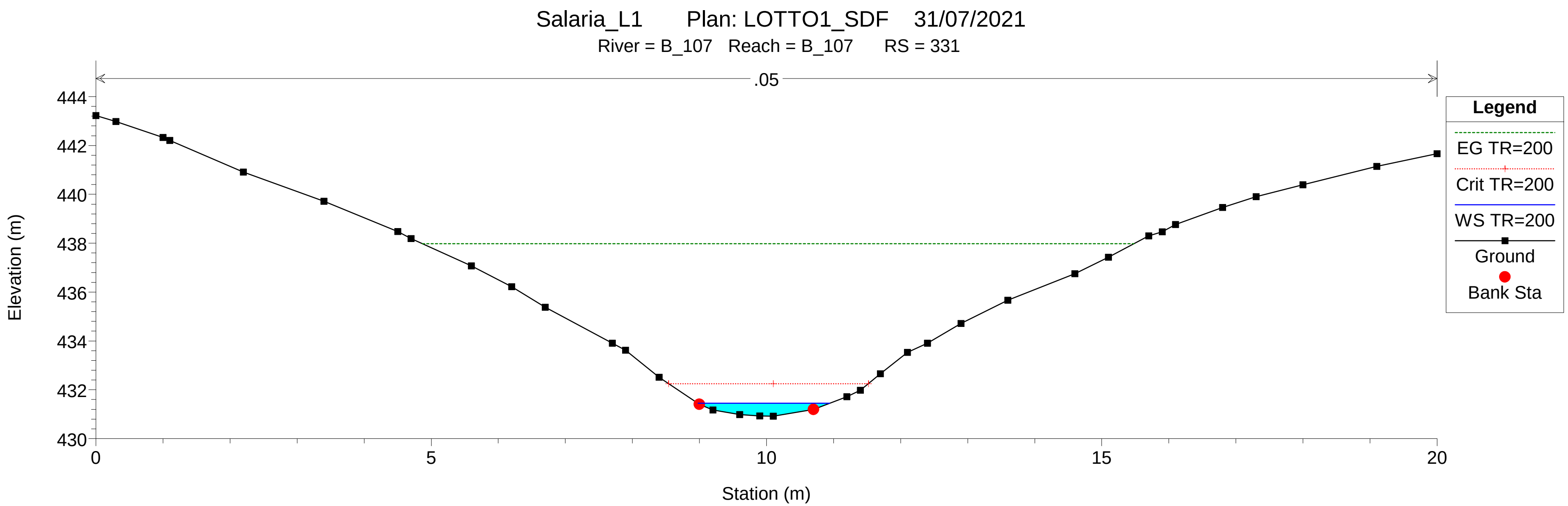
B.107 - Progr.1+632

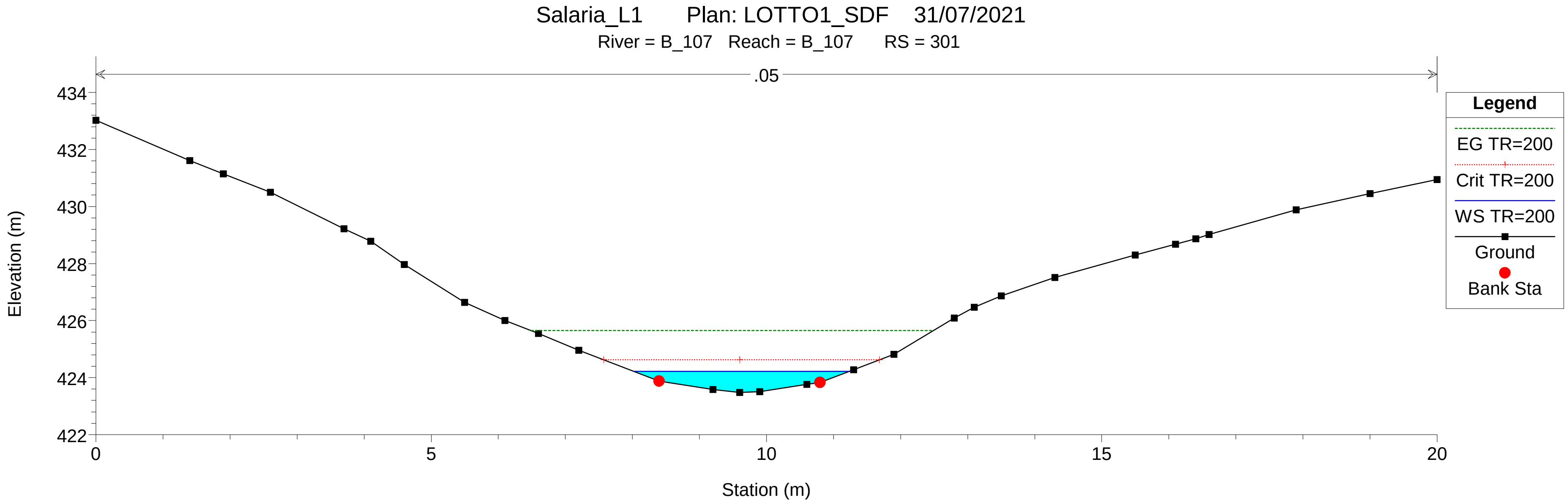

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
B_107 B_107
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
Main Channel Distance (m)
340
360
380
400
420
440
460
0
50
100
150
200
250
300
350
30
40
56
71
96
111
131
151
171
191
211
241
271
301
331
356

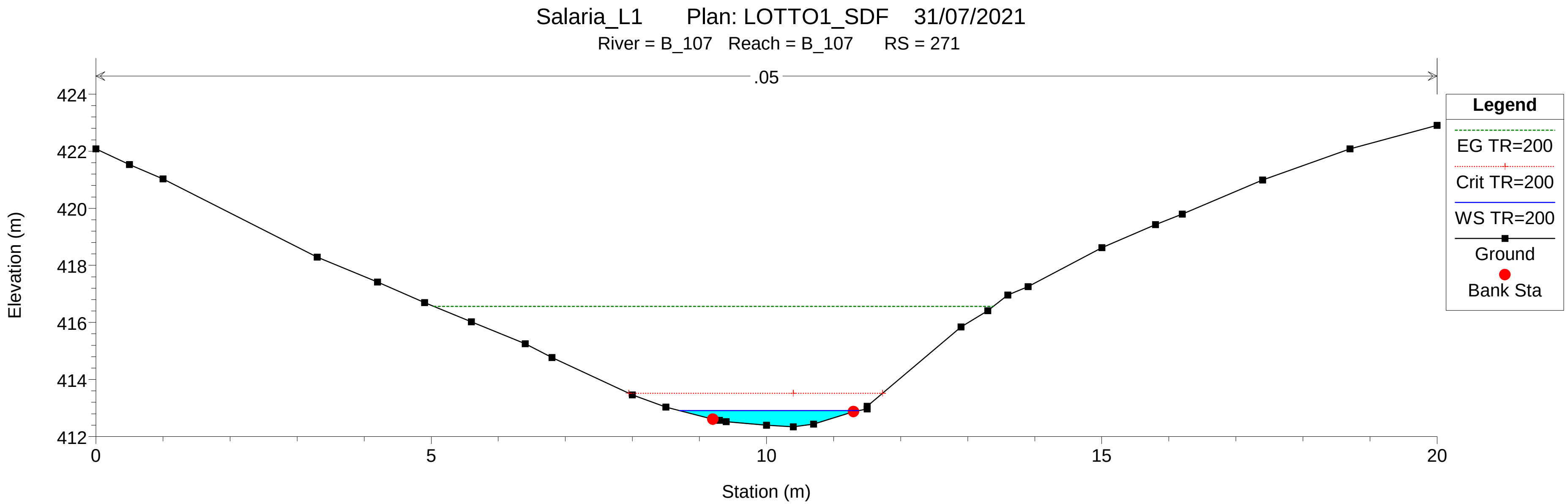
HEC-RAS Plan: L1_SDF River: B_107 Reach: B_107 Profile: TR=200

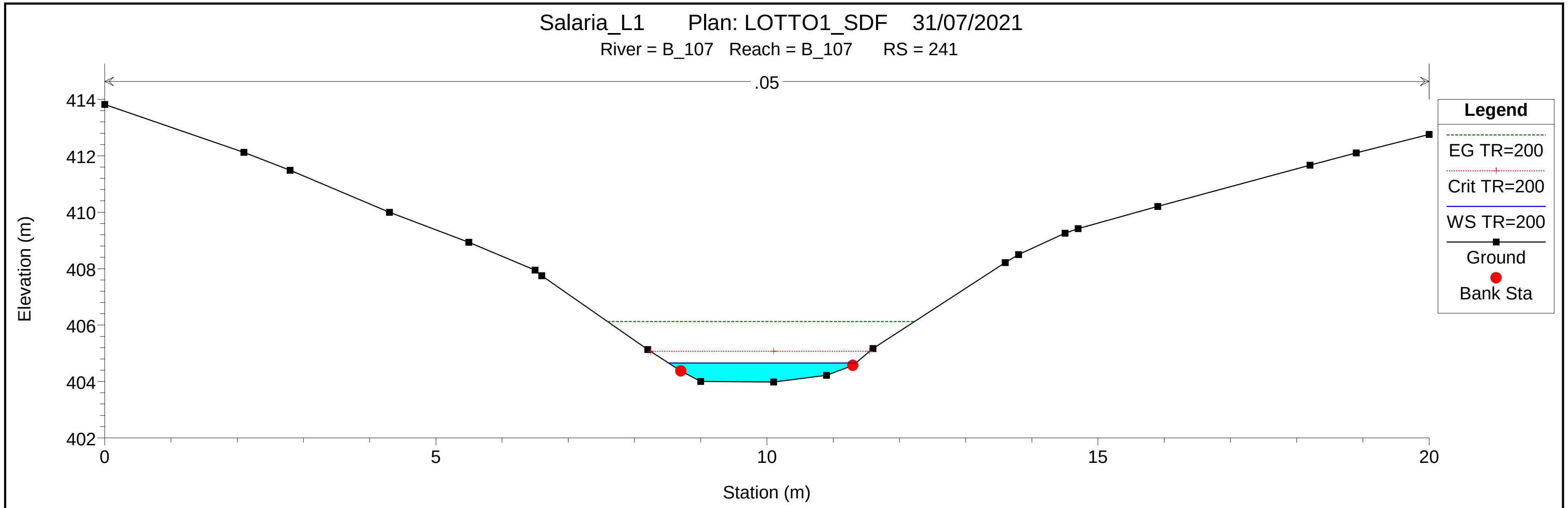
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_107	356	TR=200	7.70	438.79	1.37	440.16	440.16	0.00	0.94	440.61	3.08	2.78	0.93	238.72	0.83
B_107	331	TR=200	7.70	430.92	0.53	431.45	432.25	-0.80	5.84	437.98	11.41	11.10	0.35	4546.75	0.35
B_107	301	TR=200	7.70	423.48	0.74	424.22	424.62	-0.40	2.28	425.65	5.39	5.08	0.54	873.37	0.47
B_107	271	TR=200	7.70	412.34	0.57	412.91	413.52	-0.61	4.30	416.56	8.60	8.24	0.38	2516.10	0.35
B_107	241	TR=200	7.70	403.98	0.68	404.66	405.07	-0.41	2.32	406.12	5.38	5.30	0.48	902.94	0.51
B_107	211	TR=200	7.70	393.44	0.99	394.43	395.15	-0.72	3.01	397.45	7.73	7.56	0.42	1951.59	0.61
B_107	191	TR=200	7.70	388.68	0.82	389.50	389.99	-0.49	2.43	391.32	6.03	5.79	0.56	1079.27	0.55
B_107	171	TR=200	7.70	382.25	0.67	382.92	383.60	-0.68	3.32	386.14	8.31	7.27	0.61	2000.39	0.49
B_107	151	TR=200	7.70	378.80	0.66	379.46	379.86	-0.40	2.32	380.91	5.47	5.08	0.53	904.61	0.46
B_107	131	TR=200	7.70	372.21	0.87	373.08	373.72	-0.64	3.08	376.02	7.82	7.13	0.54	1835.07	0.50
B_107	111	TR=200	7.70	366.29	0.66	366.95	367.47	-0.52	3.03	369.20	6.73	6.46	0.46	1437.53	0.43
B_107	96	TR=200	7.70	361.99	0.86	362.85	363.39	-0.54	2.61	364.88	6.34	6.18	0.50	1243.03	0.52
B_107	71	TR=200	7.70	354.87	0.46	355.33	355.74	-0.41	3.23	357.17	6.02	5.95	0.34	1268.04	0.32
B_107	56	TR=200	7.70	349.02	0.46	349.48	349.89	-0.41	3.31	351.37	6.11	6.05	0.34	1314.72	0.32
B_107	51	TR=200	7.70	344.40	0.85	345.25	346.34	-1.09	3.19	349.53	9.16	9.16	0.84	2180.67	0.84
B_107	40		Culvert												
B_107	30	TR=200	7.70	343.80	1.87	345.67	345.67	0.00	1.00	346.58	4.24	4.24	1.77	364.53	1.82
B_107	20	TR=200	7.70	342.51	0.30	342.81	343.18	-0.37	5.22	345.71	7.69	7.27	0.22	2401.82	0.18

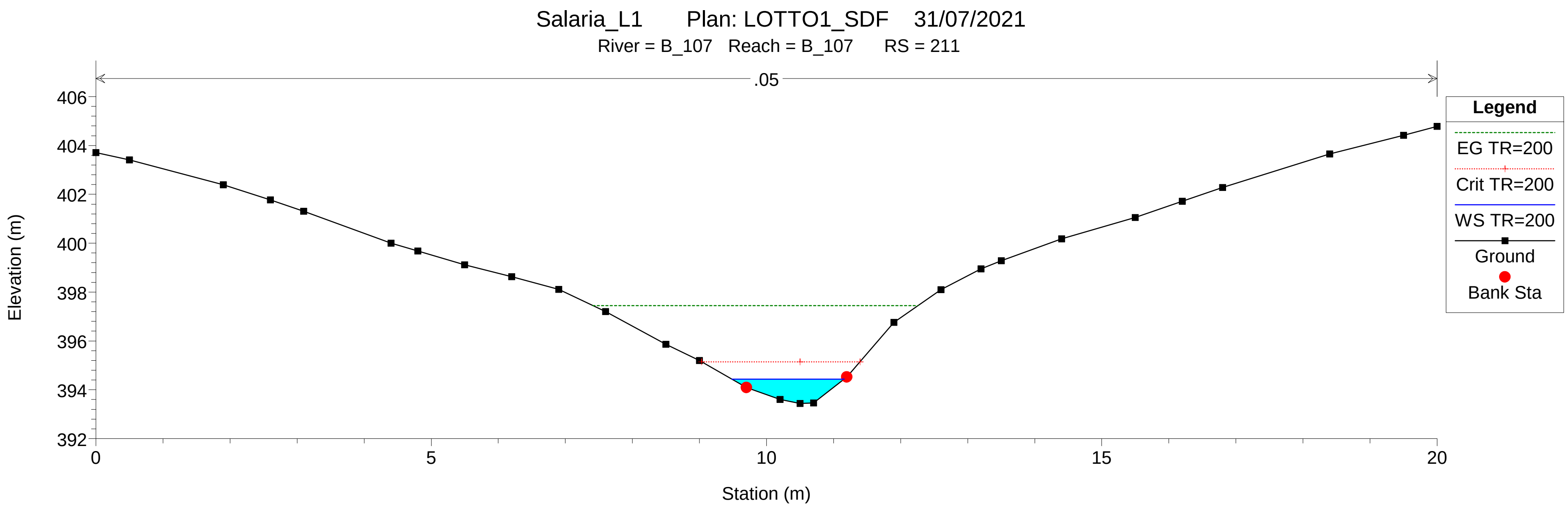

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 356
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
450
448
446
444
442
440
438
0
5
10
15
20

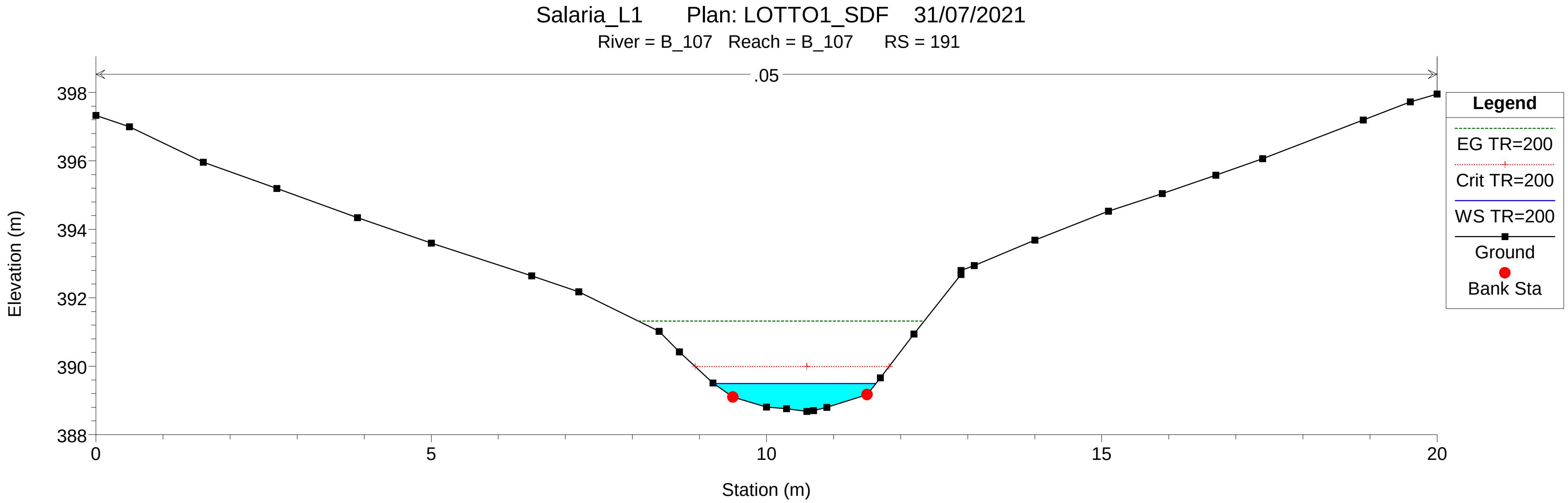

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 331
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
444
442
440
438
436
434
432
430
0
5
10
15
20

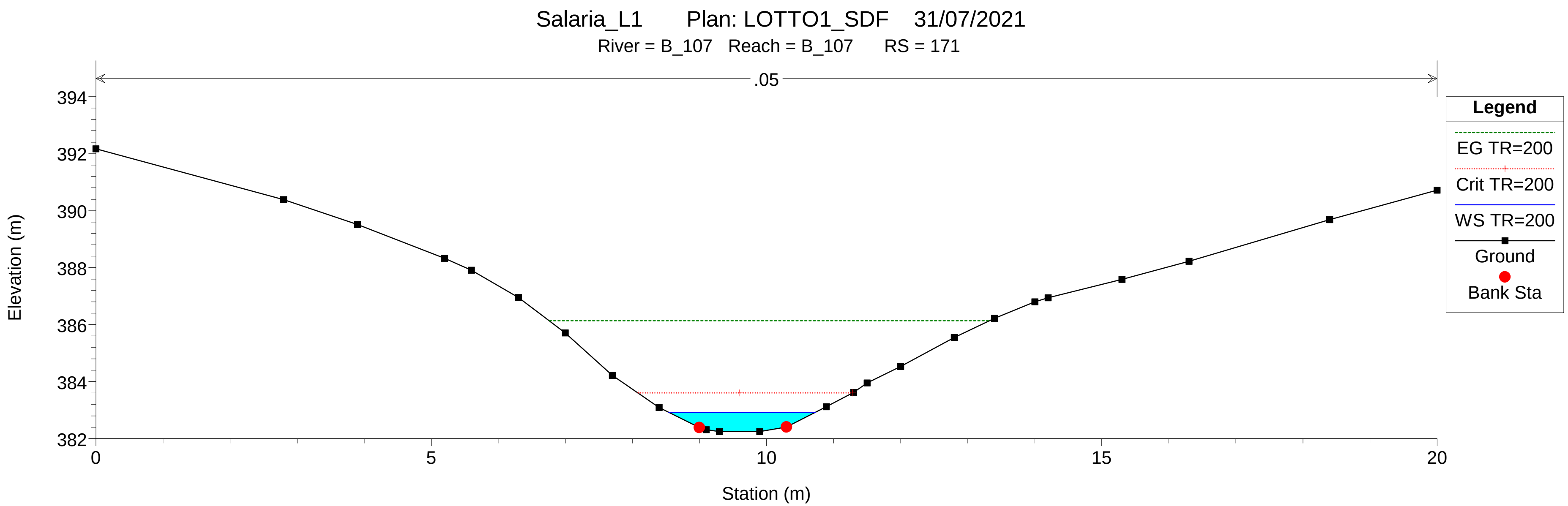

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 301
.05
434
432
430
428
426
424
422
Elevation (m)
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

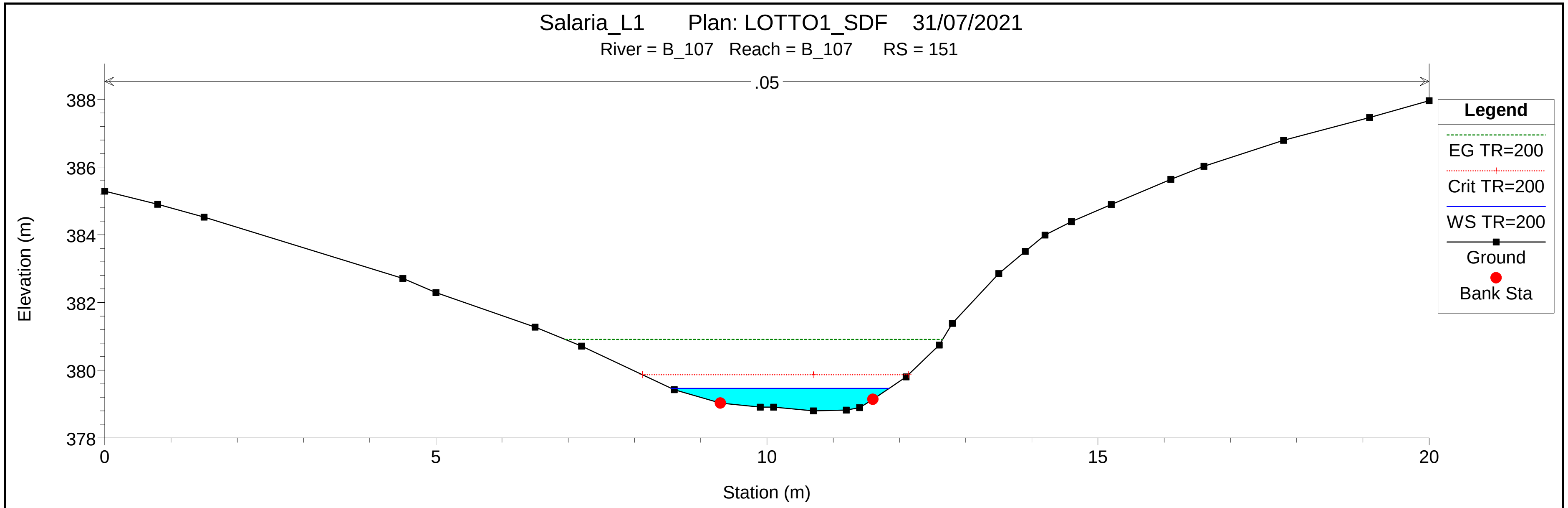

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 271
.05
424
422
420
418
416
414
412
Elevation (m)
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

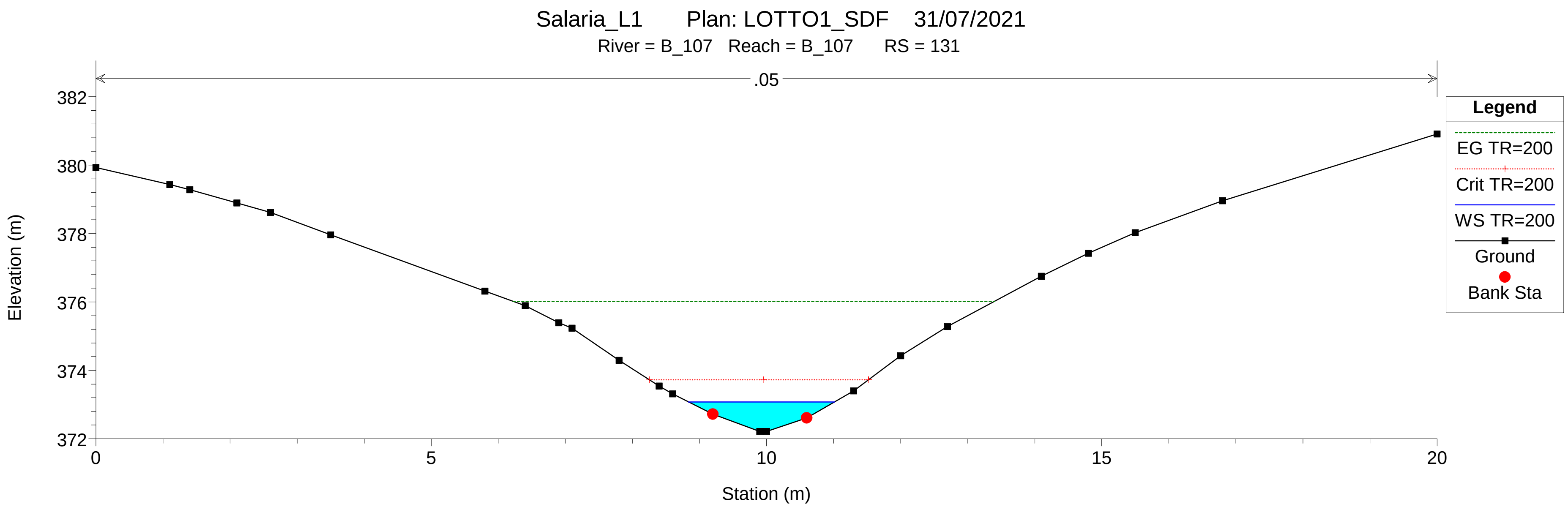

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 241
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

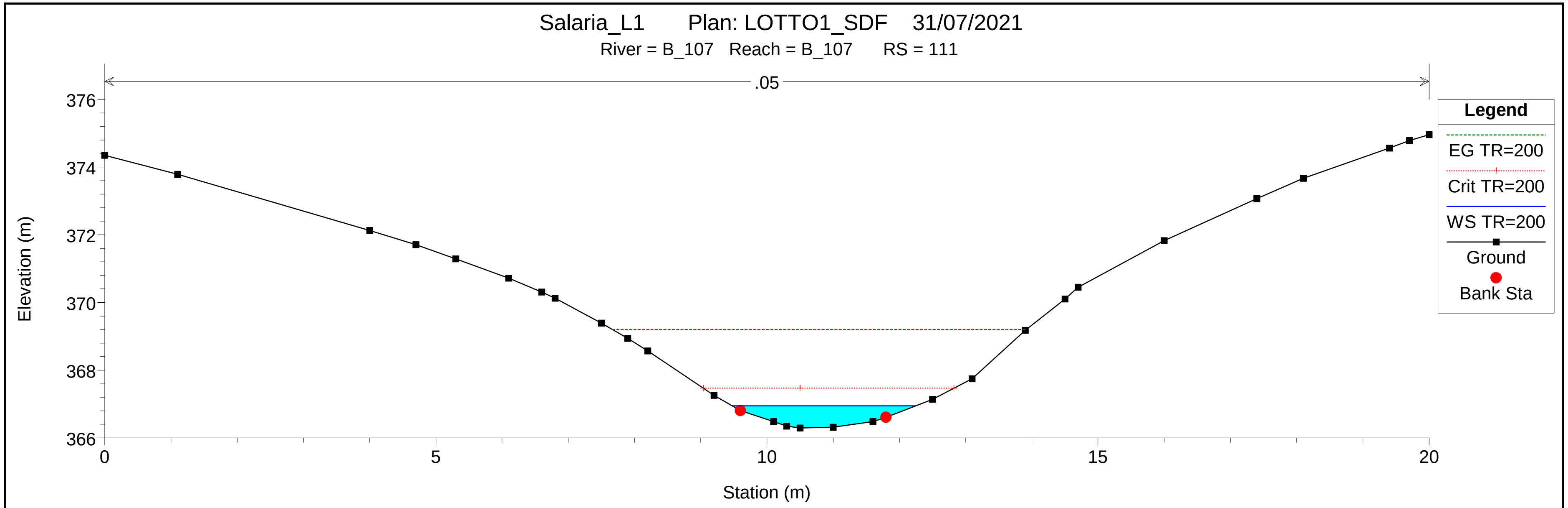

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 211
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

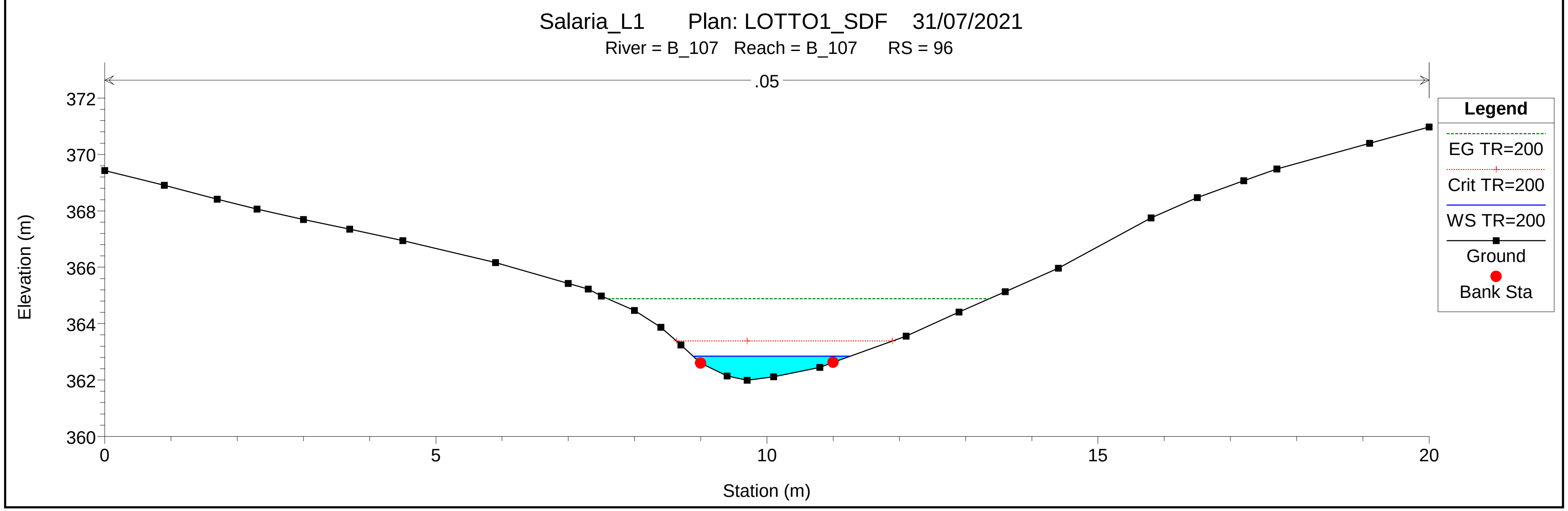

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 191
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

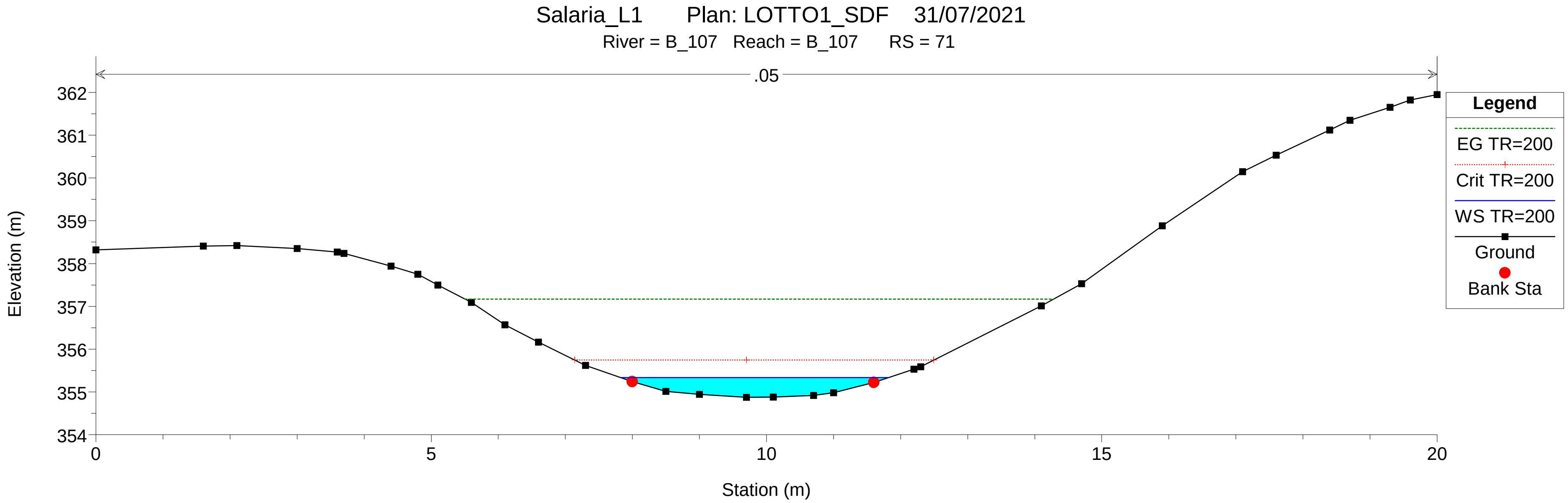

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 171
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 151
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

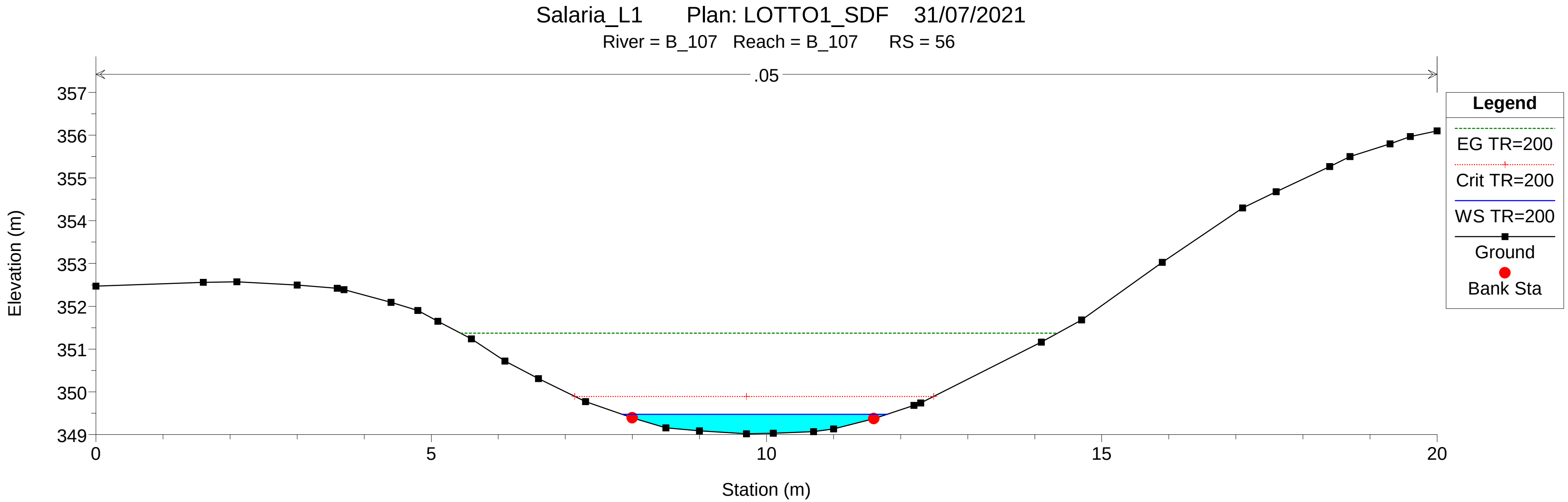

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 131
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 111
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

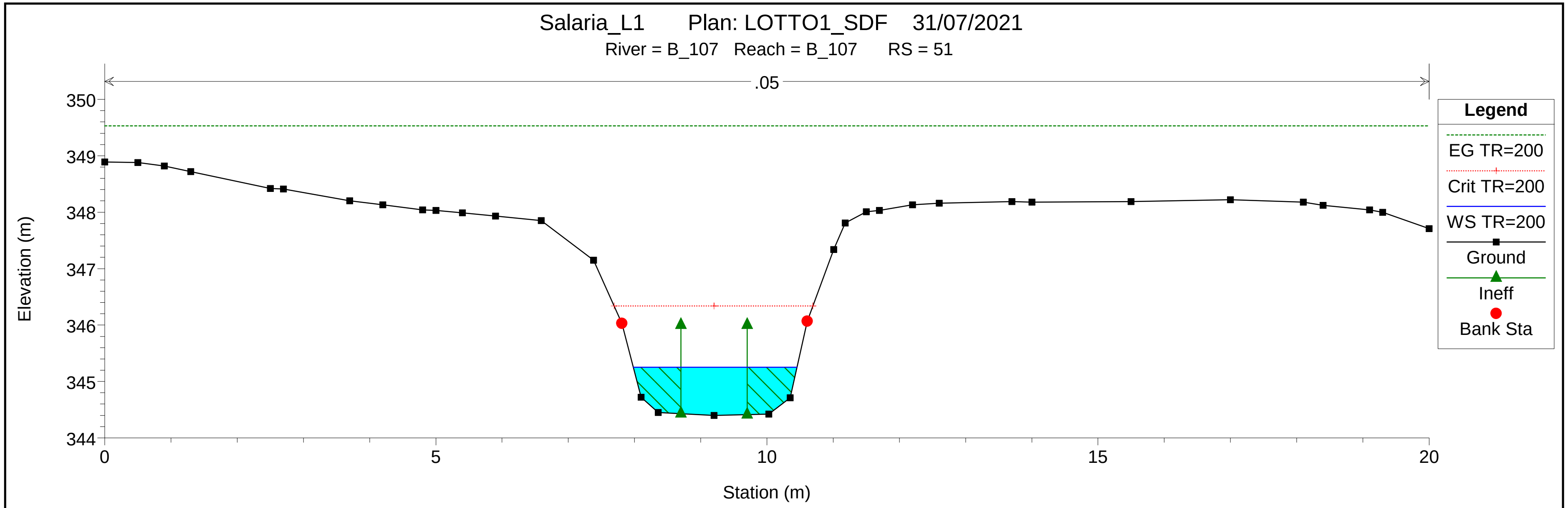

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 96
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

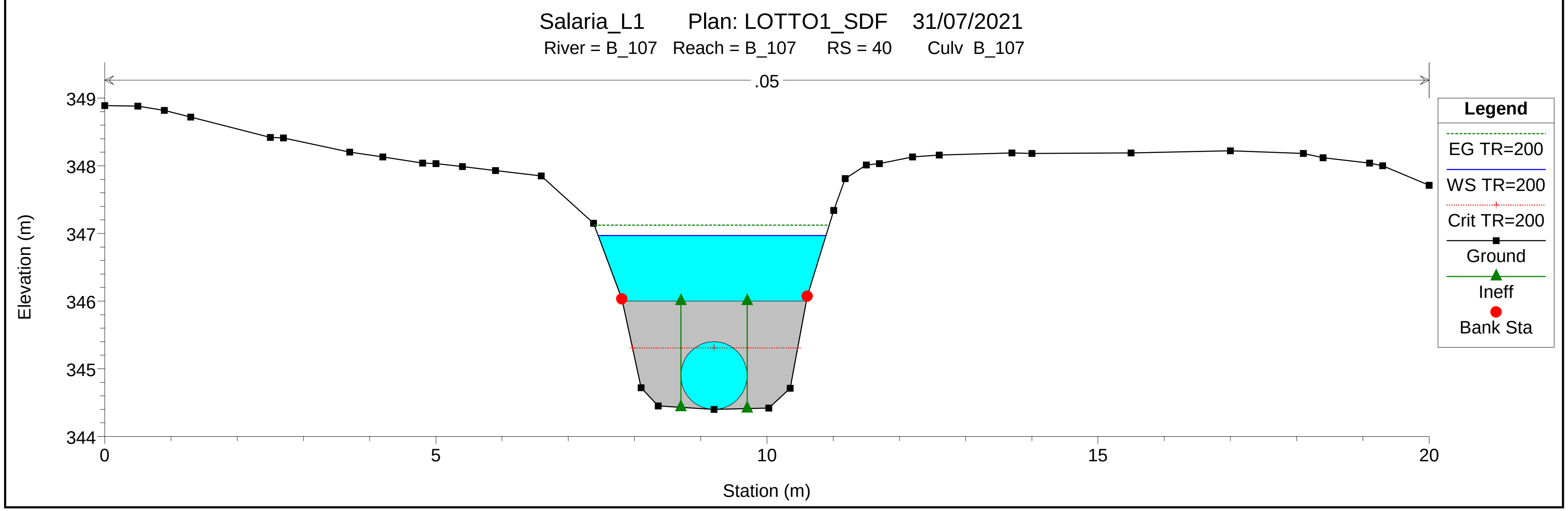


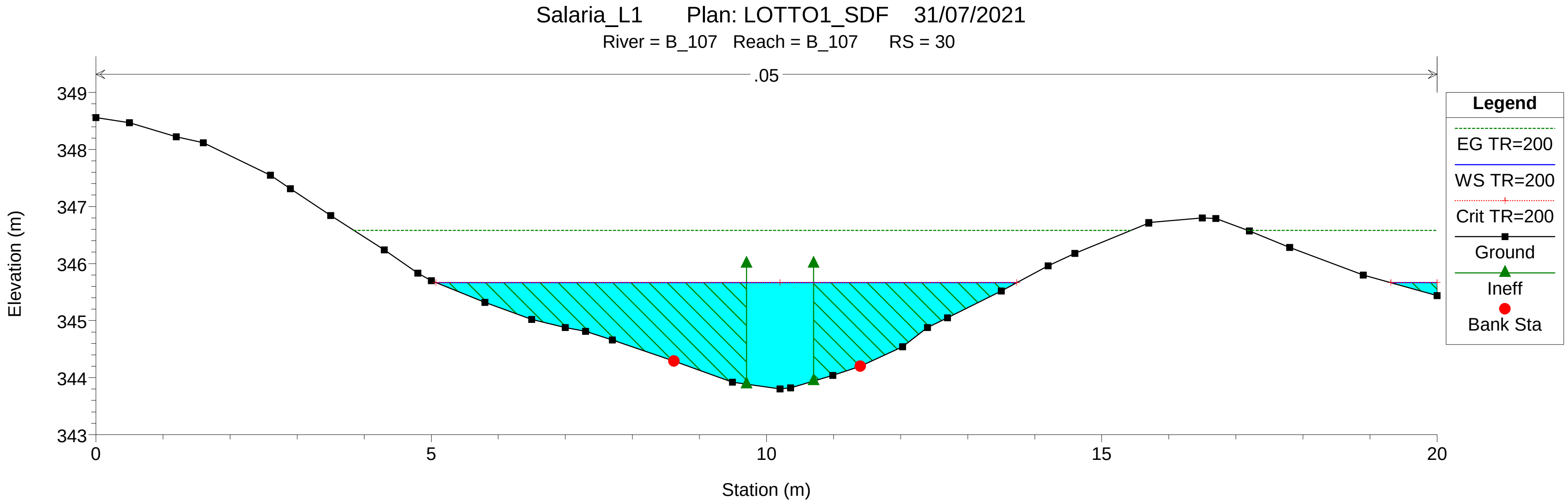
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 71
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
362
361
360
359
358
357
356
355
354
0
5
10
15
20
Station (m)

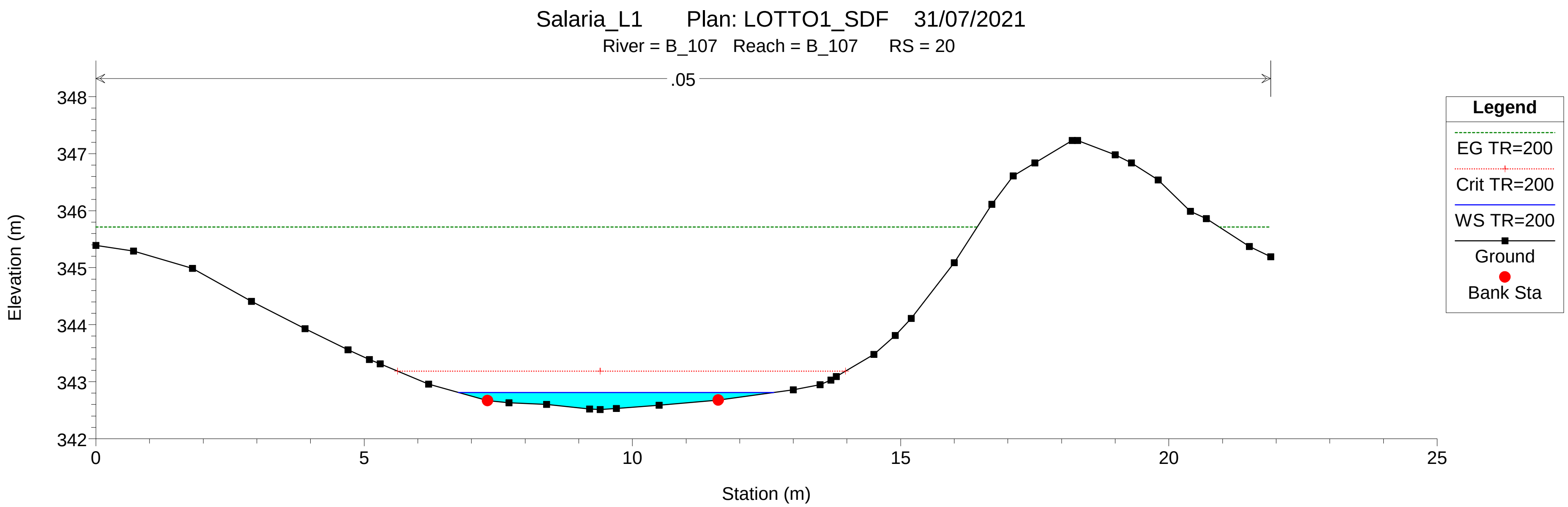


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 56
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
357
356
355
354
353
352
351
350
349
0
5
10
15
20
Station (m)

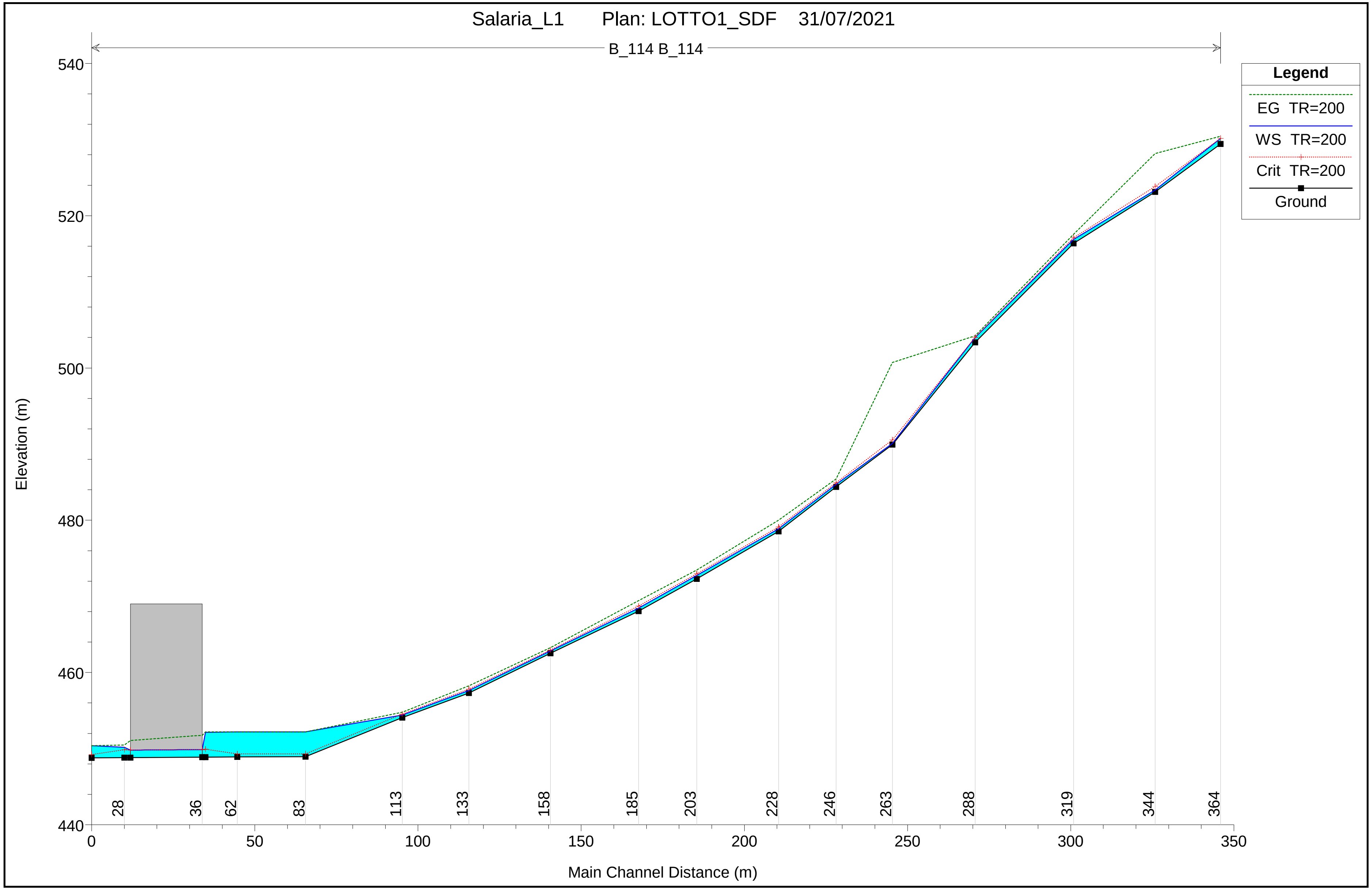

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 51
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
350
349
348
347
346
345
344
0
5
10
15
20


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 40 Culv B_107
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
349
348
347
346
345
344
0
5
10
15
20


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 30
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_107 Reach = B_107 RS = 20
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

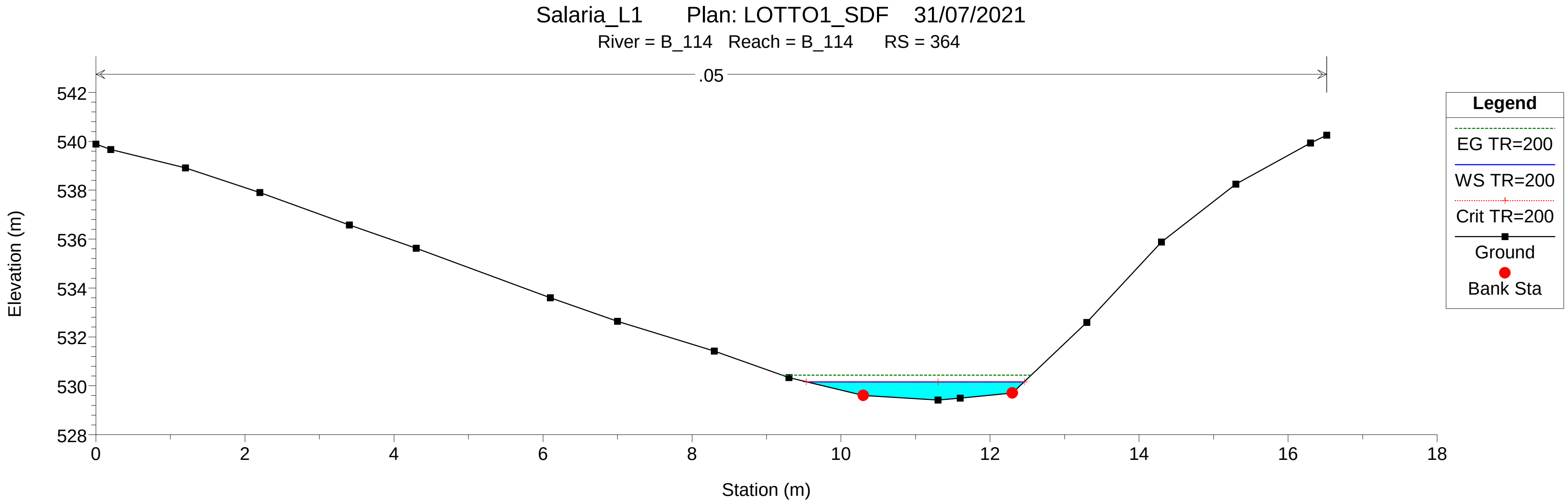
2.1.4. STATO DI FATTO
B.114 - Progr.4+370

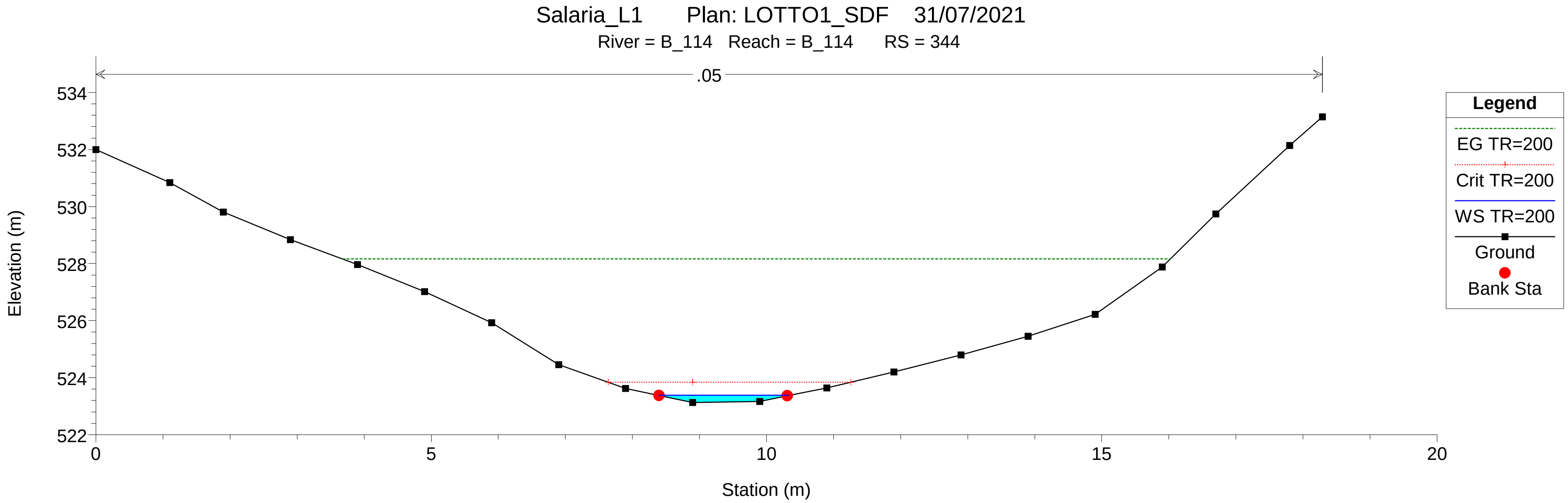


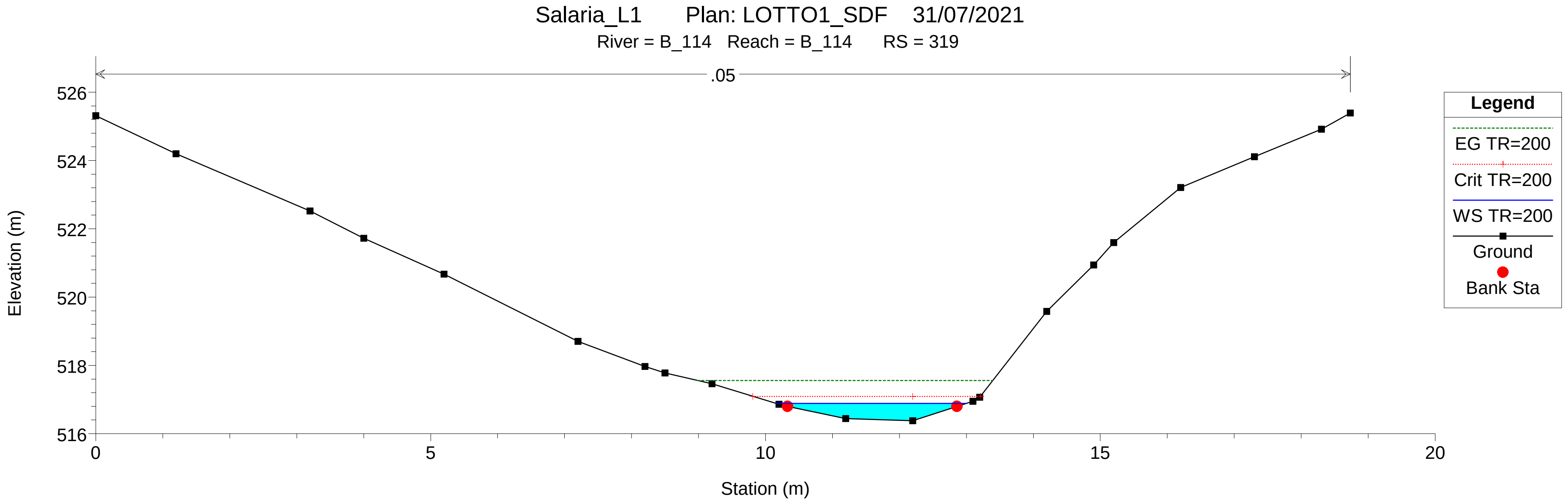
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
B_114 B_114
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Elevation (m)
540
520
500
480
460
440
28
36
62
83
113
133
158
185
203
228
246
263
288
319
344
364
0
50
100
150
200
250
300
350
Main Channel Distance (m)

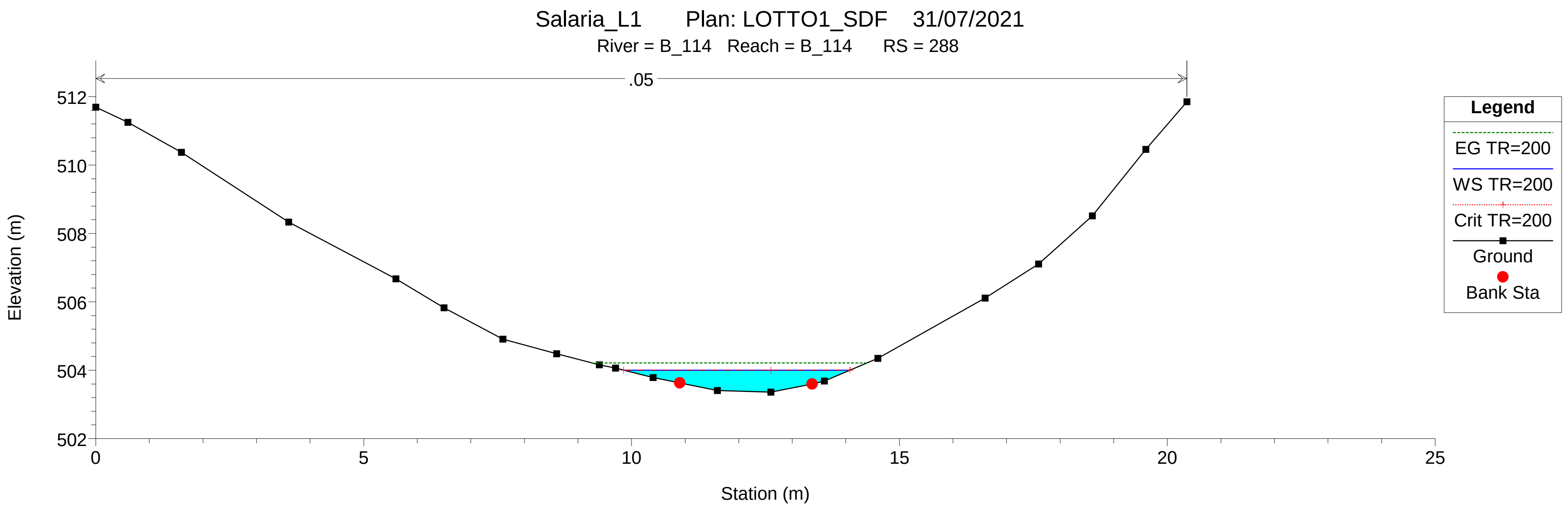
HEC-RAS Plan: L1_SDF River: B_114 Reach: B_114 Profile: TR=200

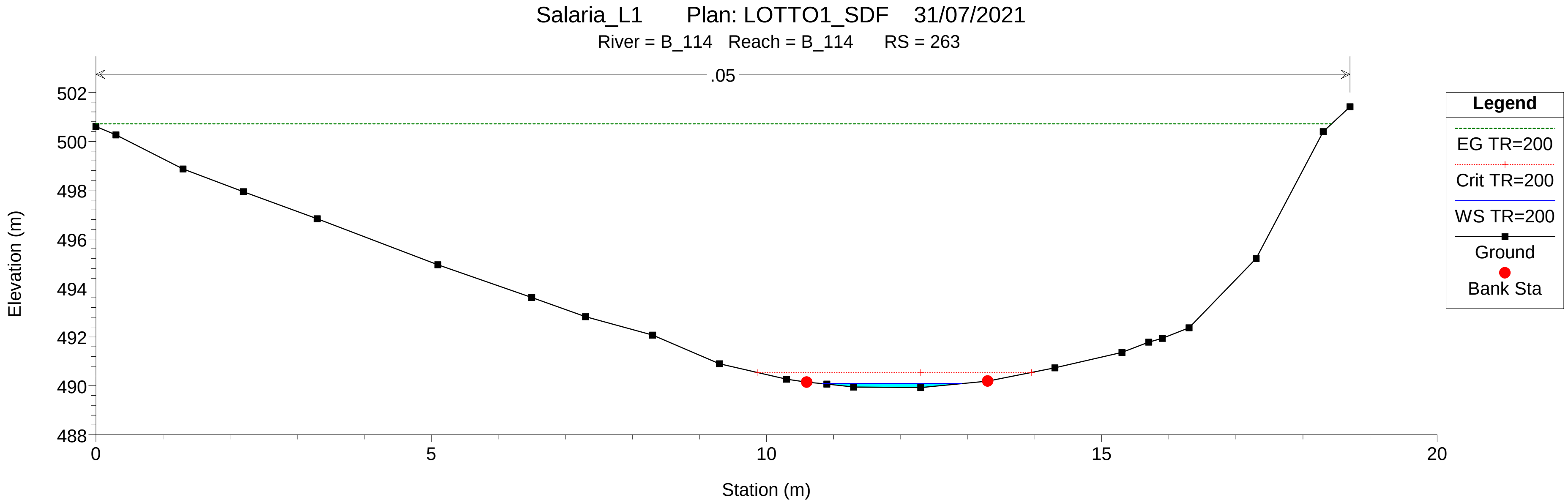
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_114	364	TR=200	3.30	529.42	0.74	530.16	530.16	0.00	0.96	530.43	2.39	2.18	0.61	164.88	0.52
B_114	344	TR=200	3.30	523.13	0.25	523.38	523.84	-0.46	7.32	528.16	9.68	9.68	0.17	4158.68	0.18
B_114	319	TR=200	3.30	516.38	0.51	516.89	517.09	-0.20	1.94	517.56	3.64	3.59	0.33	468.33	0.32
B_114	288	TR=200	3.30	503.36	0.64	504.00	504.00	0.00	0.93	504.22	2.15	1.93	0.53	140.25	0.41
B_114	263	TR=200	3.30	489.93	0.16	490.09	490.54	-0.45	13.90	500.72	14.44	14.44	0.11	10735.73	0.11
B_114	246	TR=200	3.30	484.37	0.36	484.73	484.92	-0.19	2.43	485.42	3.80	3.68	0.24	565.99	0.24
B_114	228	TR=200	3.30	478.53	0.33	478.86	479.13	-0.27	3.15	480.01	4.74	4.71	0.23	905.08	0.22
B_114	203	TR=200	3.30	472.29	0.47	472.76	472.97	-0.21	2.11	473.46	3.72	3.70	0.30	508.58	0.30
B_114	185	TR=200	3.30	468.06	0.41	468.47	468.72	-0.25	2.71	469.43	4.34	4.34	0.25	734.93	0.26
B_114	158	TR=200	3.30	462.52	0.32	462.84	462.97	-0.13	2.02	463.27	2.90	2.90	0.21	347.54	0.21
B_114	133	TR=200	3.30	457.31	0.33	457.64	457.81	-0.17	2.39	458.26	3.49	3.48	0.22	498.80	0.21
B_114	113	TR=200	3.30	454.09	0.32	454.41	454.53	-0.12	1.76	454.78	2.69	2.66	0.24	287.82	0.22
B_114	83	TR=200	3.30	448.95	3.26	452.21	449.30	2.91	0.02	452.21	0.11	0.09	3.24	0.21	2.29
B_114	62	TR=200	3.30	448.90	3.31	452.21	449.32	2.89	0.02	452.21	0.10	0.08	3.24	0.18	2.65
B_114	53	TR=200	3.30	448.87	3.28	452.15	449.91	2.24	0.18	452.20	1.01	1.01	3.27	16.79	3.27
B_114	36		Culvert												
B_114	28	TR=200	3.30	448.81	1.36	450.17	449.85	0.32	0.67	450.47	2.45	2.45	1.35	133.28	1.35
B_114	18	TR=200	3.30	448.80	1.58	450.38	449.22	1.16	0.07	450.38	0.25	0.21	1.51	1.37	1.20

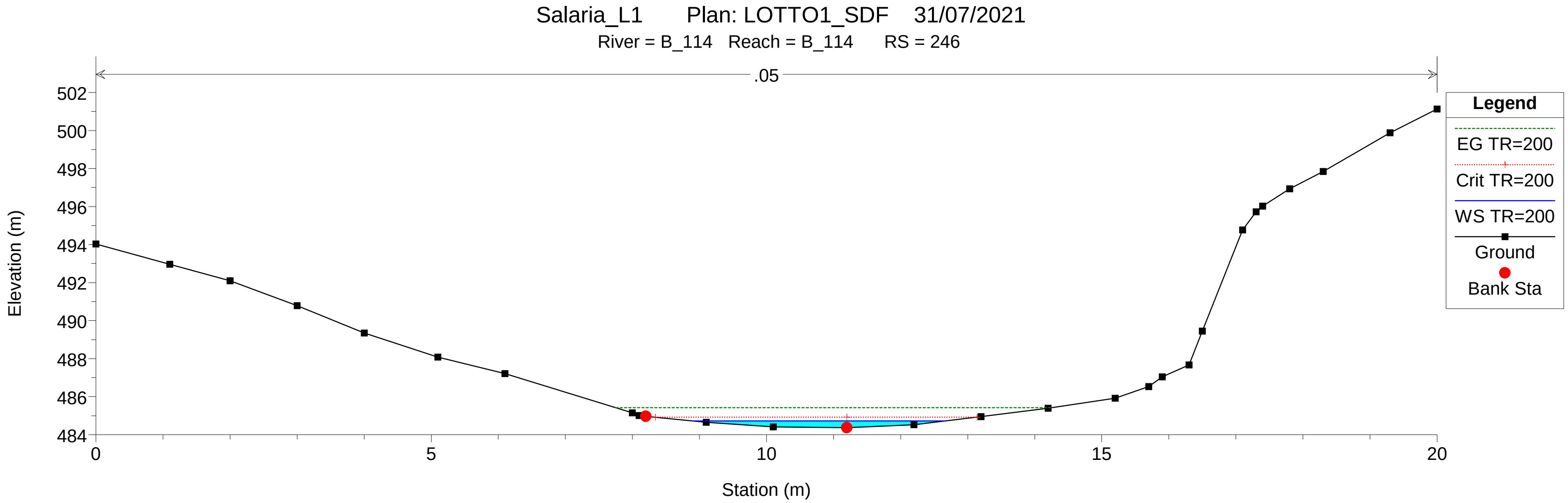

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 364
.05
Elevation (m)
542
540
538
536
534
532
530
528
0
2
4
6
8
10
12
14
16
18
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

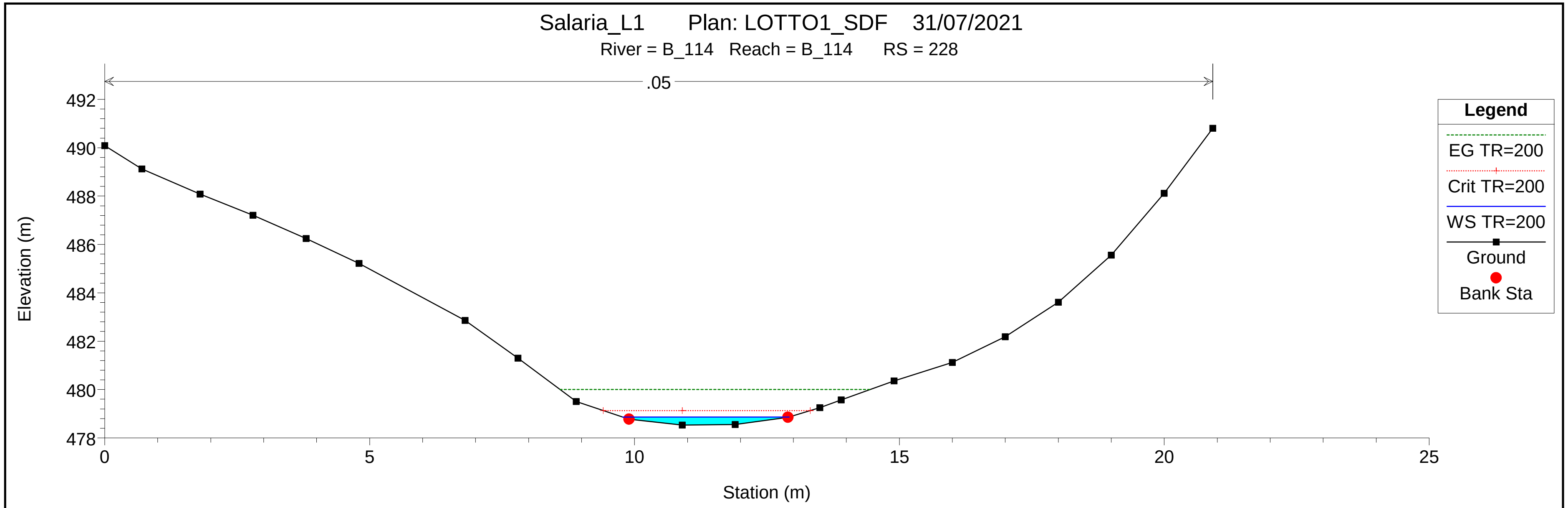

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 344
.05
Elevation (m)
534
532
530
528
526
524
522
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

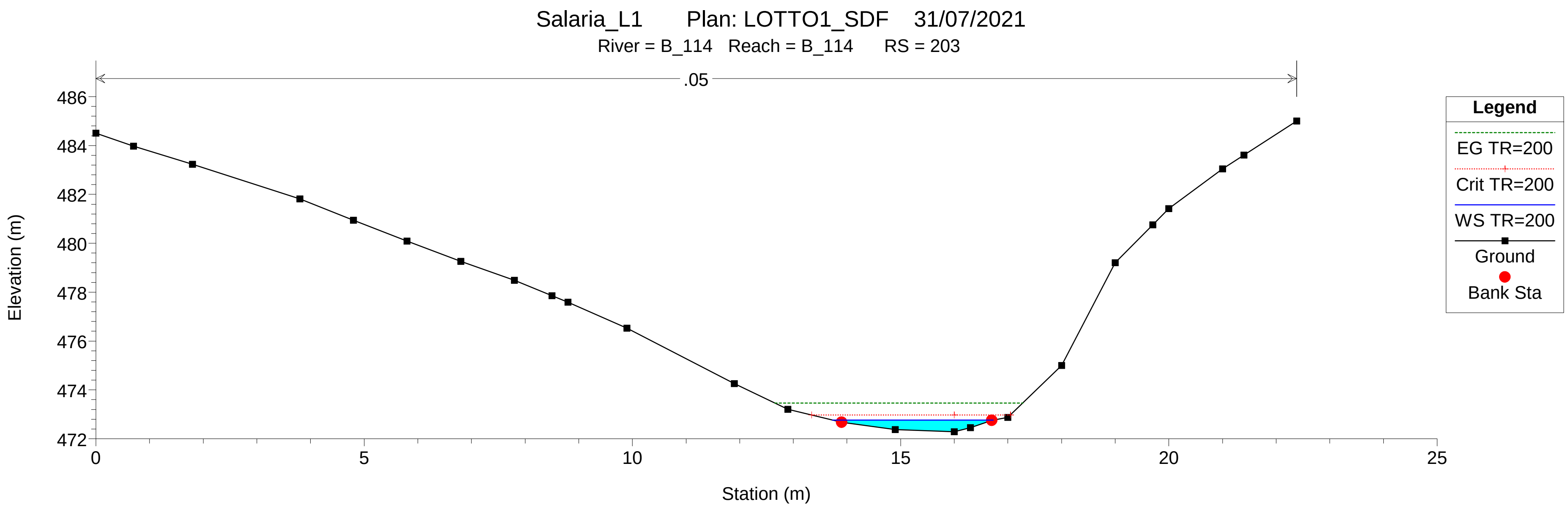

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 319
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

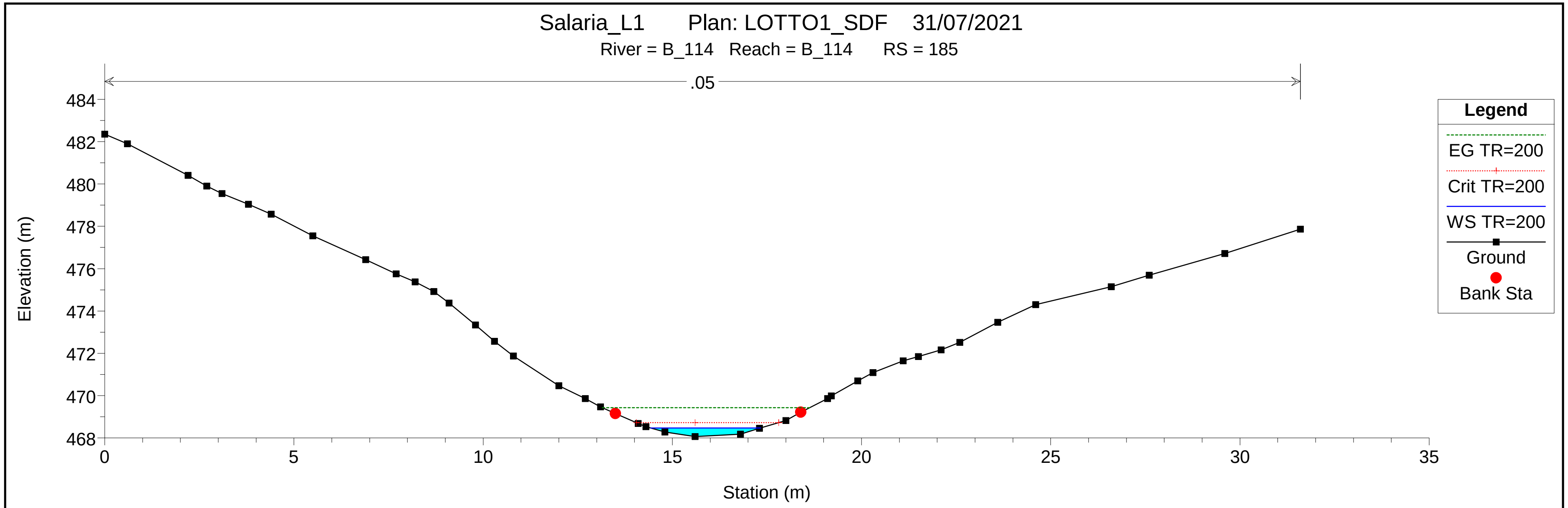

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 288
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

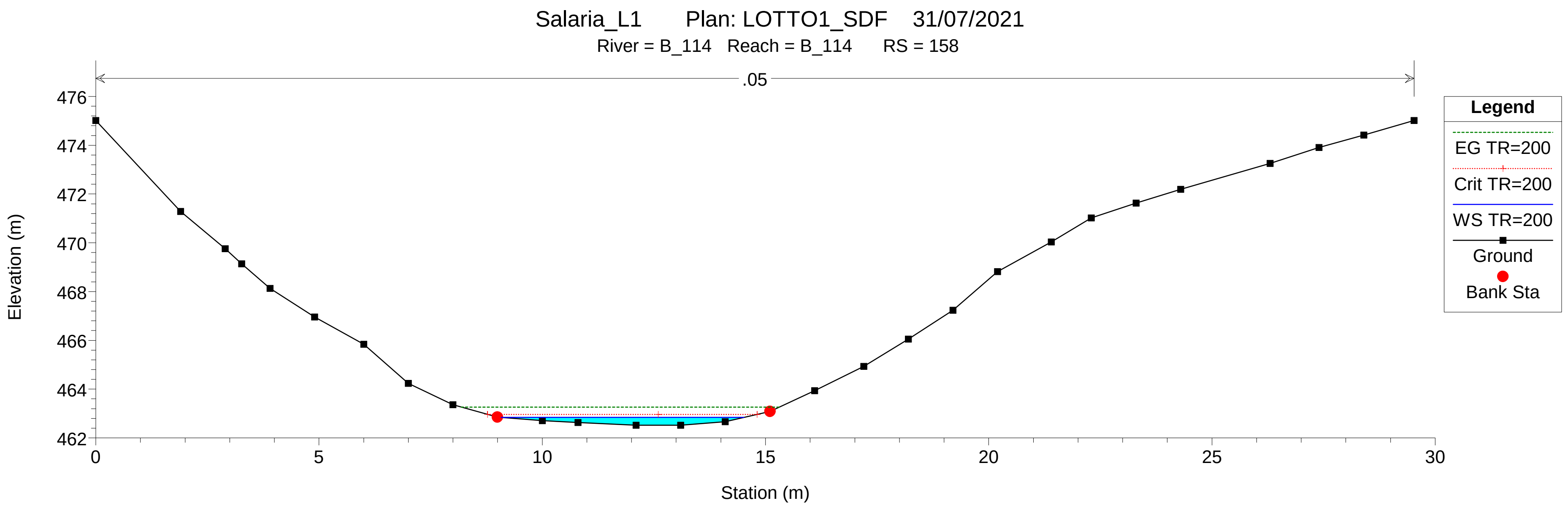

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 263
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

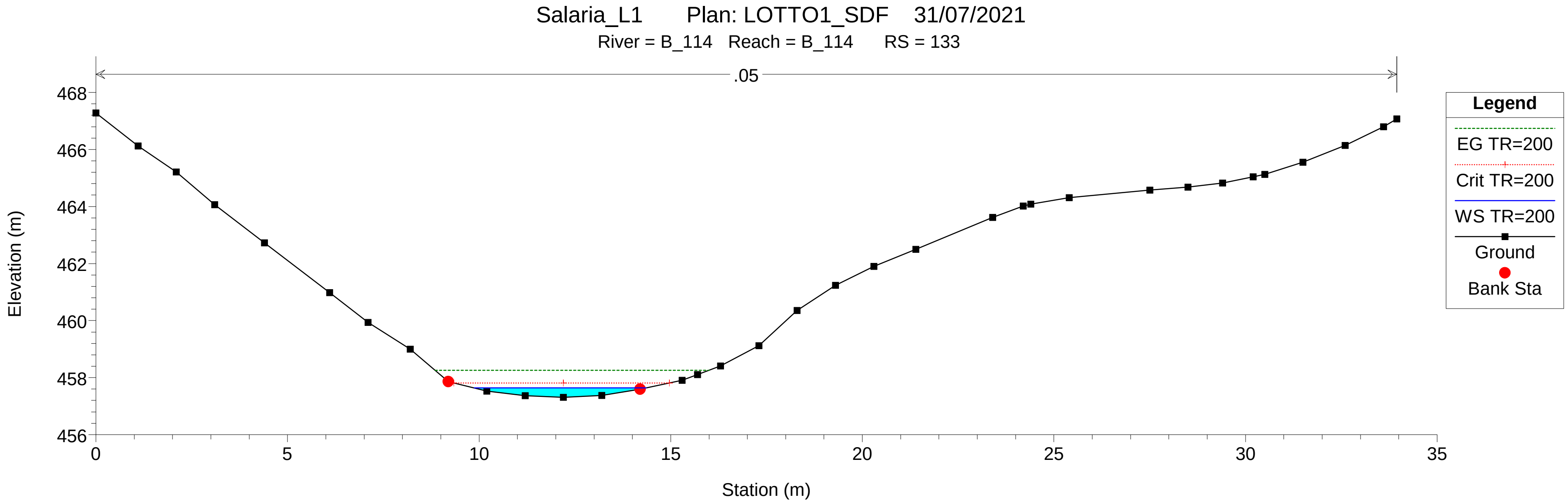

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 246
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

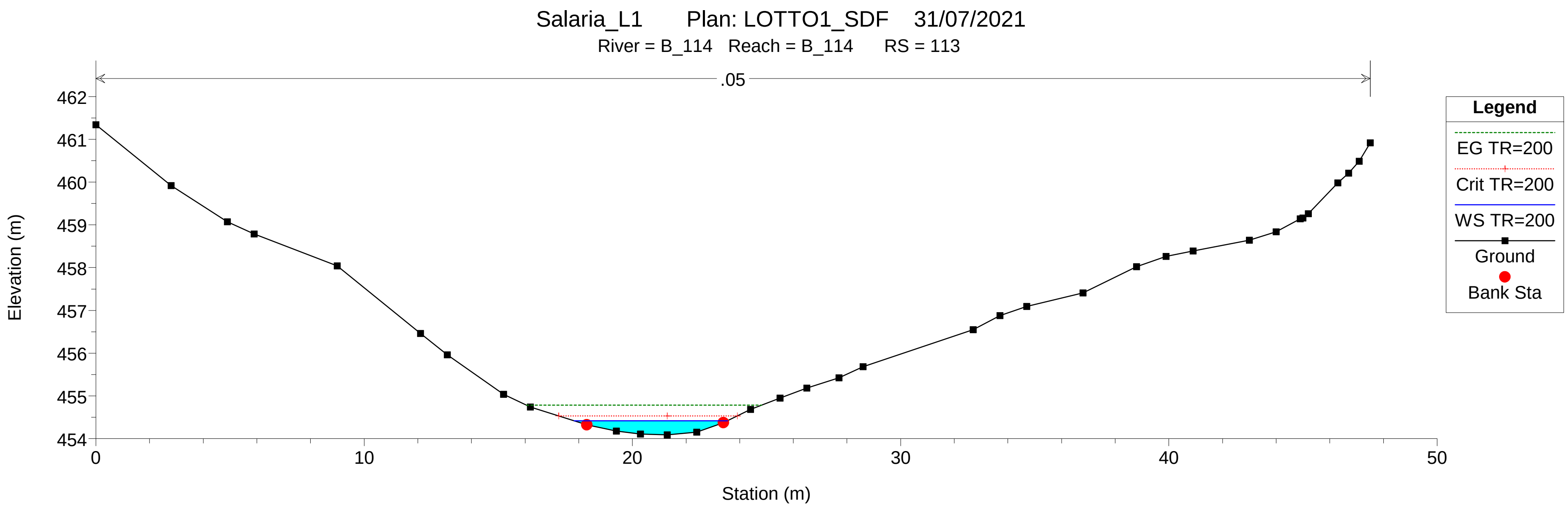

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 228
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

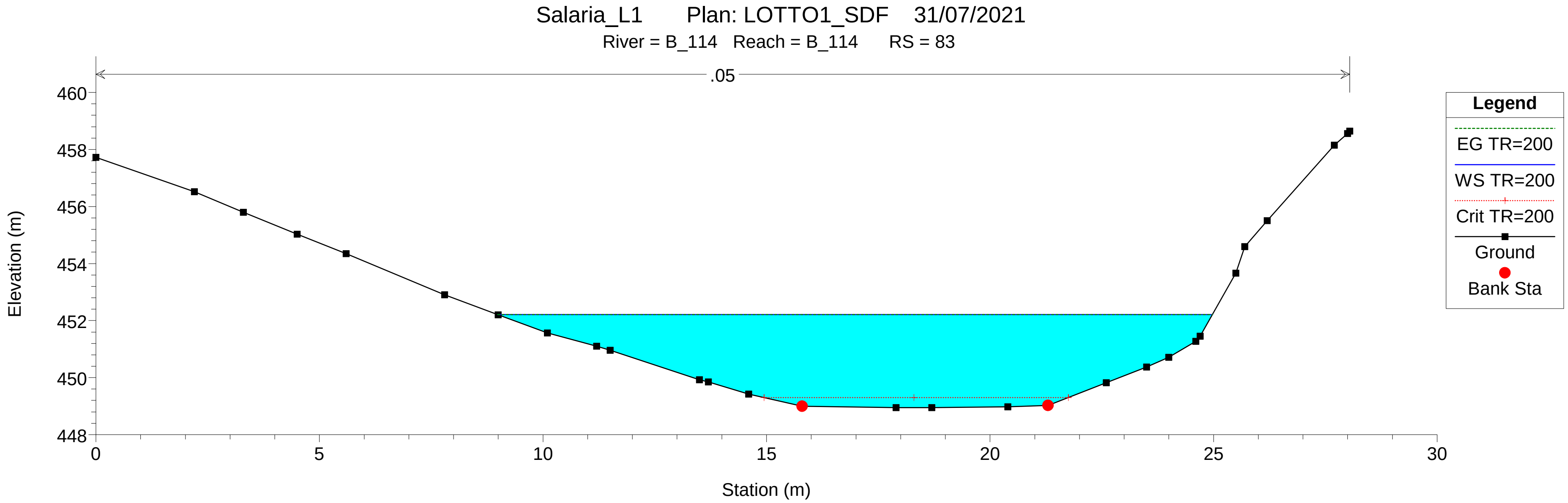

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 203
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

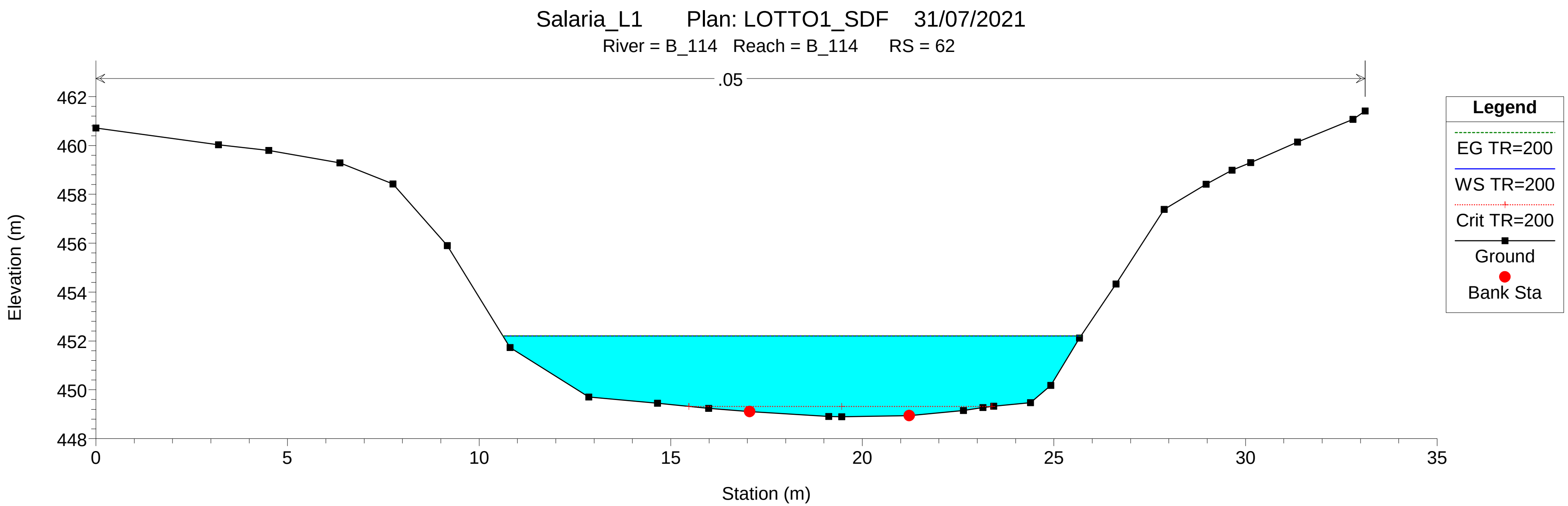

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 185
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

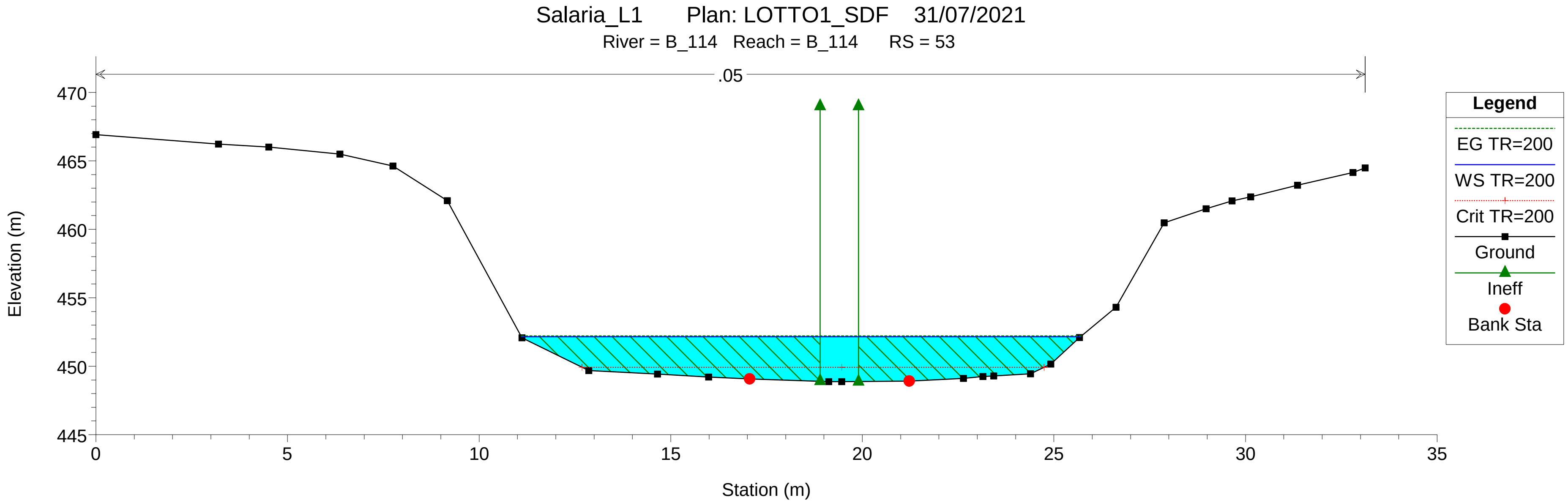

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 158
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 133
.05
Elevation (m)
468
466
464
462
460
458
456
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

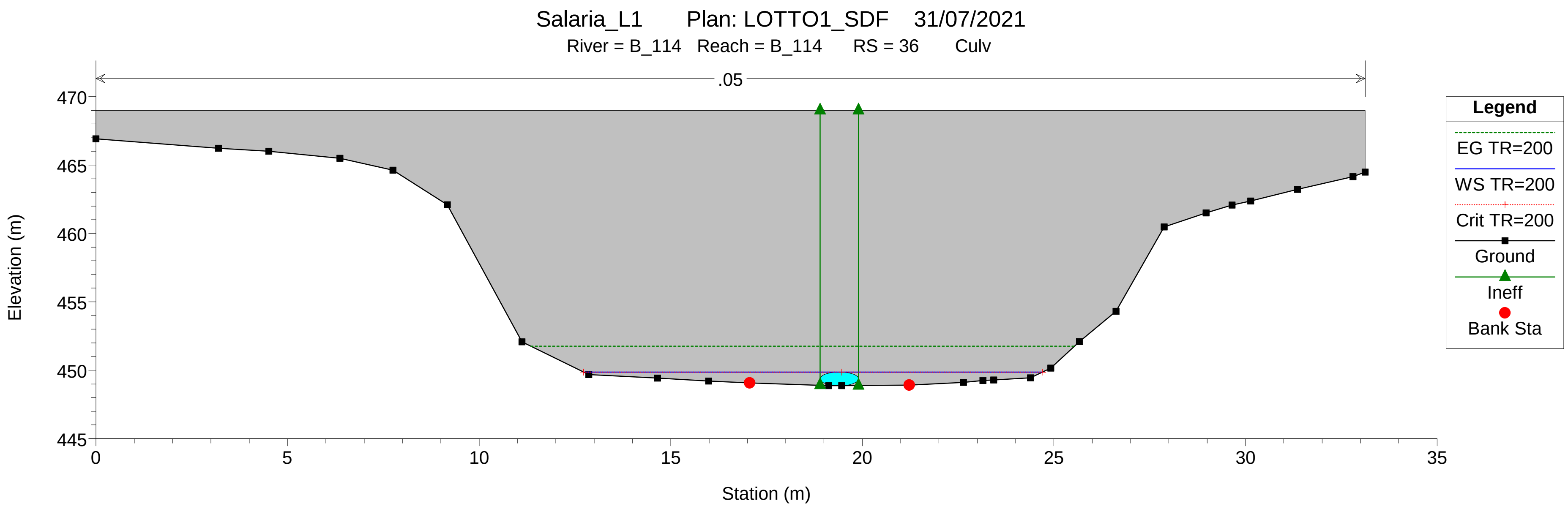

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 113
.05
Elevation (m)
462
461
460
459
458
457
456
455
454
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 83
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

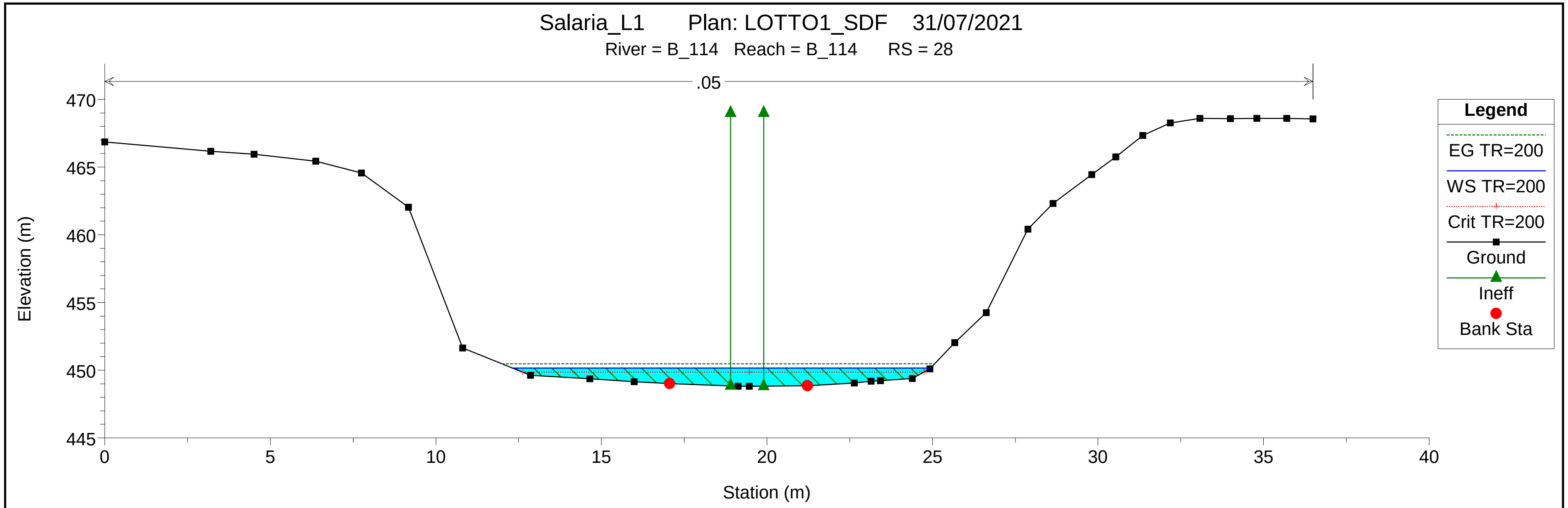

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 62
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta



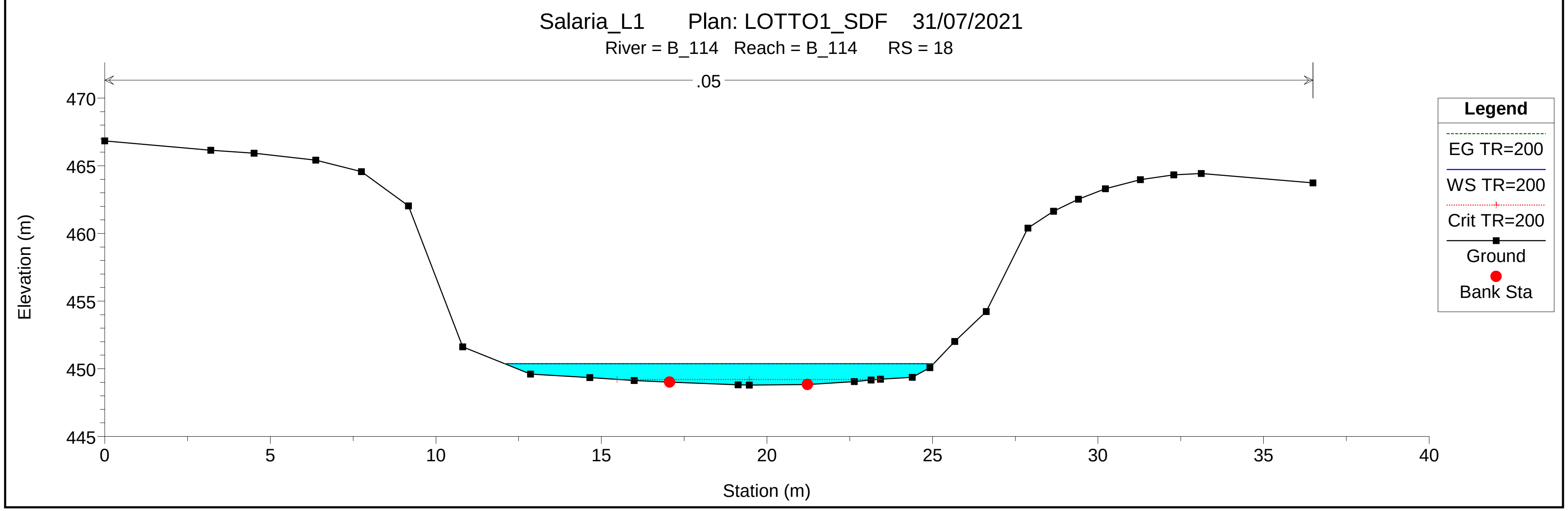
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 53
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 36 Culv
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



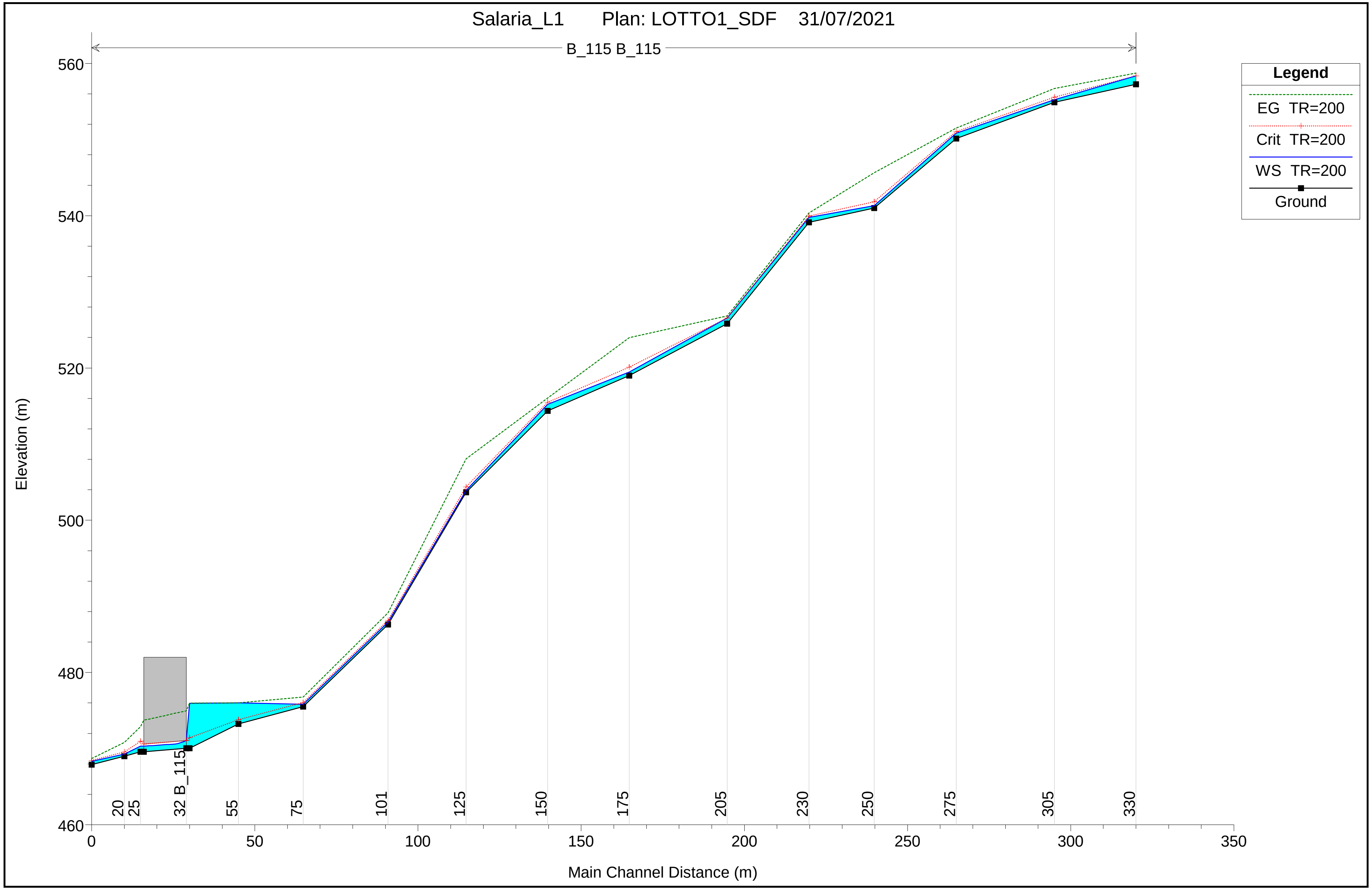
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 28
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_114 Reach = B_114 RS = 18
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

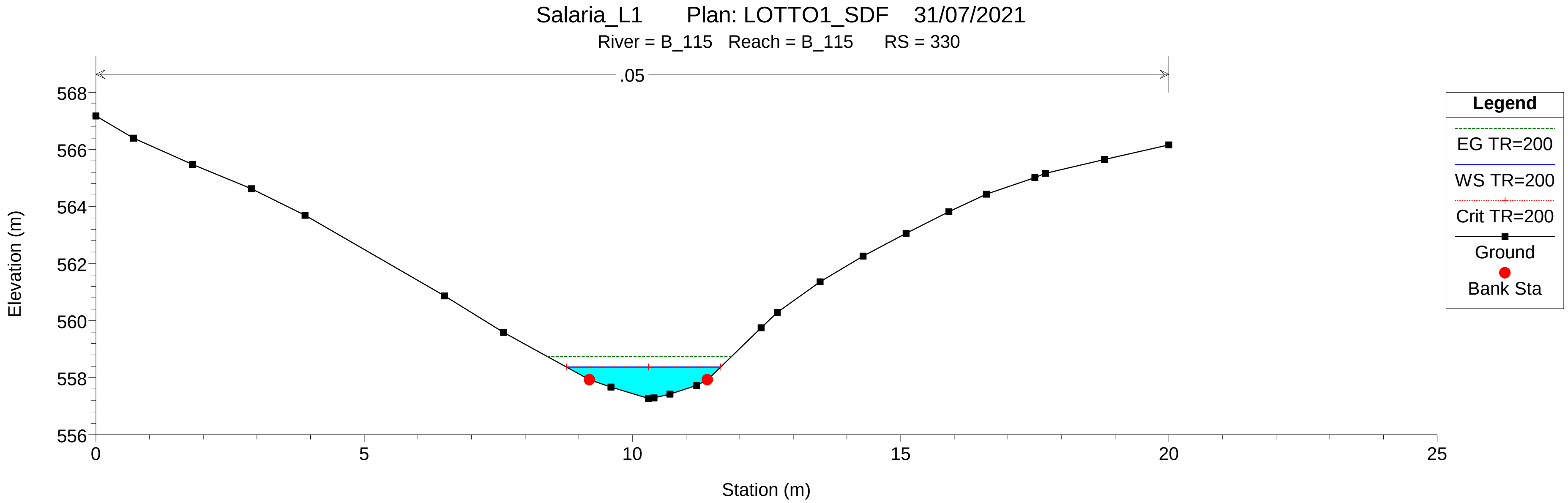
2.1.5. STATO DI FATTO

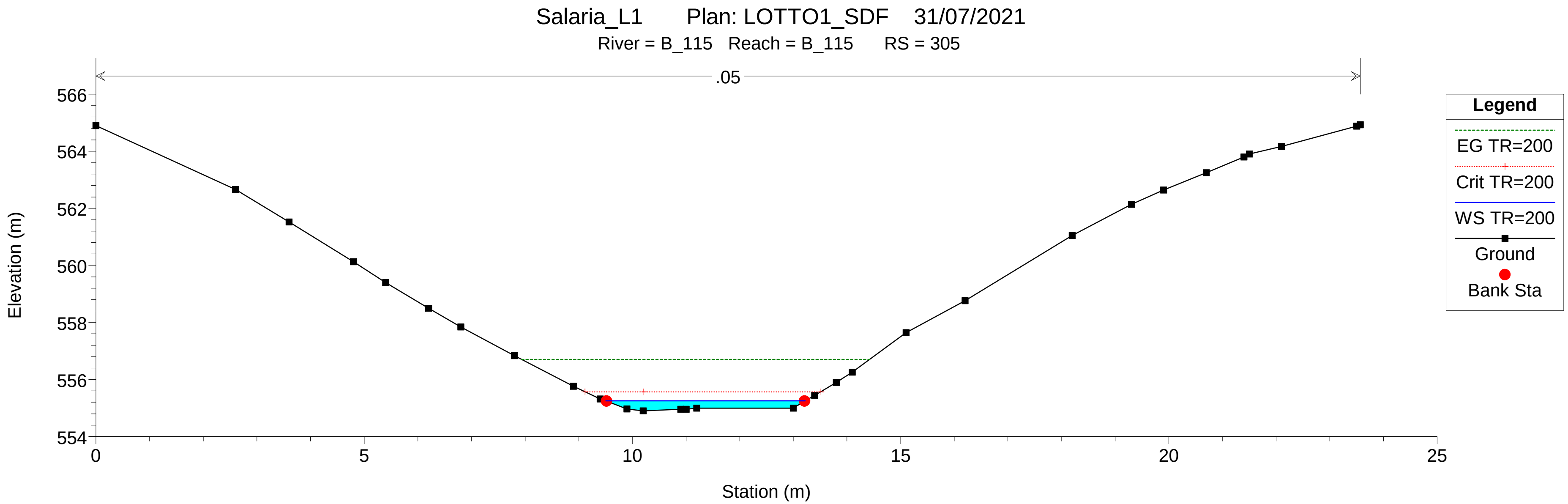
B.115 - Progr.4+625

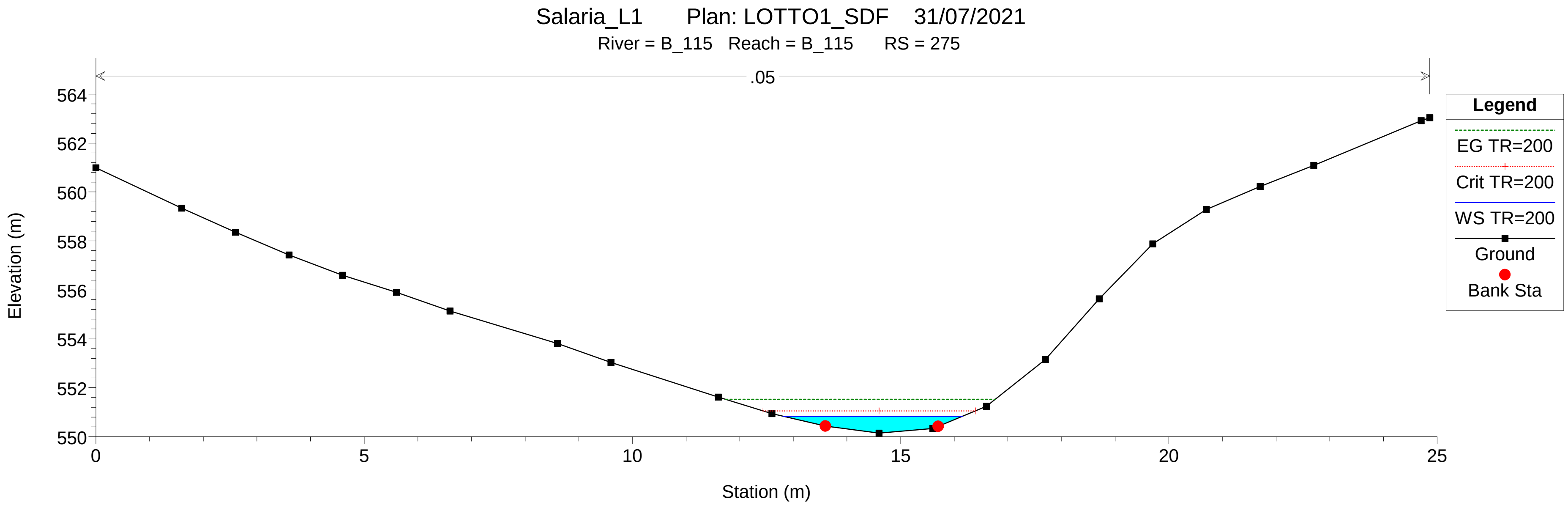

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
B_115 B_115
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
560
540
520
500
480
460
20
25
32 B_115
55
75
101
125
150
175
205
230
250
275
305
330
0
50
100
150
200
250
300
350
Main Channel Distance (m)

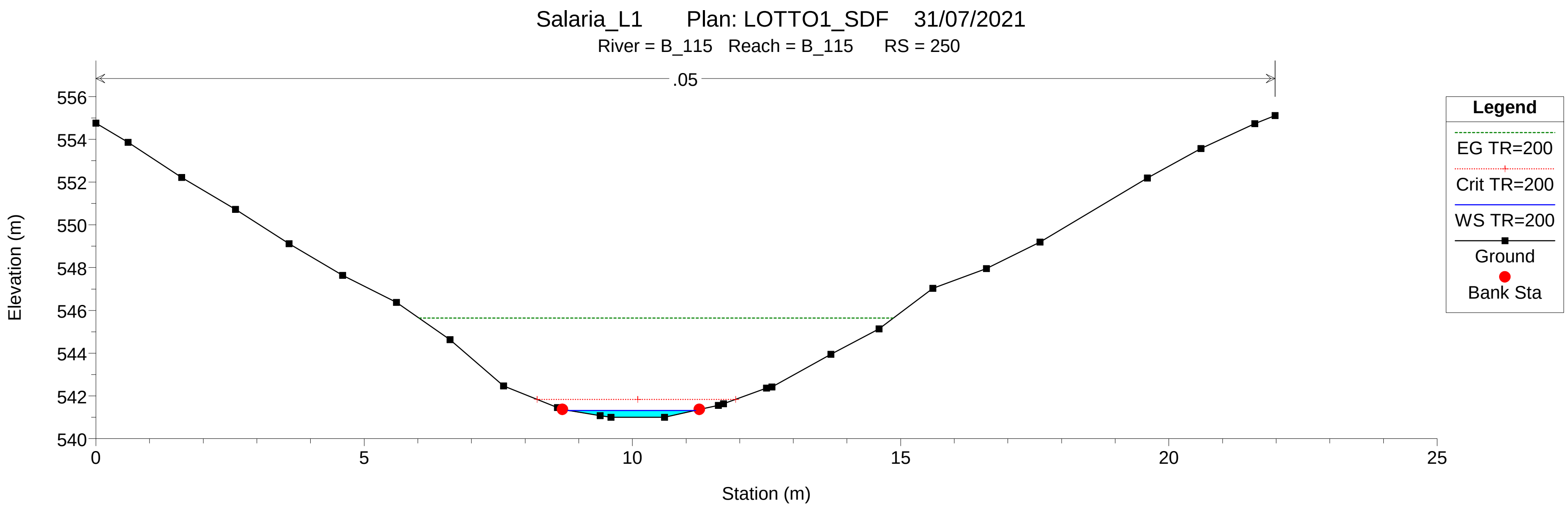
HEC-RAS Plan: L1_SDF River: B_115 Reach: B_115 Profile: TR=200

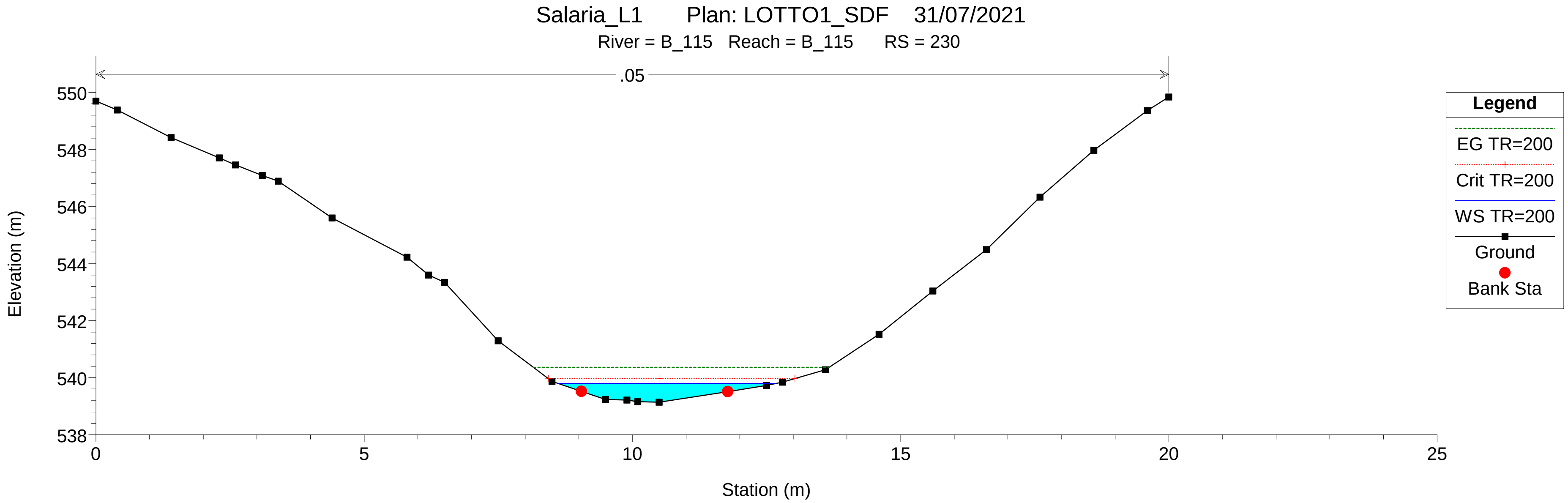
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_115	330	TR=200	5.00	557.27	1.10	558.37	558.37	0.00	0.96	558.74	2.72	2.58	0.69	205.23	0.67
B_115	305	TR=200	5.00	554.90	0.35	555.25	555.57	-0.32	3.38	556.70	5.34	5.34	0.24	1124.39	0.25
B_115	275	TR=200	5.00	550.14	0.69	550.83	551.05	-0.22	1.62	551.53	3.82	3.46	0.54	439.24	0.43
B_115	250	TR=200	5.00	541.00	0.32	541.32	541.83	-0.51	6.15	545.64	9.20	9.20	0.21	3464.81	0.23
B_115	230	TR=200	5.00	539.14	0.65	539.79	539.96	-0.17	1.53	540.36	3.41	3.18	0.48	363.58	0.39
B_115	205	TR=200	5.00	525.83	0.72	526.55	526.55	0.00	0.96	526.83	2.38	2.23	0.61	163.40	0.52
B_115	175	TR=200	5.00	519.01	0.45	519.46	520.12	-0.66	5.09	523.97	9.44	9.27	0.30	3266.36	0.33
B_115	150	TR=200	5.00	514.35	0.88	515.23	515.50	-0.27	1.75	516.06	4.06	3.97	0.45	528.28	0.48
B_115	125	TR=200	5.00	503.66	0.26	503.92	504.37	-0.45	6.61	508.06	9.03	8.97	0.19	3493.40	0.18
B_115	101	TR=200	5.00	486.31	0.29	486.60	486.87	-0.27	3.34	487.86	5.04	4.82	0.23	1013.07	0.20
B_115	75	TR=200	5.00	475.51	0.32	475.83	476.05	-0.22	3.08	476.78	4.31	4.30	0.20	782.03	0.19
B_115	55	TR=200	5.00	473.26	2.74	476.00	473.80	2.20	0.04	476.00	0.22	0.18	2.60	0.86	1.96
B_115	40	TR=200	5.00	470.05	5.91	475.96	471.43	4.53	0.11	475.99	0.85	0.85	5.87	9.79	5.89
B_115	32		Culvert												
B_115	25	TR=200	5.00	469.60	0.73	470.33	470.98	-0.65	2.68	472.86	7.05	7.05	0.71	1369.01	0.71
B_115	20	TR=200	5.00	469.00	0.28	469.28	469.55	-0.27	4.18	470.83	5.54	5.47	0.18	1339.19	0.17
B_115	10	TR=200	5.00	467.90	0.44	468.34	468.44	-0.10	1.47	468.68	2.61	2.52	0.32	244.10	0.28

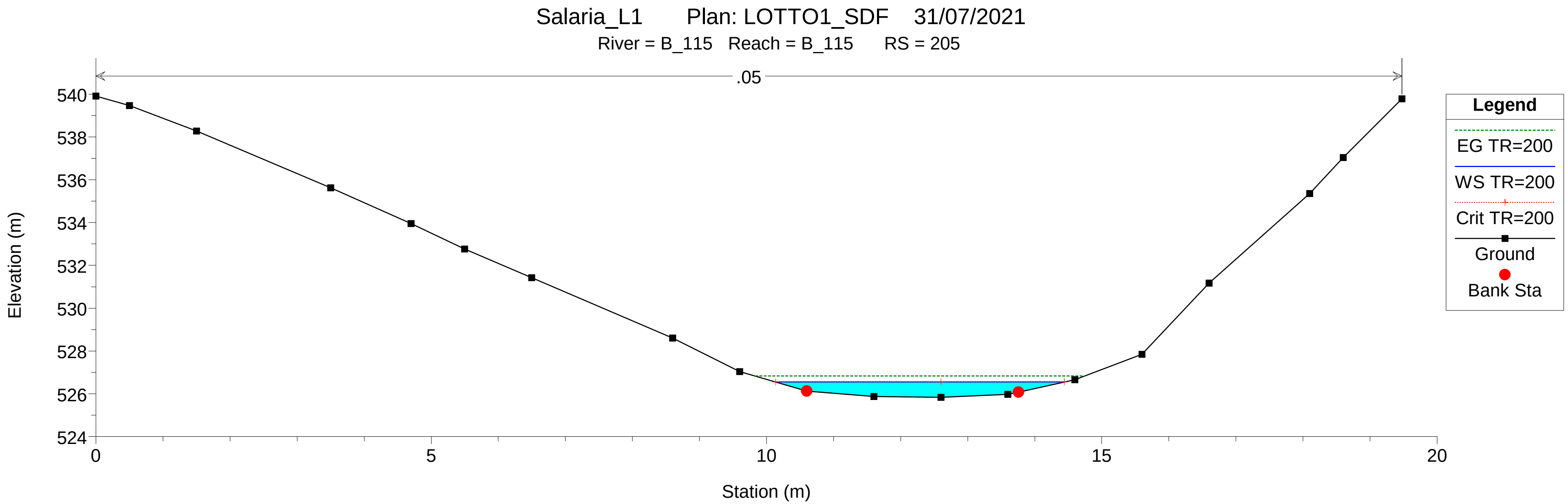

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 330
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

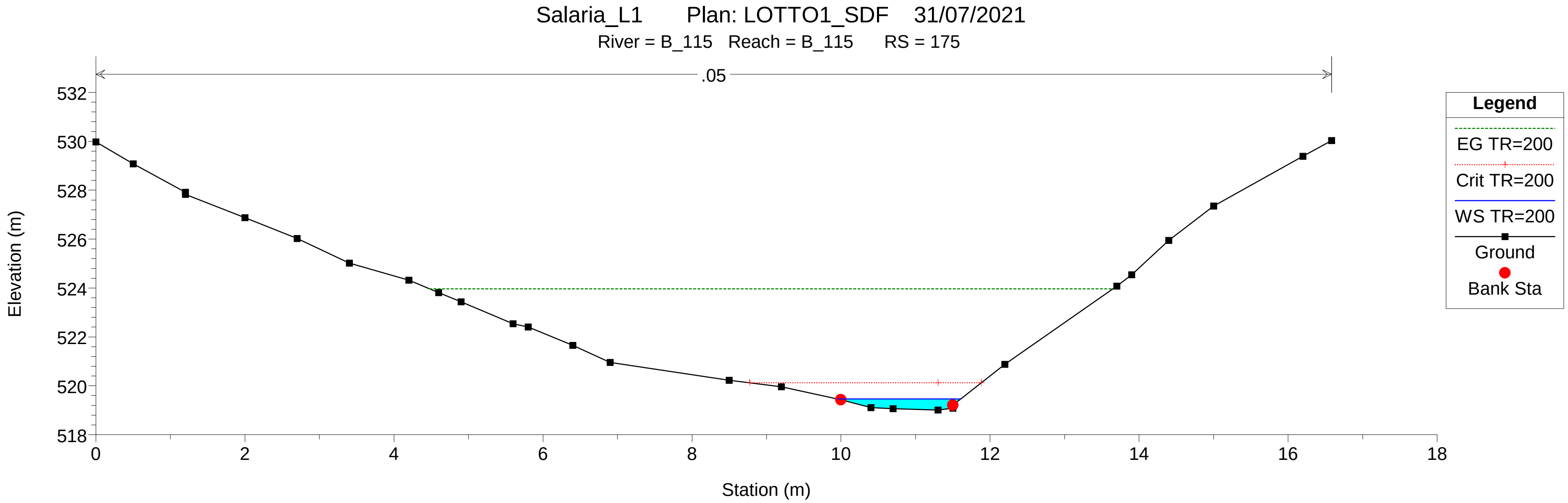

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 305
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

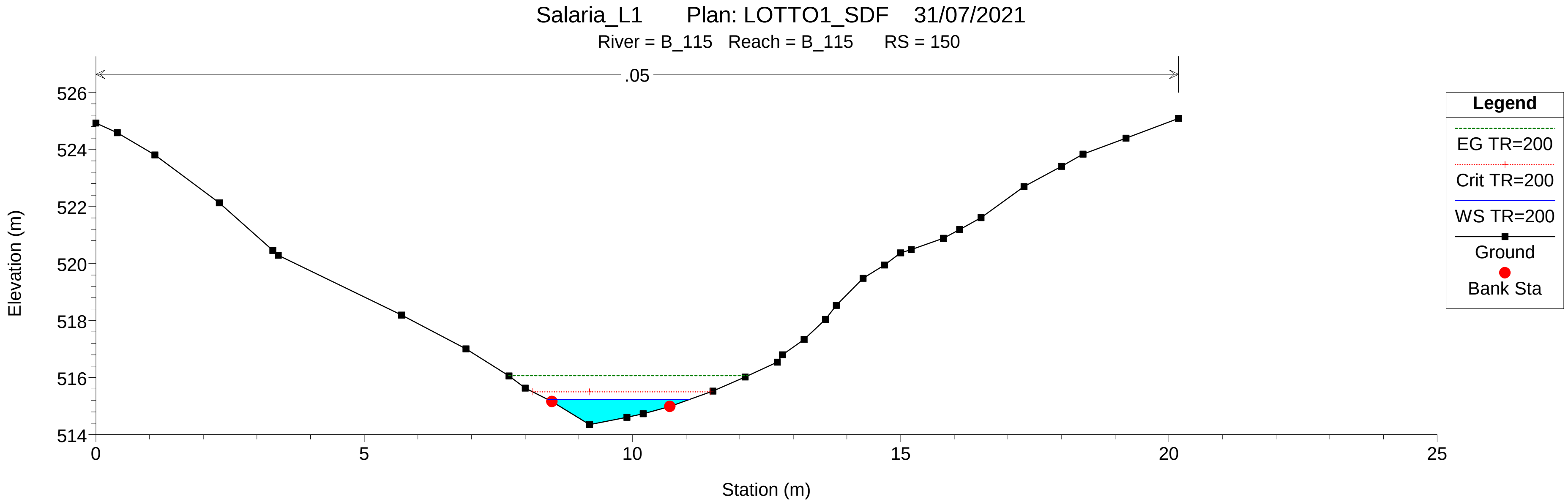

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 275
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

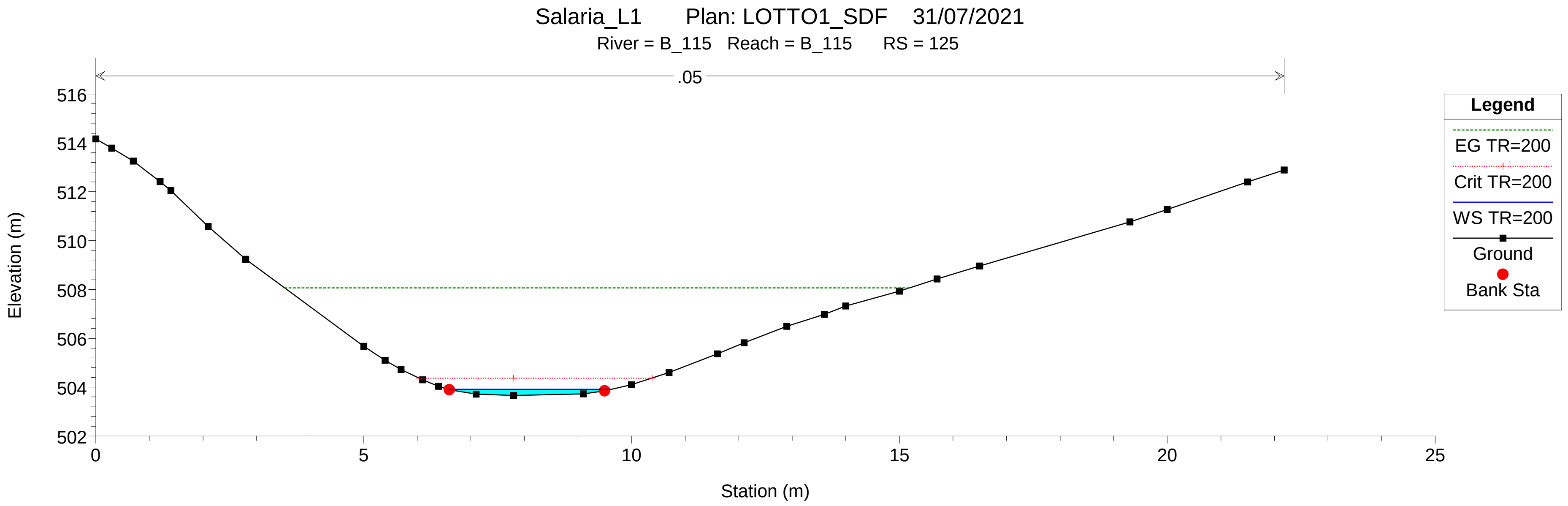

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 250
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

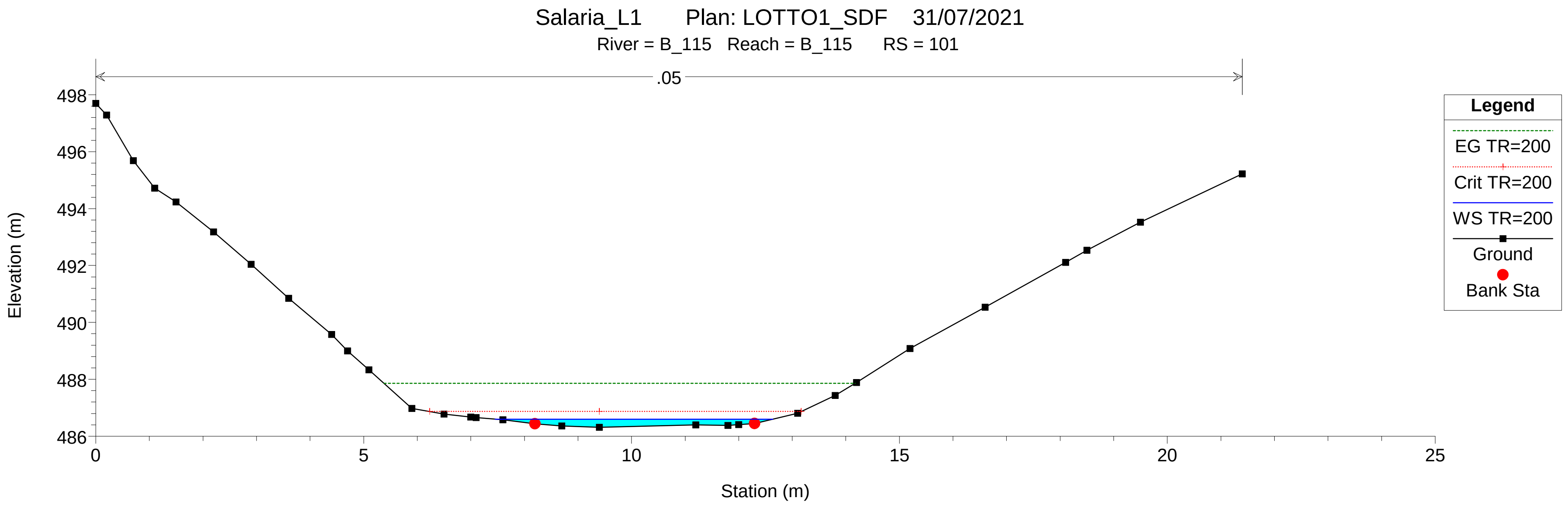

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 230
.05
Elevation (m)
550
548
546
544
542
540
538
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

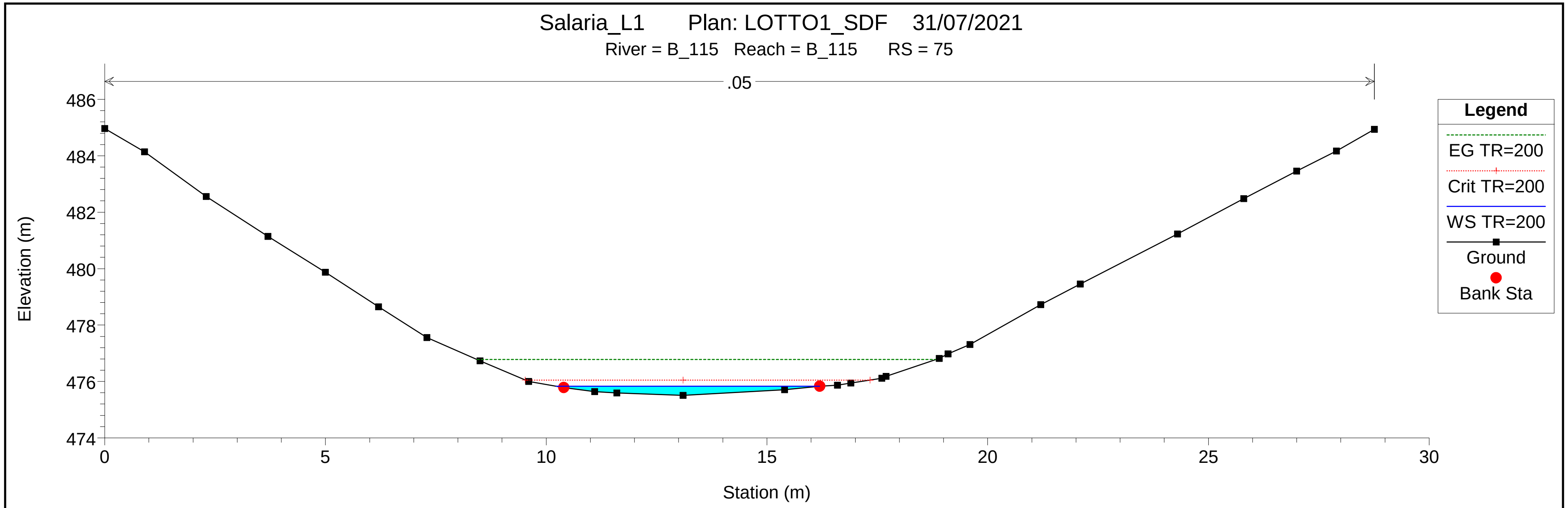

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 205
.05
Elevation (m)
540
538
536
534
532
530
528
526
524
0
5
10
15
20
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

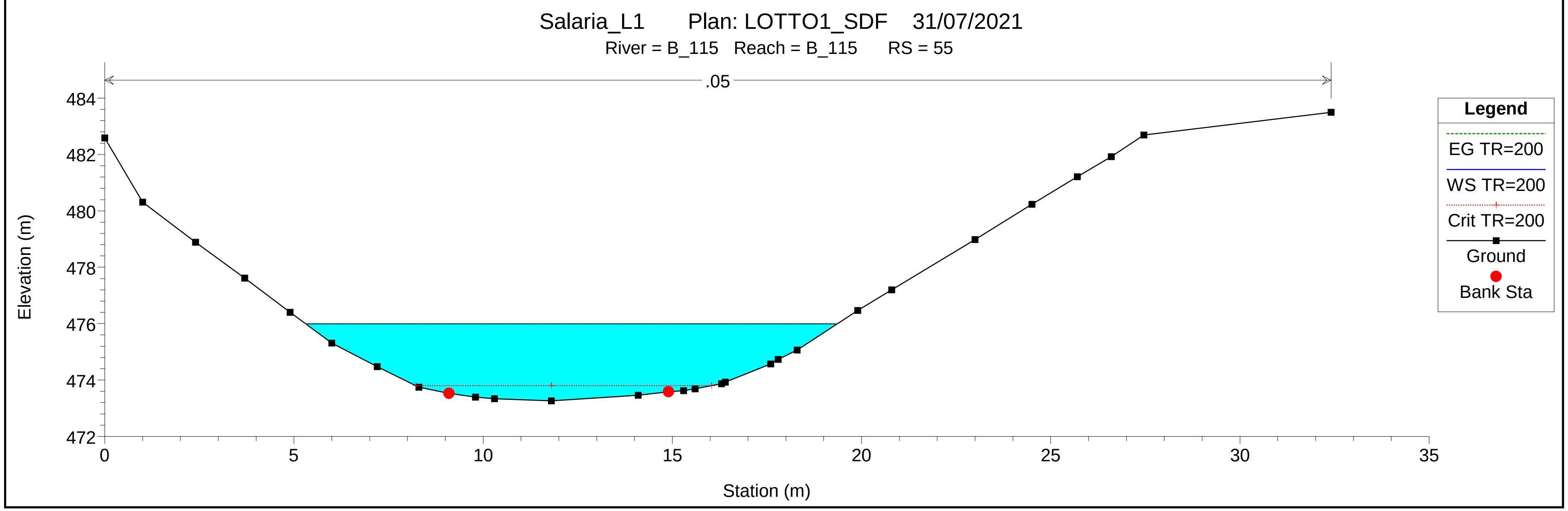

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 175
.05
Elevation (m)
532
530
528
526
524
522
520
518
0
2
4
6
8
10
12
14
16
18
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

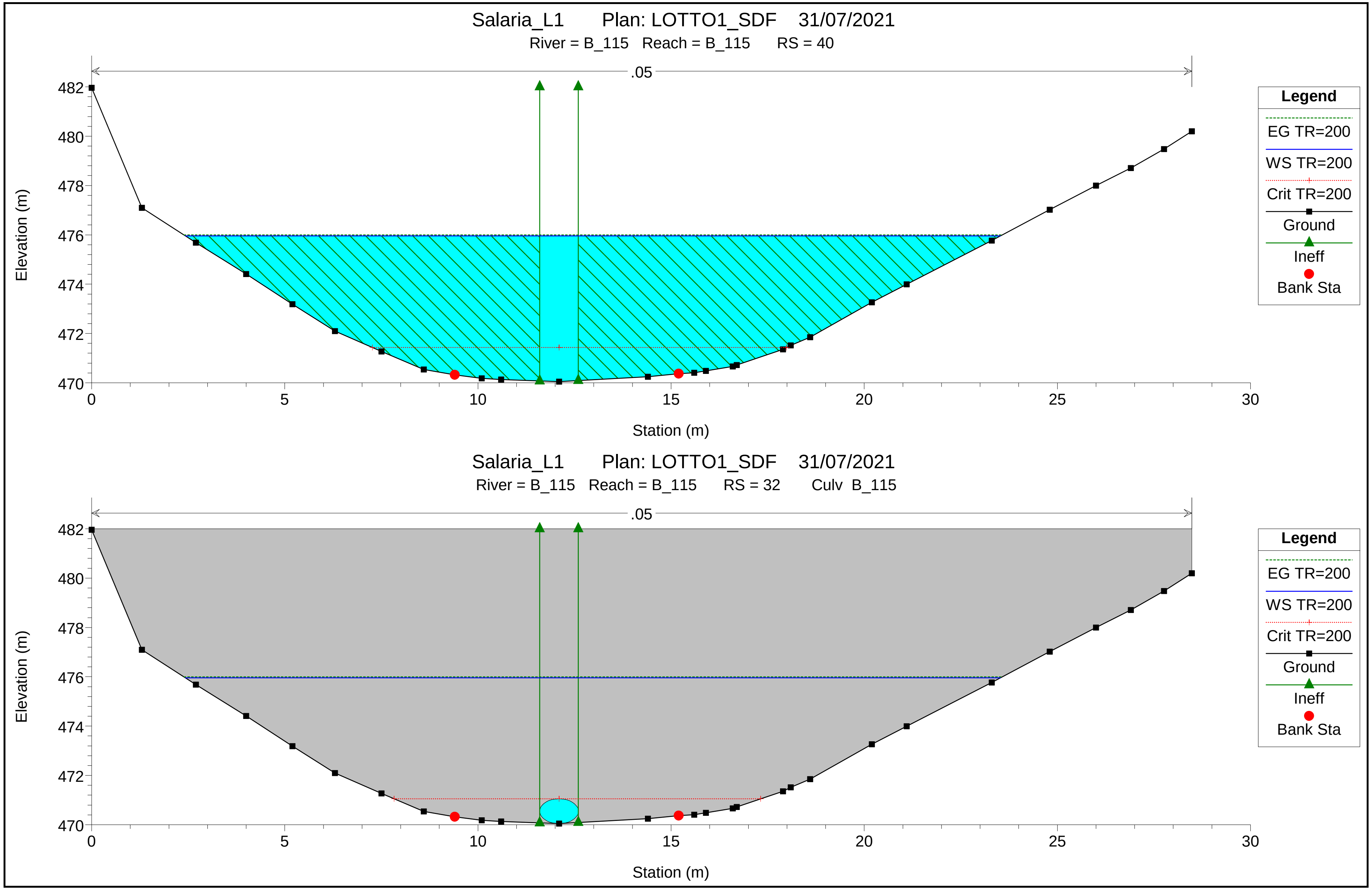

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 150
.05
Elevation (m)
526
524
522
520
518
516
514
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 125
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

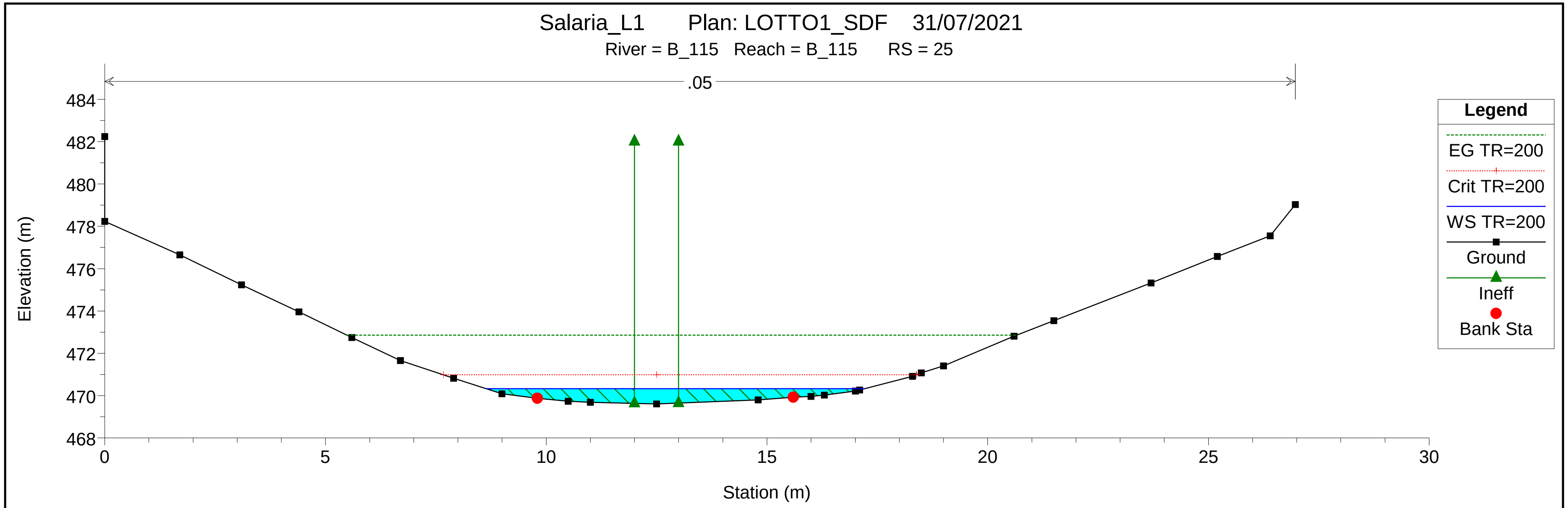

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 101
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 75
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

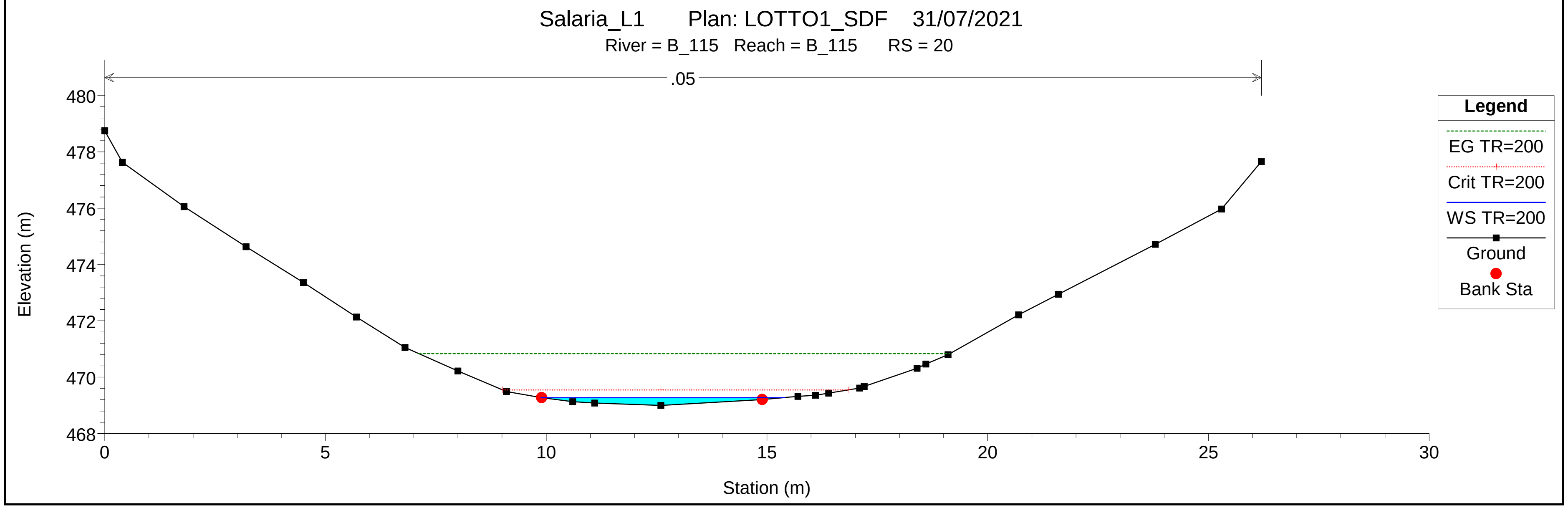

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 55
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta



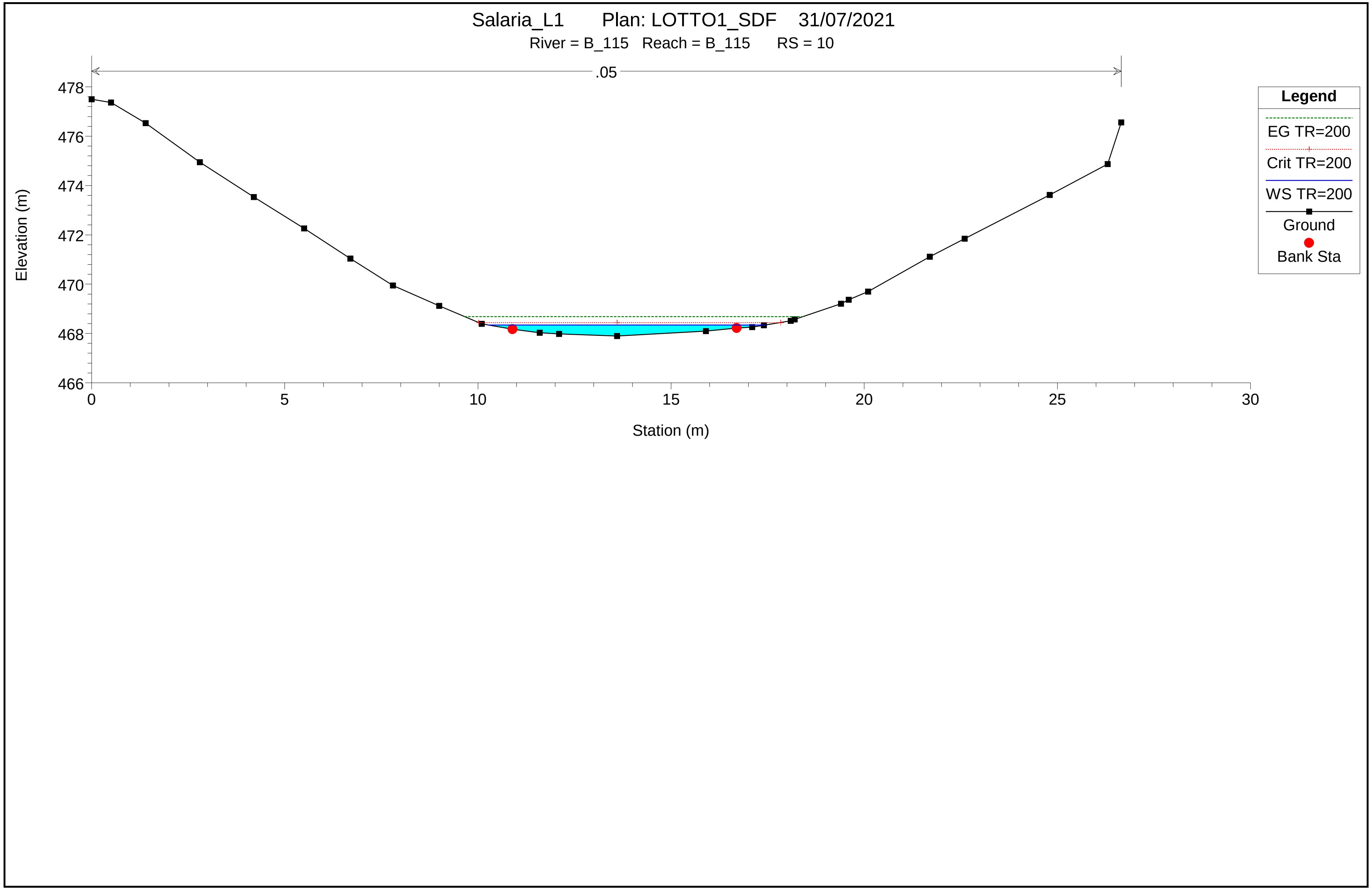
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 40
.05
Elevation (m)
482
480
478
476
474
472
470
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 32 Culv B_115
.05
Elevation (m)
482
480
478
476
474
472
470
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 25
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

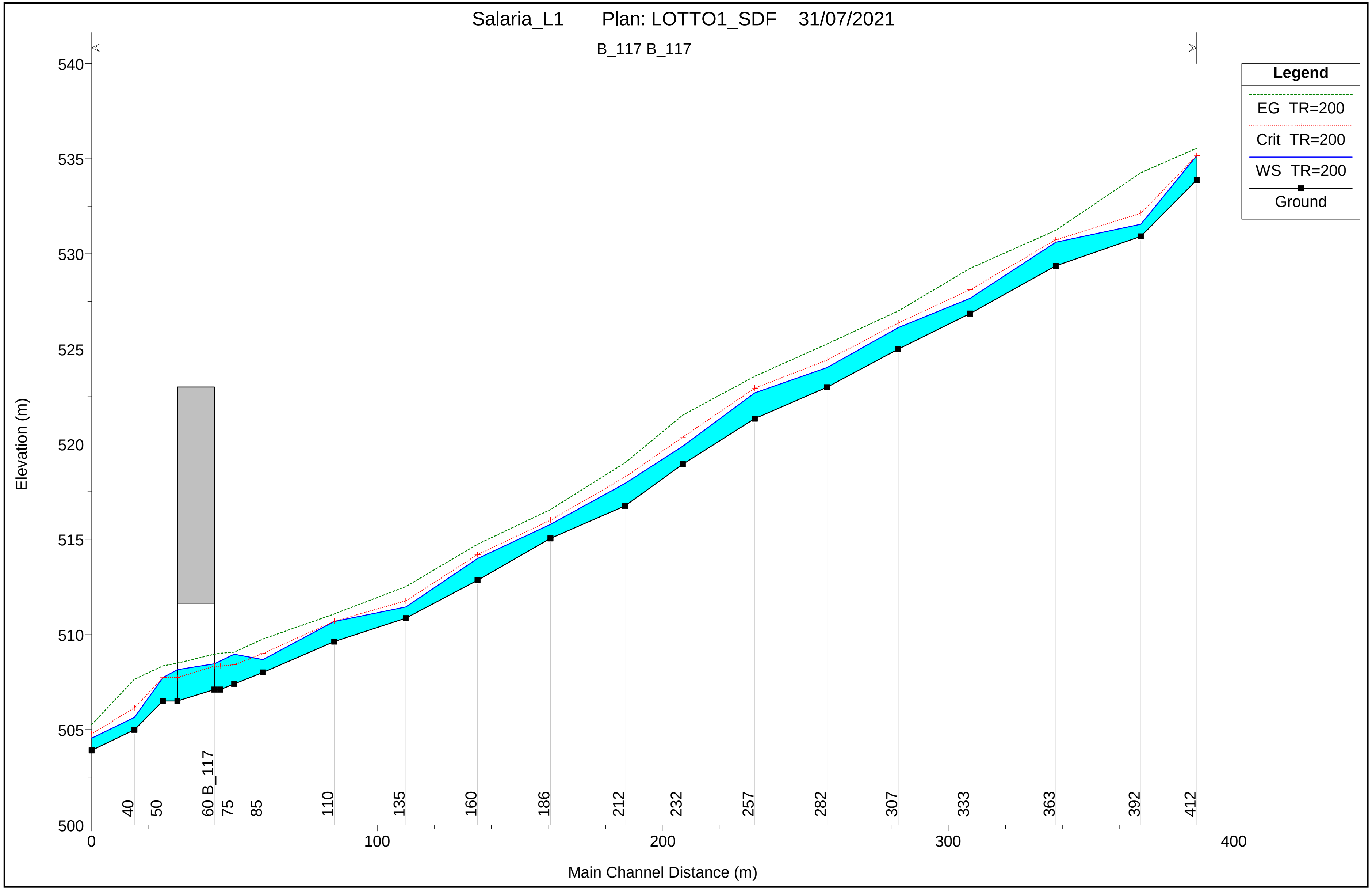


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 20
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_115 Reach = B_115 RS = 10
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
478
476
474
472
470
468
466
0
5
10
15
20
25
30

2.1.6. STATO DI FATTO

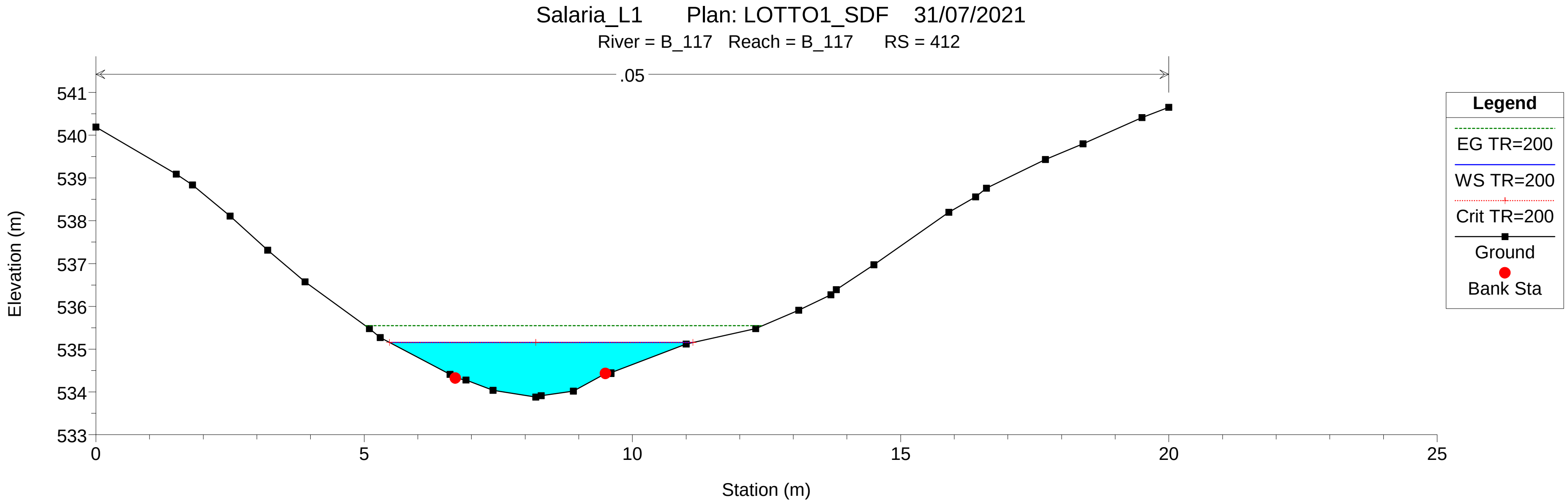
B.117 - Progr.5+525



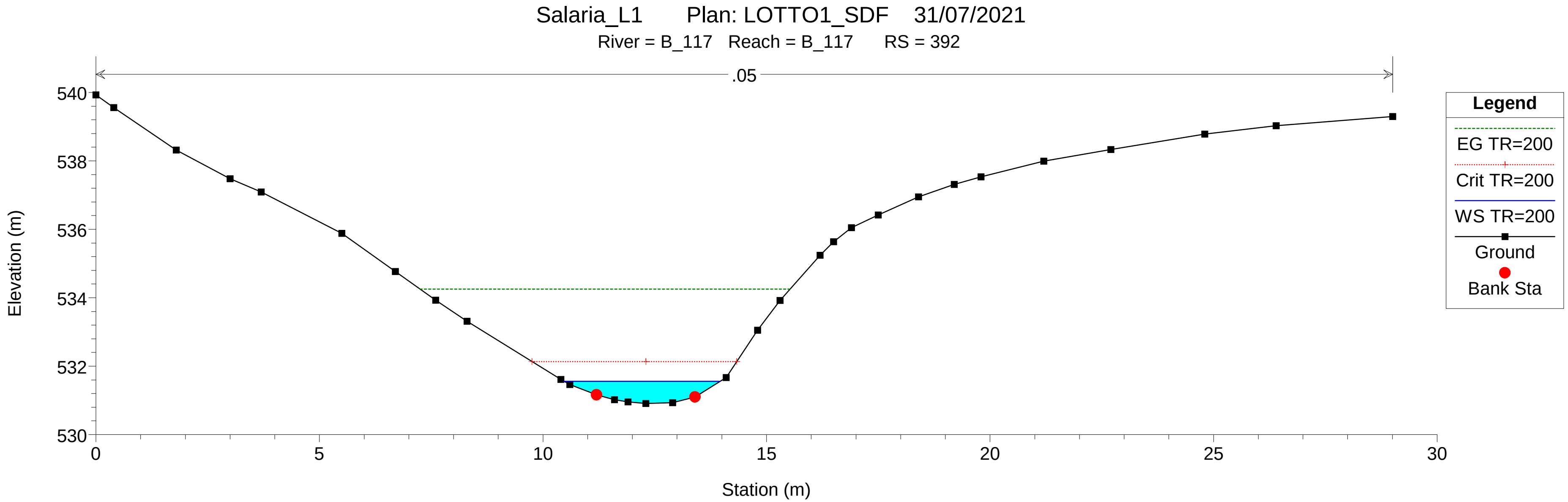
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
B_117 B_117
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
540
535
530
525
520
515
510
505
500
40
50
60 B_117
75
85
110
135
160
186
212
232
257
282
307
333
363
392
412
0
100
200
300
400
Main Channel Distance (m)

HEC-RAS Plan: L1_SDF River: B_117 Reach: B_117 Profile: TR=200

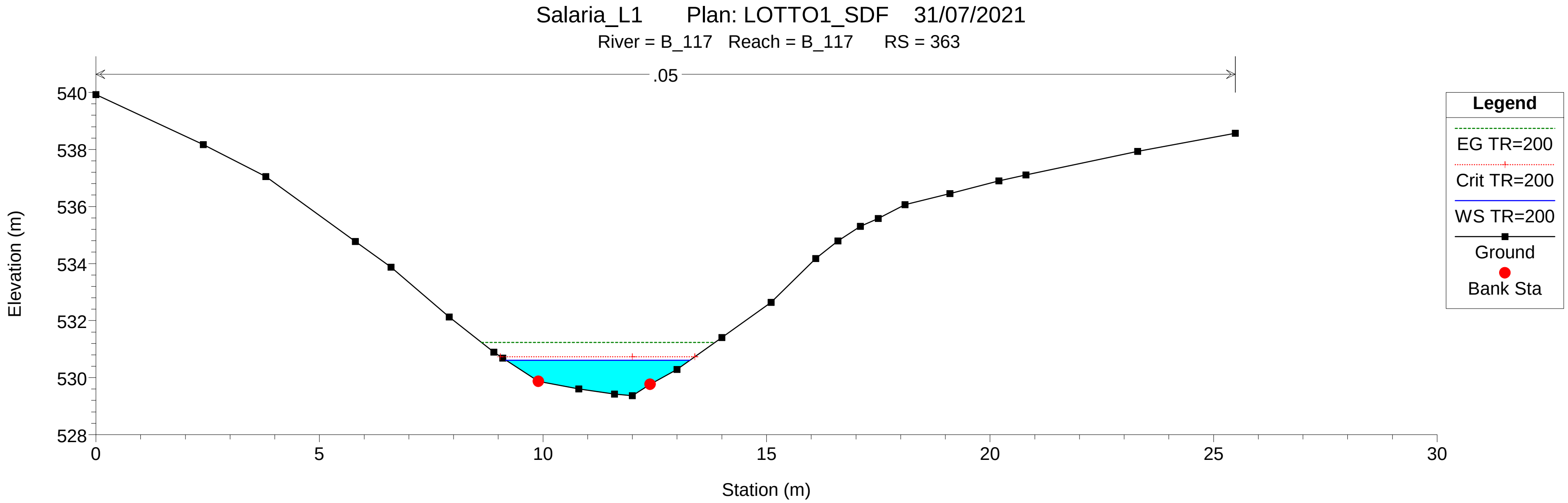
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_117	412	TR=200	10.50	533.88	1.28	535.16	535.16	0.00	0.91	535.55	2.96	2.55	1.00	214.31	0.73
B_117	392	TR=200	10.50	530.91	0.65	531.56	532.13	-0.57	3.20	534.26	7.56	6.84	0.56	1706.15	0.44
B_117	363	TR=200	10.50	529.37	1.24	530.61	530.74	-0.13	1.15	531.23	3.65	3.24	0.94	332.65	0.79
B_117	333	TR=200	10.50	526.86	0.80	527.66	528.12	-0.46	2.19	529.23	5.75	5.27	0.67	924.17	0.58
B_117	307	TR=200	10.50	524.99	1.13	526.12	526.36	-0.24	1.35	526.99	4.25	3.88	0.89	460.00	0.80
B_117	282	TR=200	10.50	522.99	1.03	524.02	524.41	-0.39	1.69	525.27	5.02	4.70	0.77	674.67	0.74
B_117	257	TR=200	10.50	521.34	1.35	522.69	522.93	-0.24	1.30	523.57	4.46	3.74	1.05	479.45	0.86
B_117	232	TR=200	10.50	518.94	0.95	519.89	520.37	-0.48	2.15	521.53	5.70	5.56	0.62	934.50	0.64
B_117	212	TR=200	10.50	516.75	1.19	517.94	518.26	-0.32	1.57	519.01	4.61	4.54	0.67	595.42	0.78
B_117	186	TR=200	10.50	515.04	0.74	515.78	516.01	-0.23	1.67	516.56	3.91	3.89	0.52	464.30	0.54
B_117	160	TR=200	10.50	512.84	1.15	513.99	514.19	-0.20	1.33	514.74	3.84	3.75	0.73	403.21	0.73
B_117	135	TR=200	10.50	510.85	0.60	511.45	511.76	-0.31	2.12	512.51	4.57	4.56	0.45	668.87	0.47
B_117	110	TR=200	10.50	509.63	1.05	510.68	510.69	-0.01	0.99	511.08	2.86	2.65	0.84	212.03	0.71
B_117	85	TR=200	10.50	508.00	0.68	508.68	509.00	-0.32	2.03	509.76	4.64	4.56	0.51	662.39	0.48
B_117	75	TR=200	10.50	507.40	1.56	508.96	508.40	0.56	0.42	509.07	1.56	1.40	1.34	54.02	1.09
B_117	70	TR=200	10.50	507.10	1.50	508.60	508.33	0.27	0.74	509.01	2.83	2.83	1.45	173.15	1.48
B_117	60		Bridge												
B_117	50	TR=200	10.50	506.50	1.23	507.73	507.73	0.00	1.01	508.34	3.47	3.47	1.19	278.33	1.21
B_117	40	TR=200	10.50	504.99	0.66	505.65	506.15	-0.50	2.72	507.64	6.31	6.11	0.49	1233.44	0.49
B_117	25	TR=200	10.50	503.91	0.63	504.54	504.76	-0.22	1.64	505.26	3.80	3.65	0.54	433.58	0.48

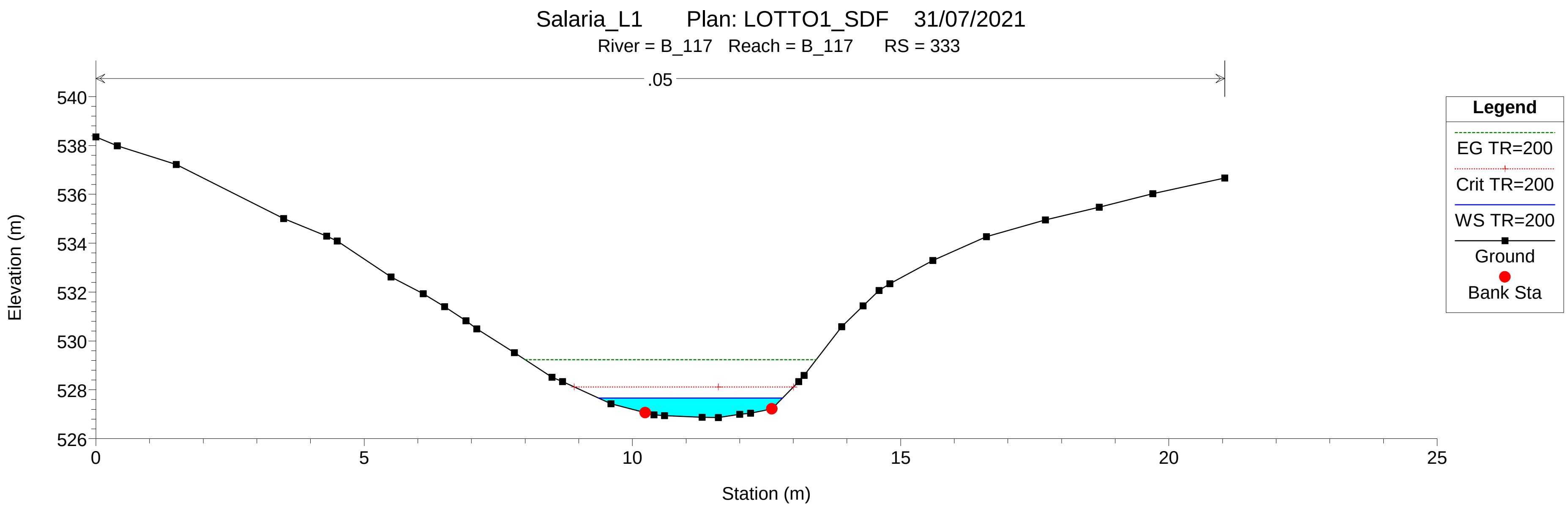


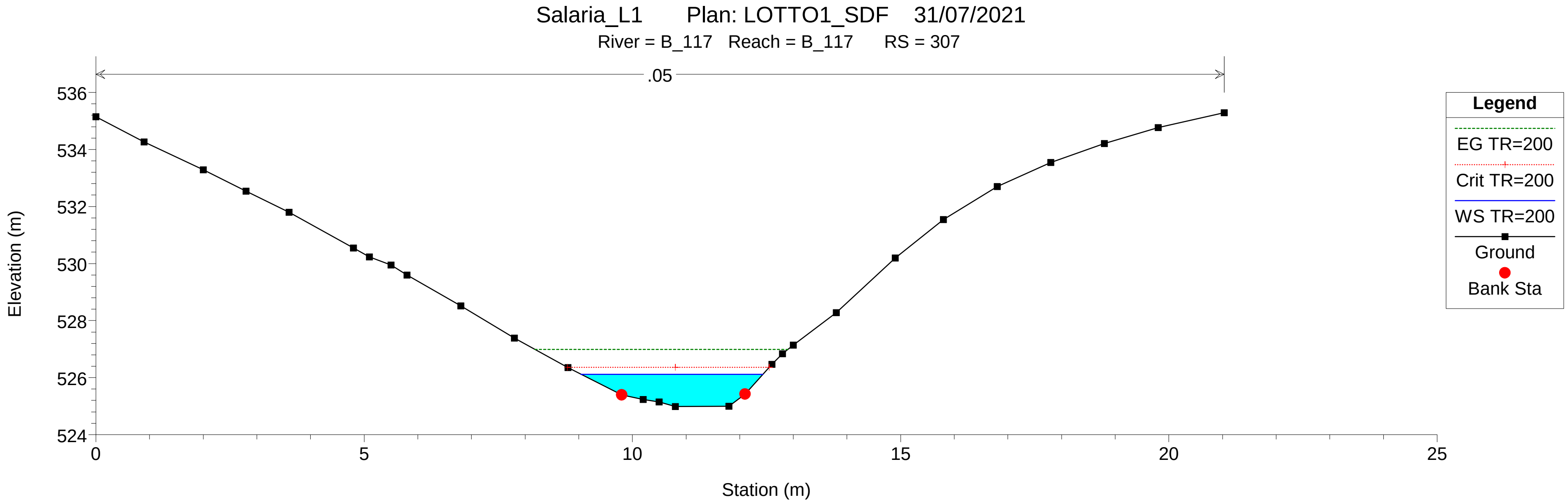
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 412
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

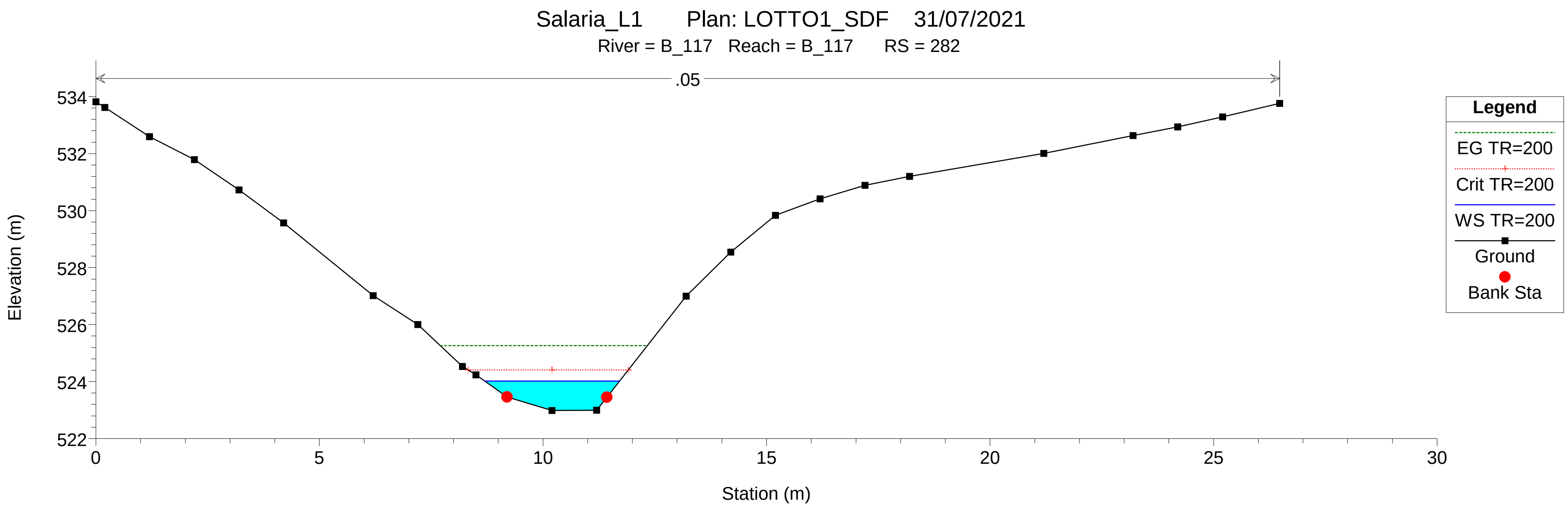


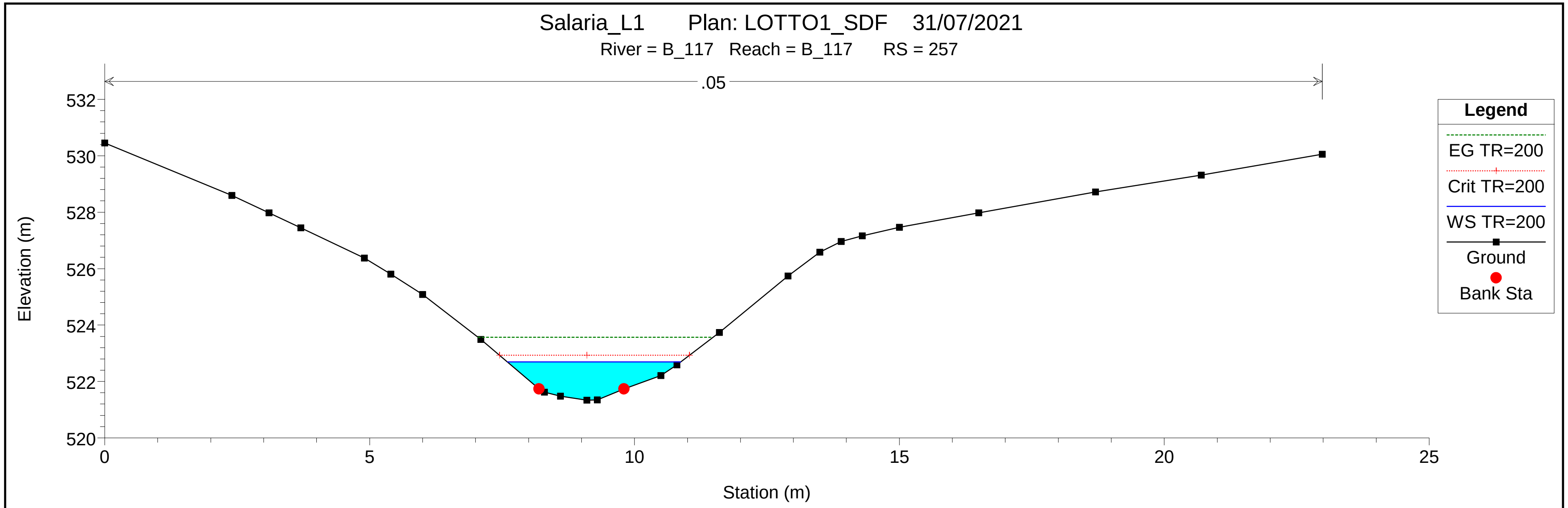
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 392
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 363
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

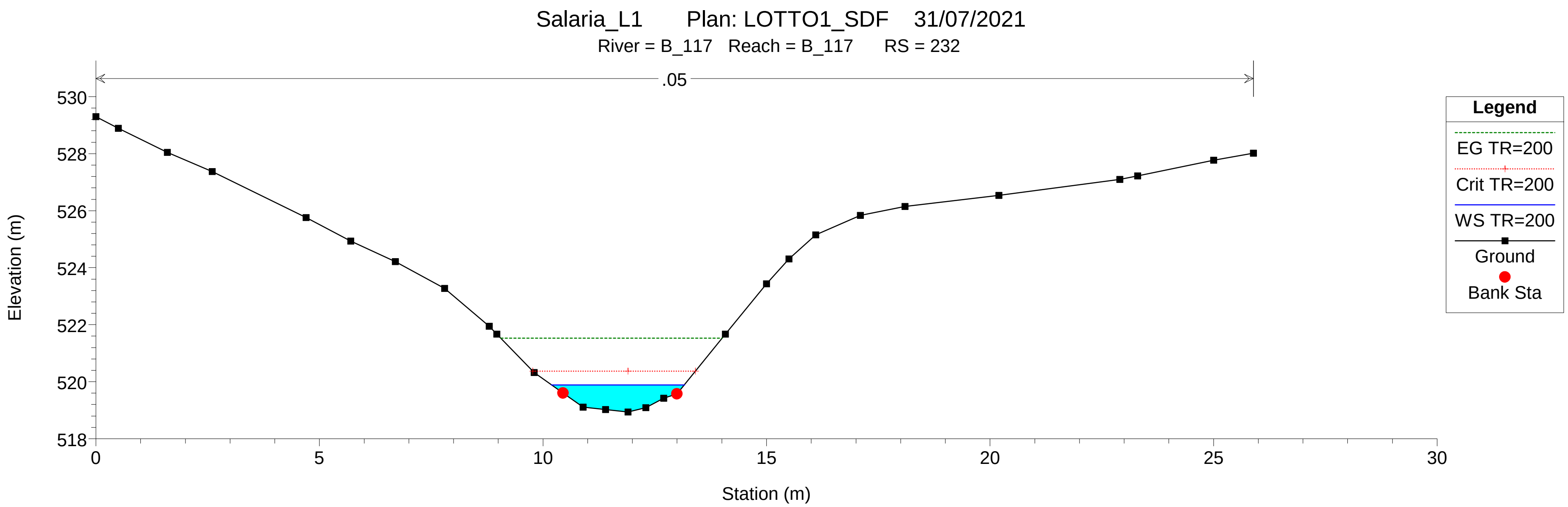

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 333
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 307
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

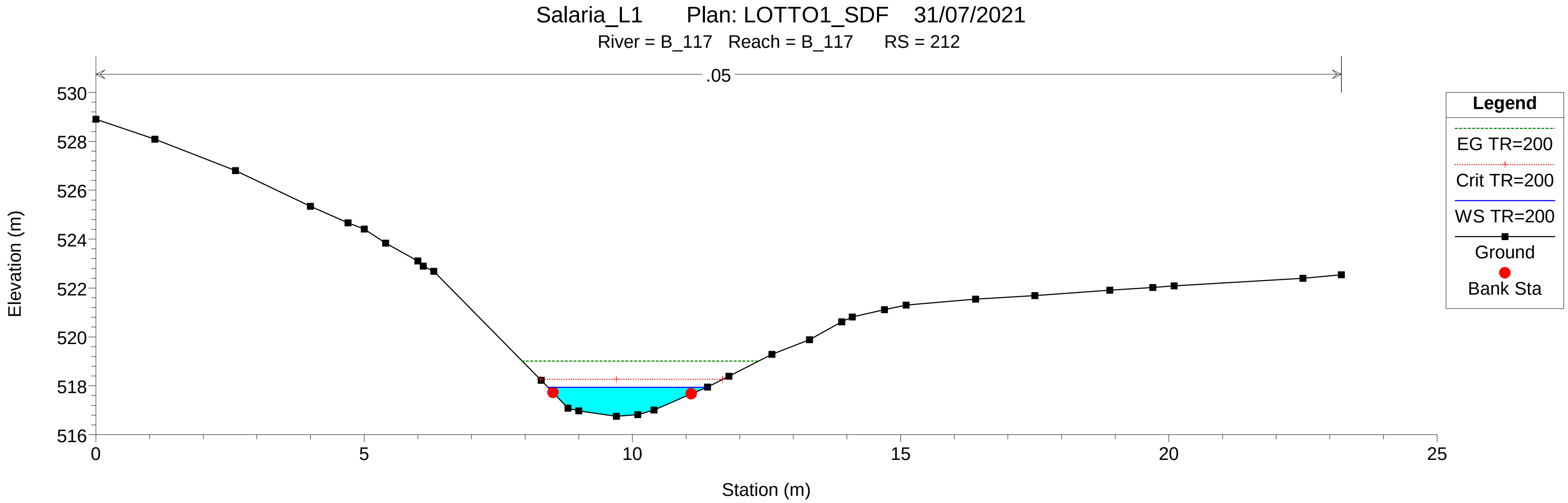

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 282
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

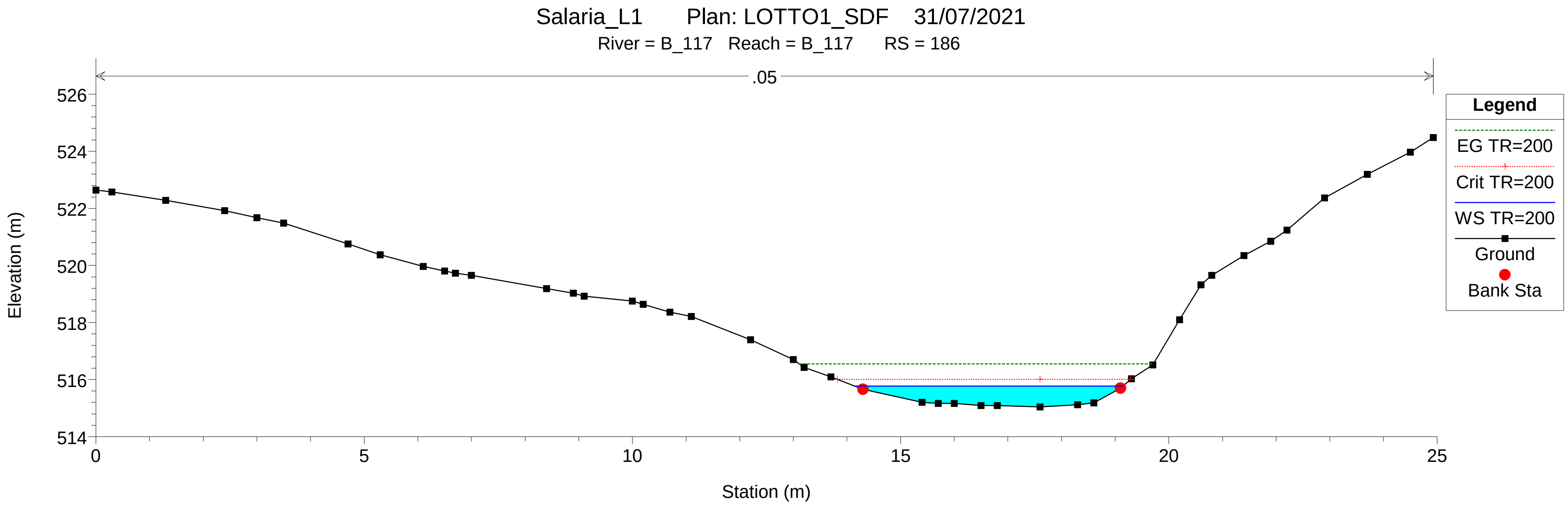


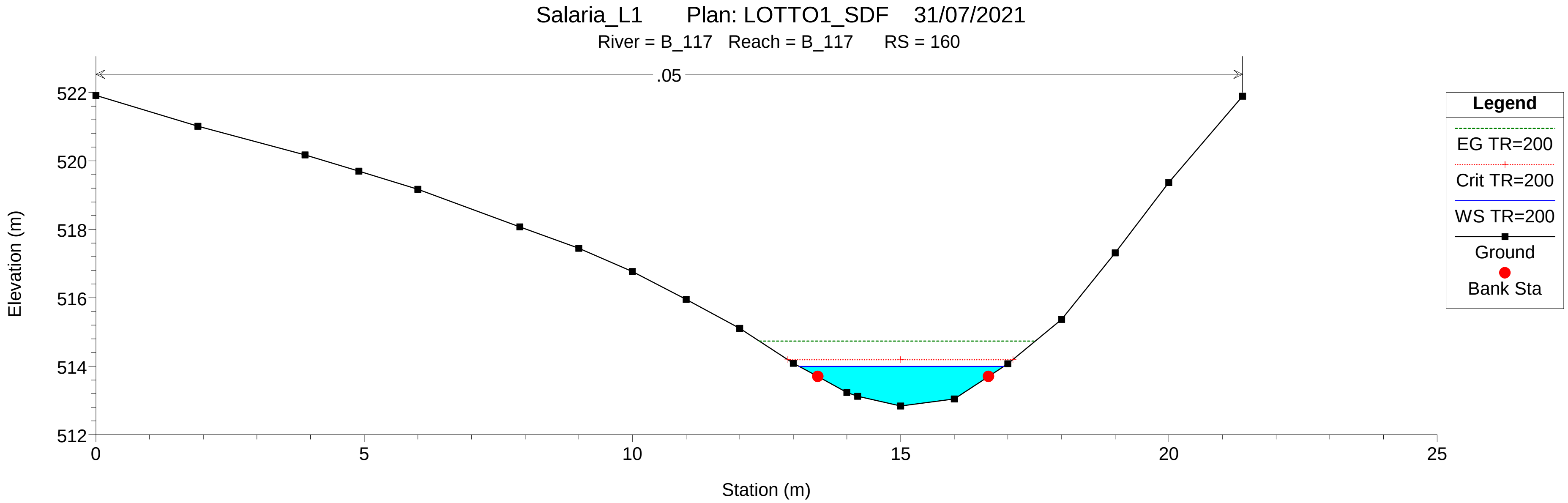
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 257
.05
Elevation (m)
532
530
528
526
524
522
520
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

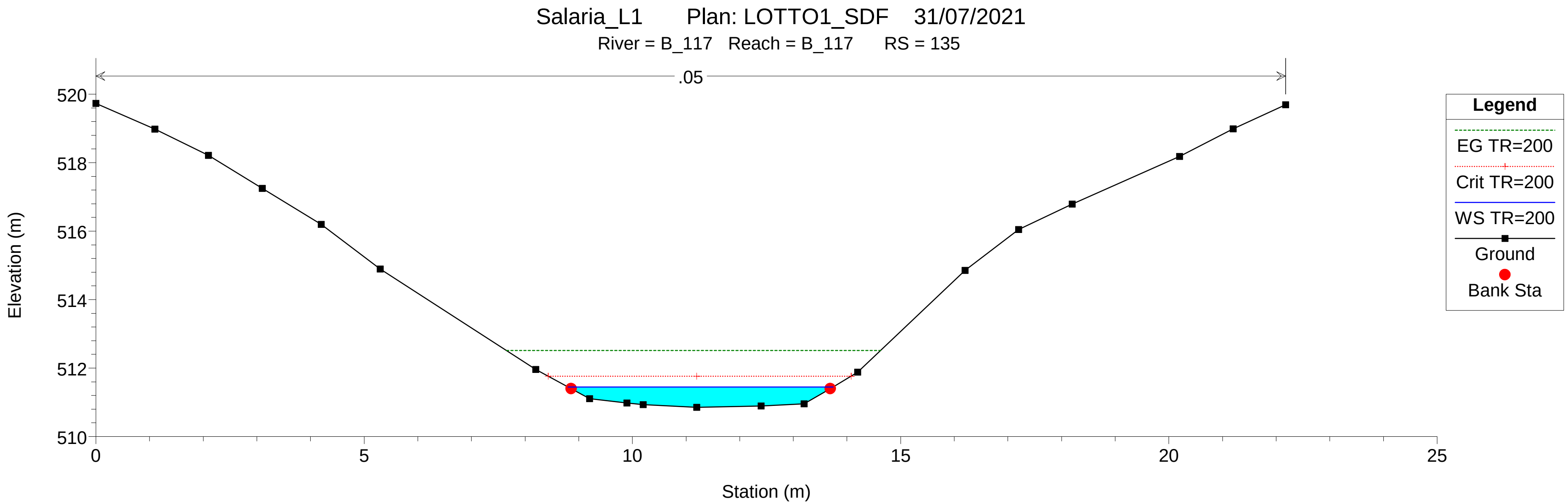


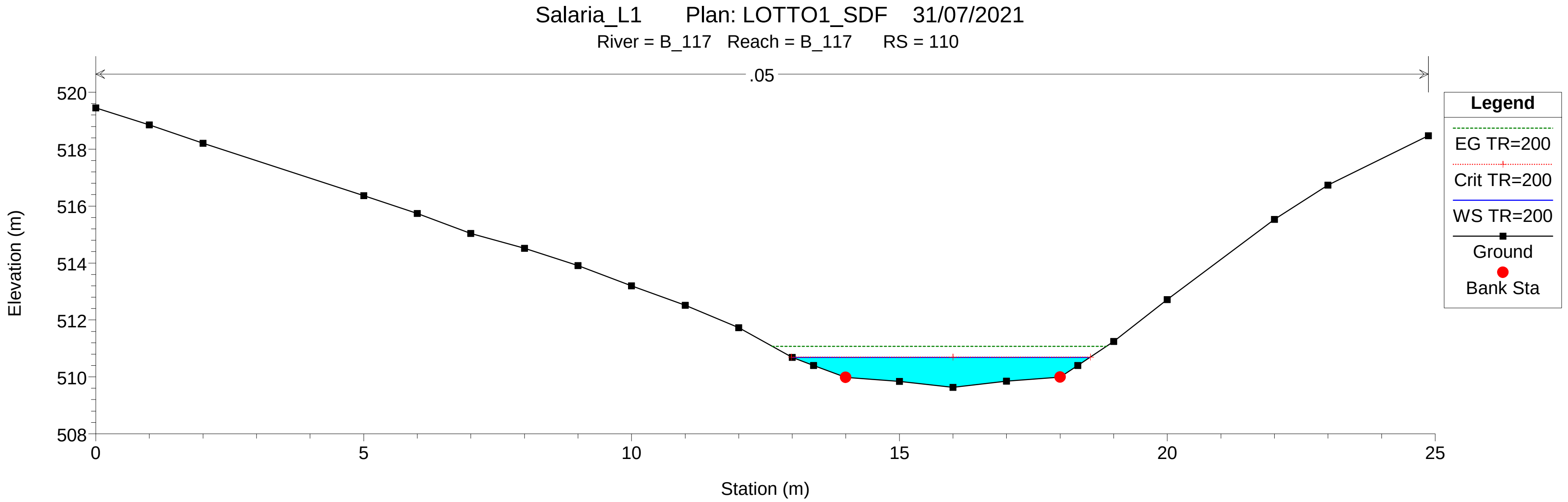
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 232
.05
Elevation (m)
530
528
526
524
522
520
518
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 212
.05
Elevation (m)
530
528
526
524
522
520
518
516
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

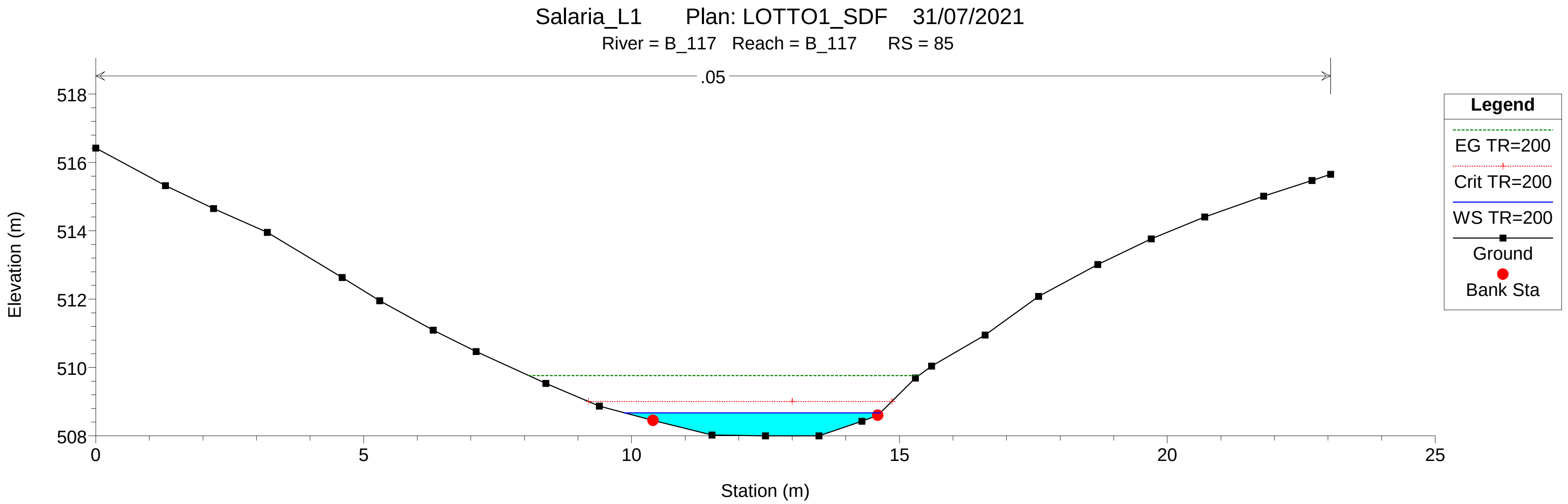

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 186
.05
Elevation (m)
526
524
522
520
518
516
514
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 160
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

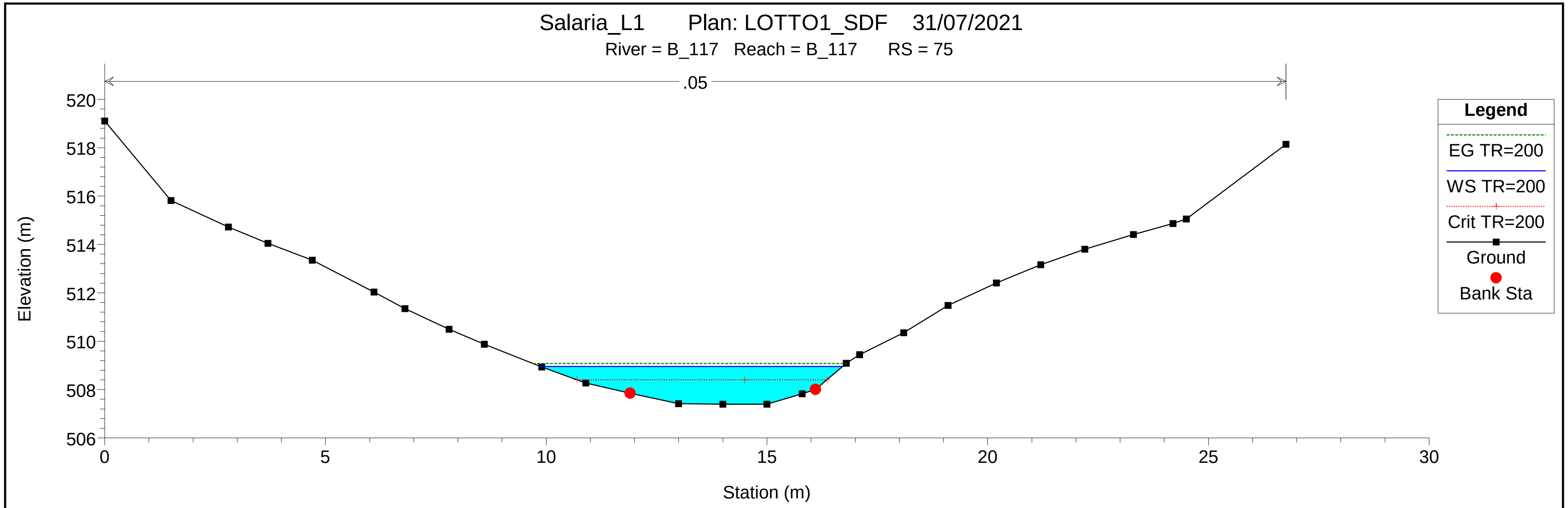

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 135
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

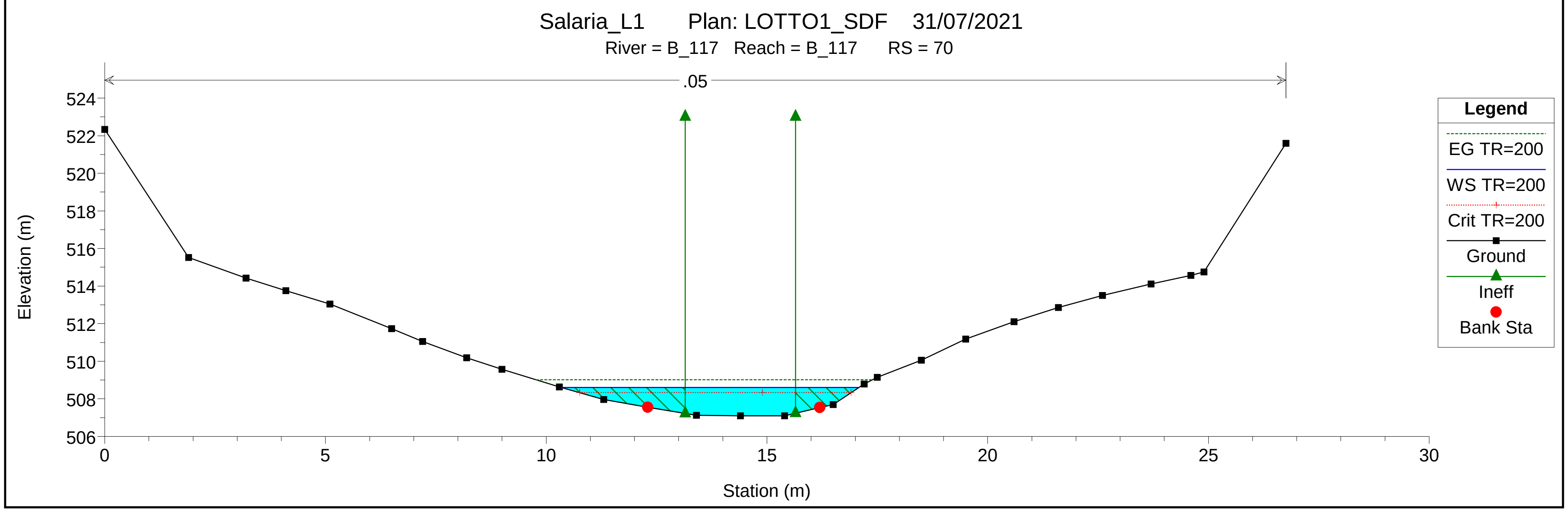


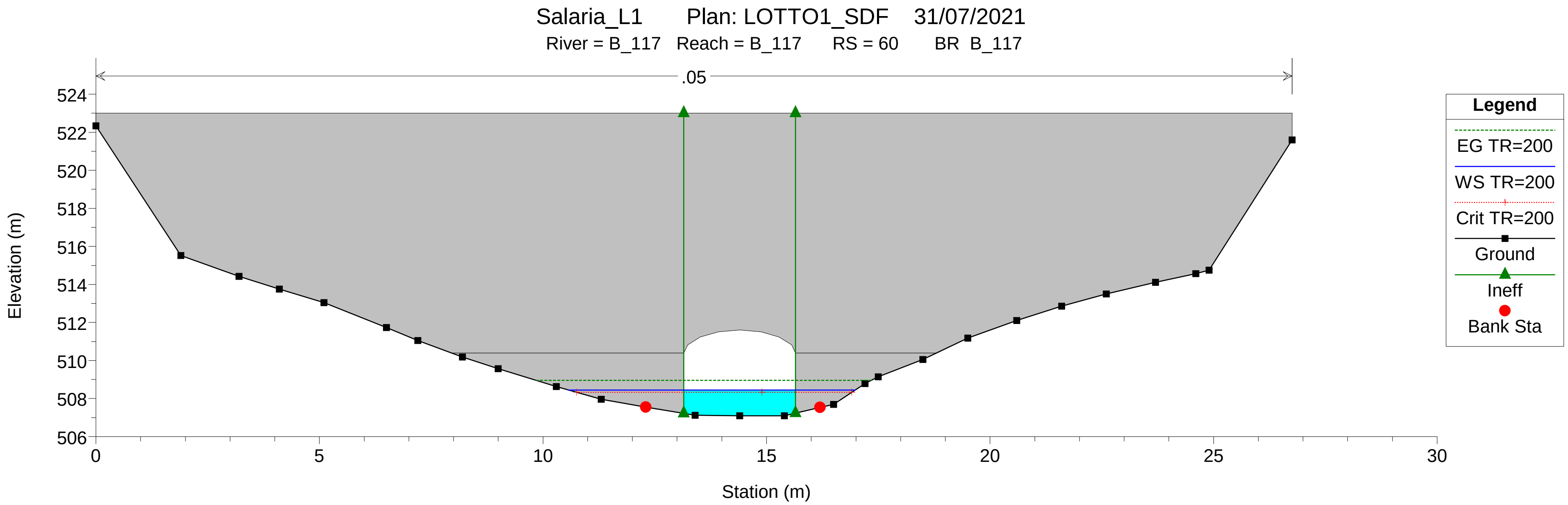
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 110
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

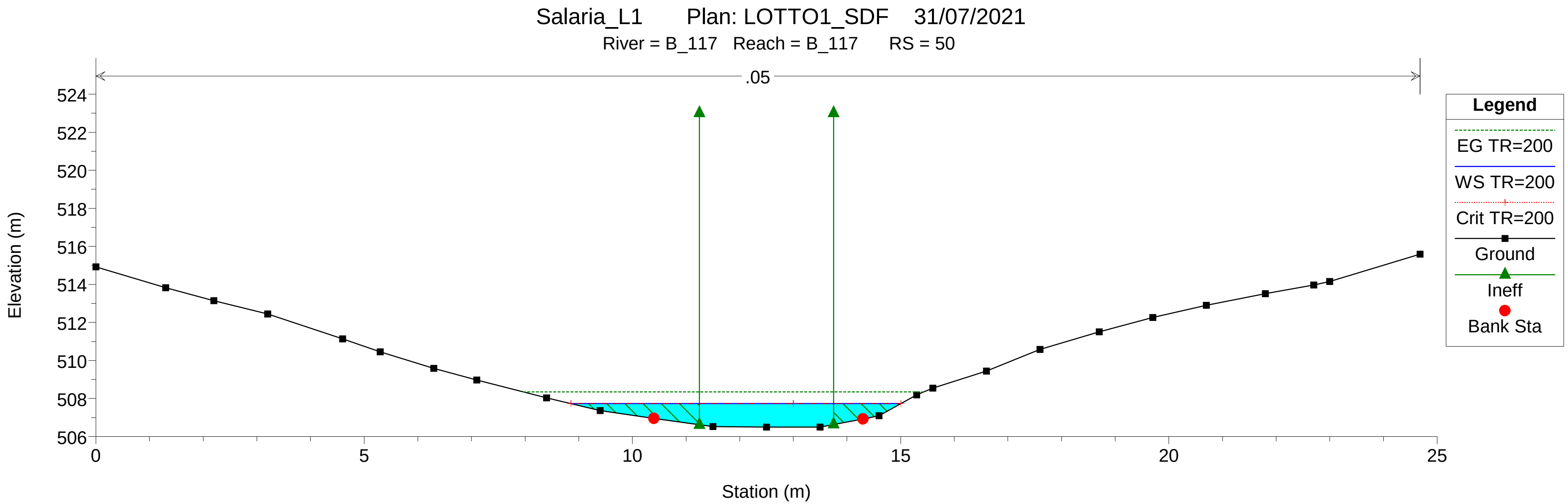


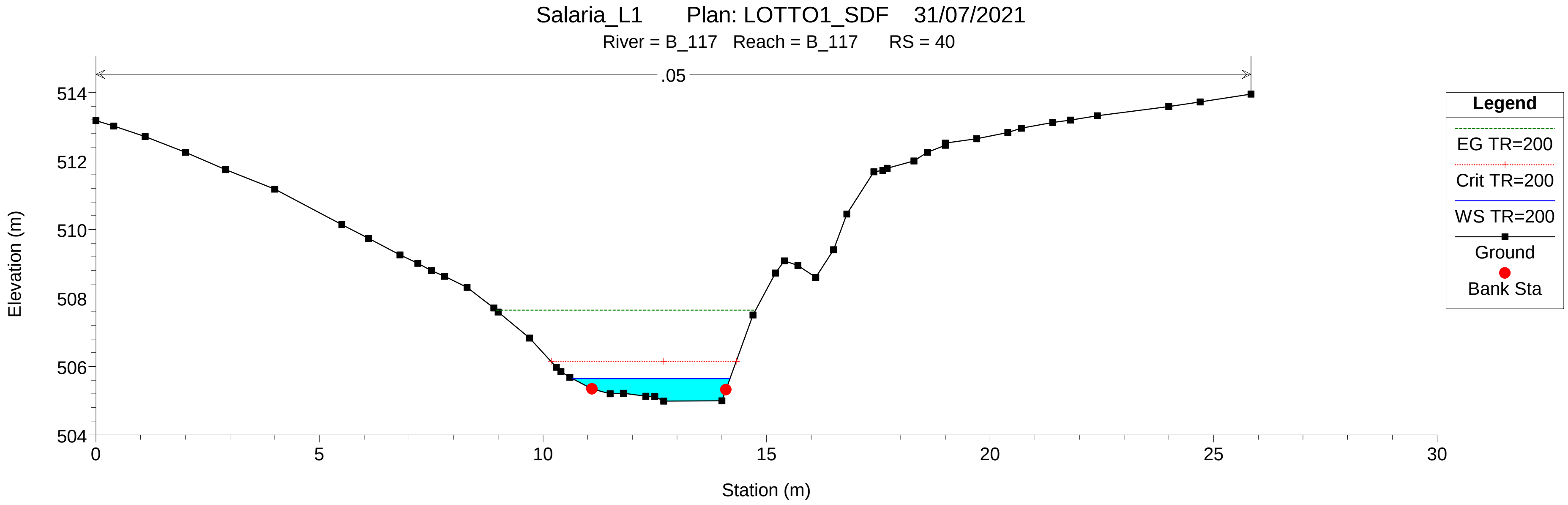
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 85
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

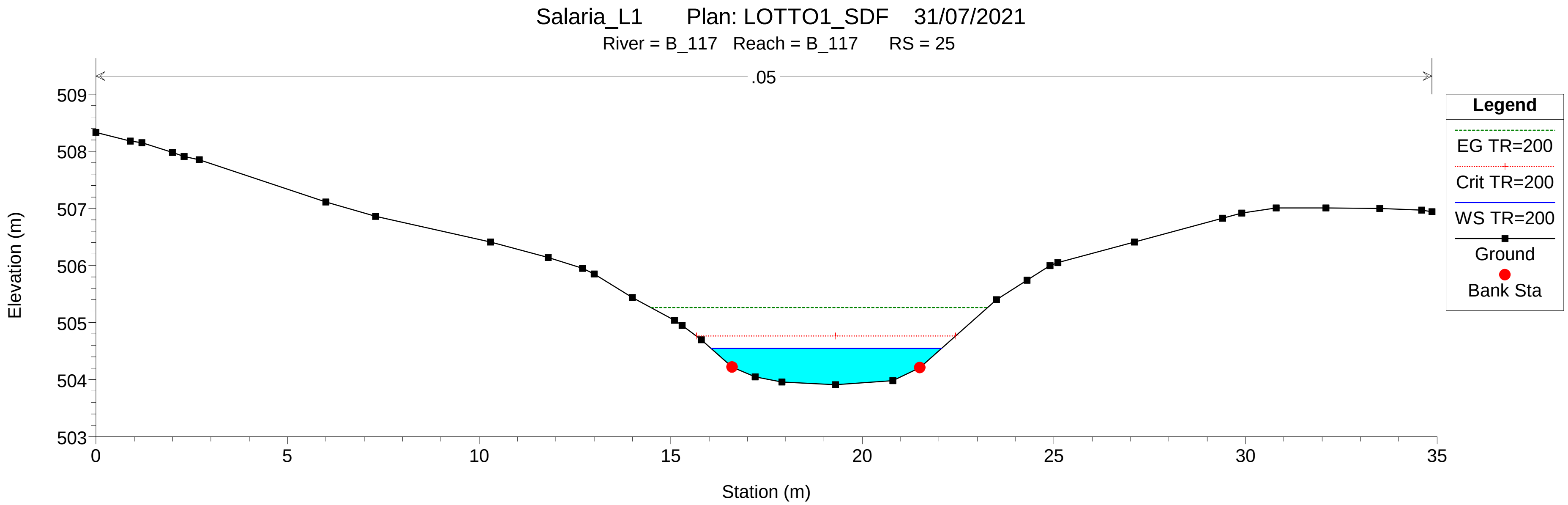

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 75
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 70
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 60 BR B_117
.05
Elevation (m)
524
522
520
518
516
514
512
510
508
506
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

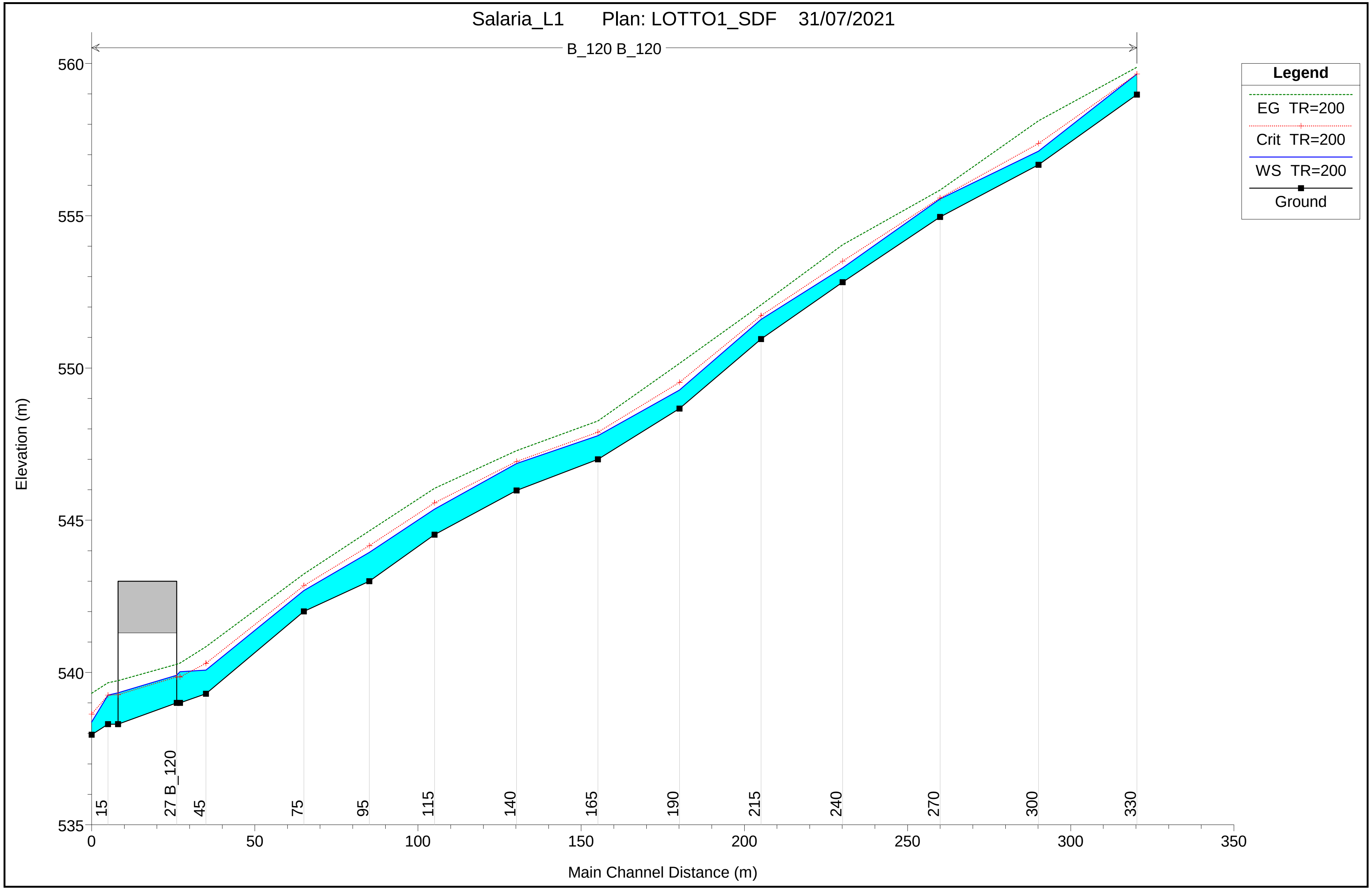

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 50
.05
Elevation (m)
524
522
520
518
516
514
512
510
508
506
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 40
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_117 Reach = B_117 RS = 25
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

2.1.7. STATO DI FATTO

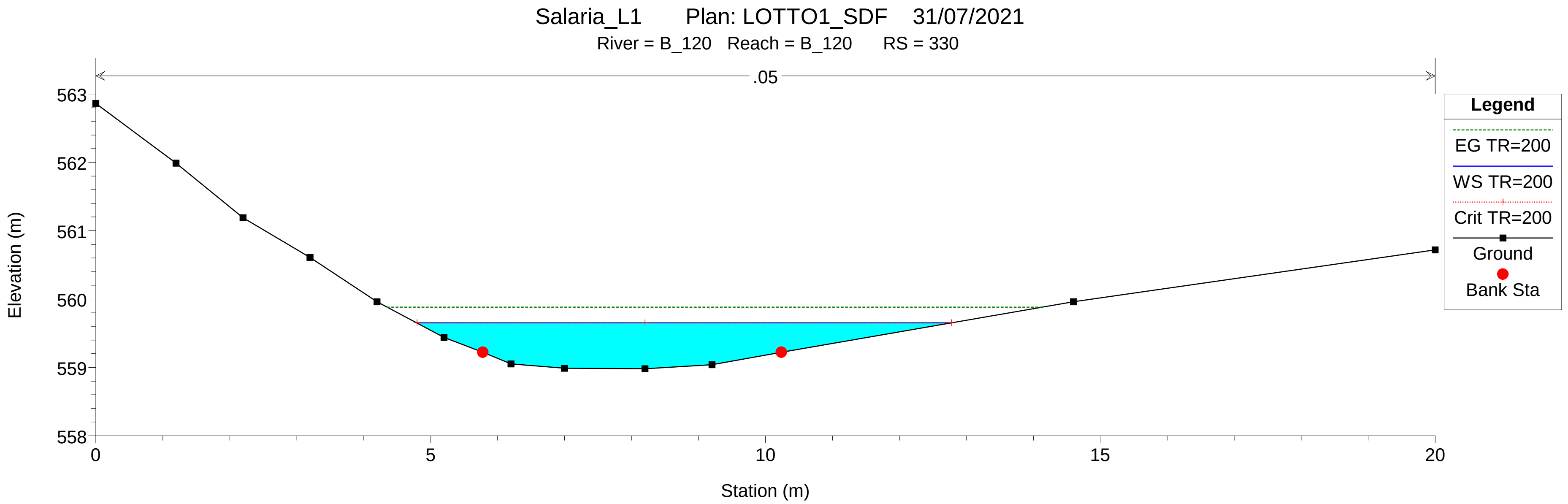
B.120 - Progr.6+125

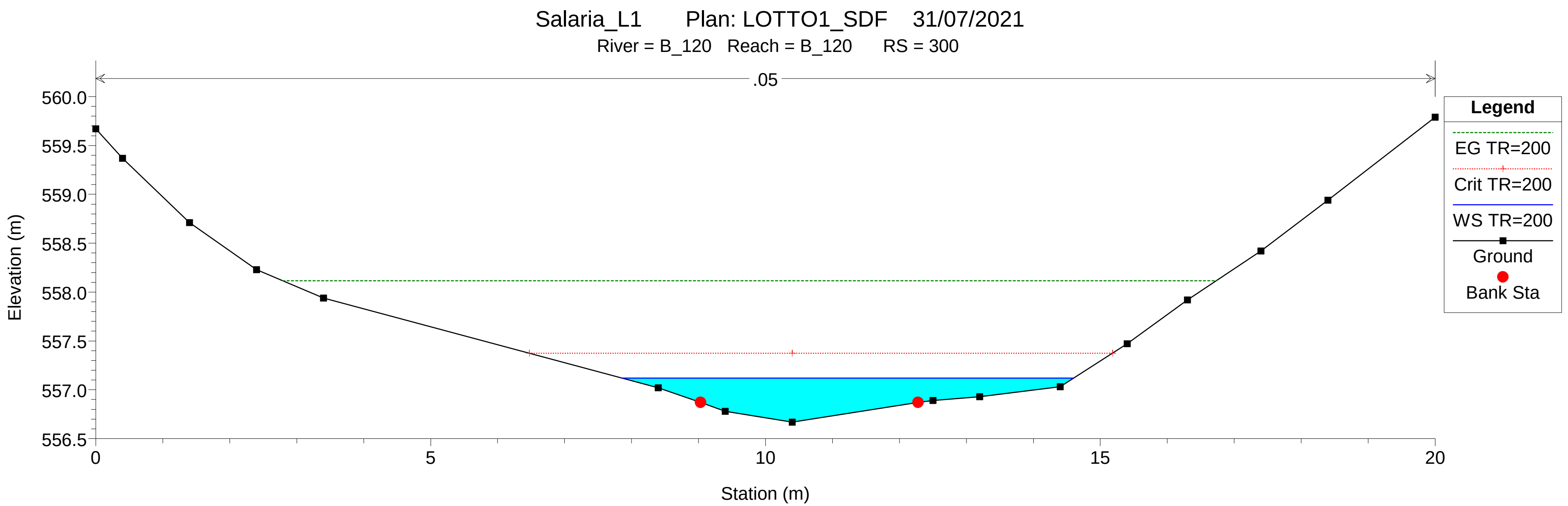


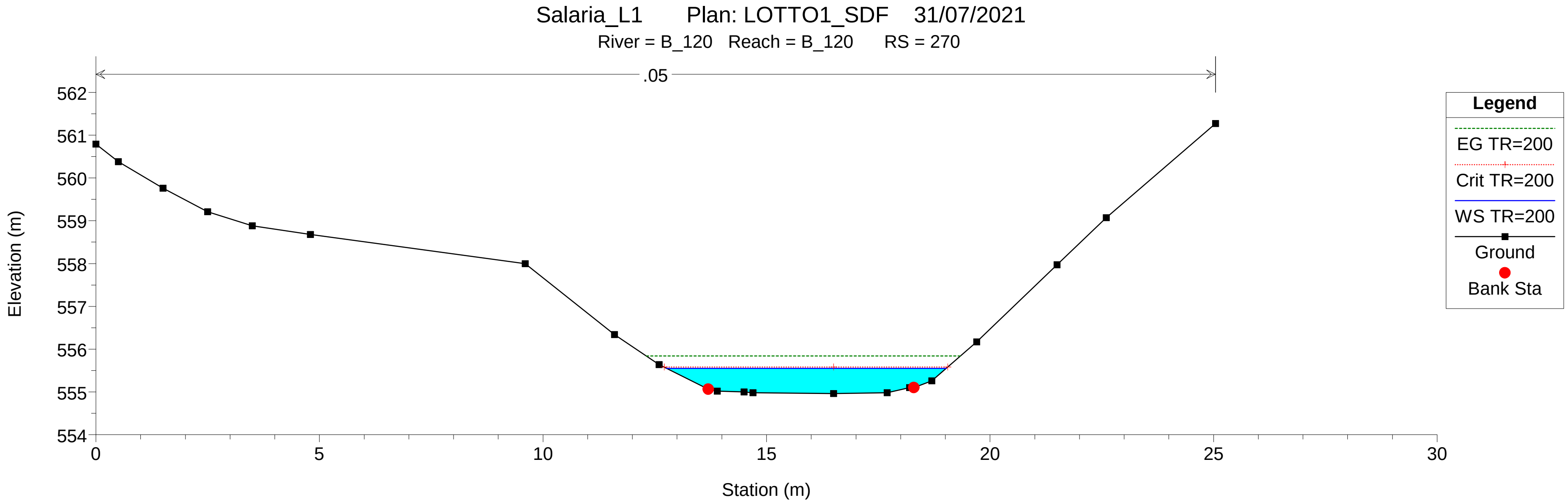
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
B_120 B_120
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
560
555
550
545
540
535
15
27 B_120
45
75
95
115
140
165
190
215
240
270
300
330
0
50
100
150
200
250
300
350
Main Channel Distance (m)

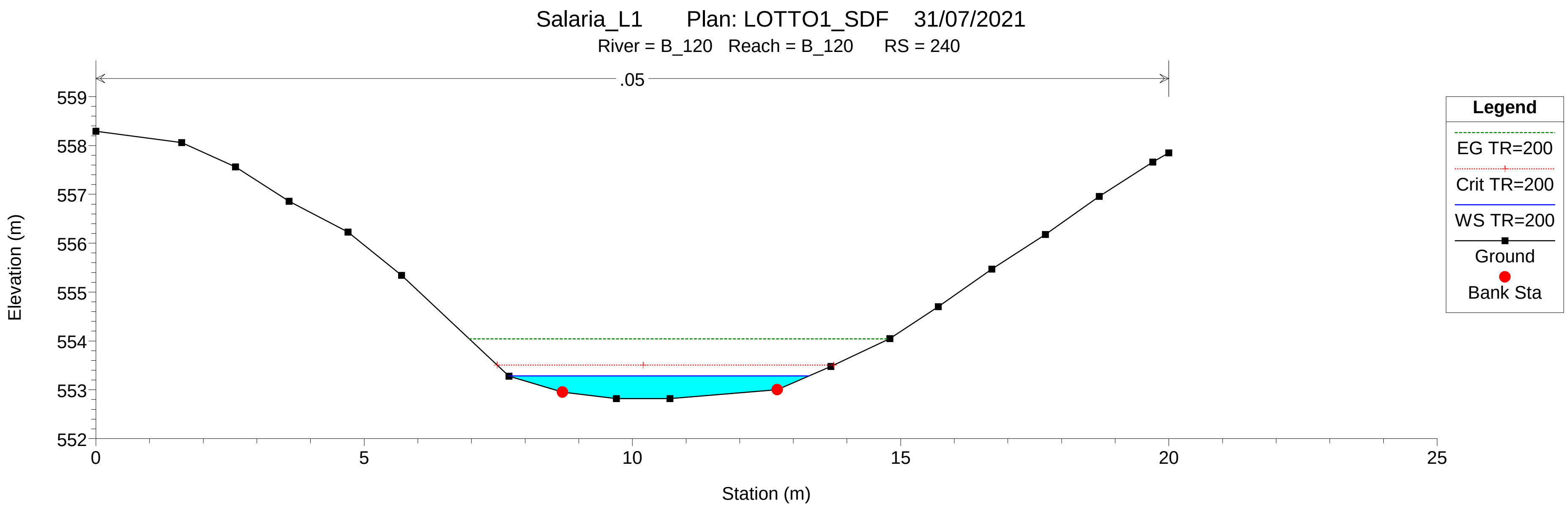
HEC-RAS Plan: L1_SDF River: B_120 Reach: B_120 Profile: TR=200

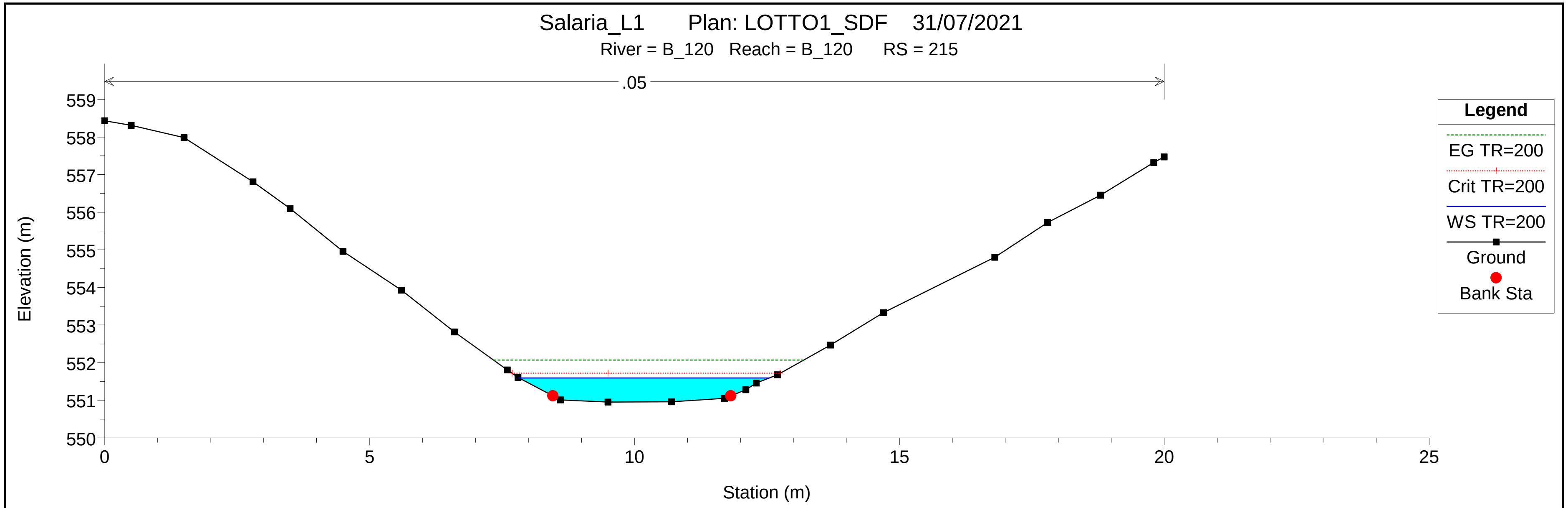
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_120	330	TR=200	6.90	558.98	0.67	559.65	559.65	0.00	0.92	559.88	2.23	1.98	0.60	144.91	0.44
B_120	300	TR=200	6.90	556.67	0.45	557.12	557.37	-0.25	2.53	558.12	4.75	4.11	0.36	781.35	0.25
B_120	270	TR=200	6.90	554.96	0.59	555.55	555.58	-0.03	1.05	555.84	2.46	2.30	0.56	179.47	0.48
B_120	240	TR=200	6.90	552.82	0.46	553.28	553.51	-0.23	2.00	554.04	3.97	3.71	0.40	523.37	0.33
B_120	215	TR=200	6.90	550.95	0.65	551.60	551.72	-0.12	1.28	552.07	3.13	2.90	0.60	284.93	0.50
B_120	190	TR=200	6.90	548.67	0.60	549.27	549.53	-0.26	2.01	550.15	4.27	4.01	0.45	583.46	0.39
B_120	165	TR=200	6.90	547.00	0.78	547.78	547.89	-0.11	1.23	548.26	3.15	2.95	0.65	281.31	0.55
B_120	140	TR=200	6.90	545.98	0.88	546.86	546.93	-0.07	1.09	547.29	2.94	2.74	0.71	237.20	0.60
B_120	115	TR=200	6.90	544.53	0.83	545.36	545.57	-0.21	1.54	546.05	3.72	3.53	0.57	410.18	0.50
B_120	95	TR=200	6.90	543.00	0.94	543.94	544.16	-0.22	1.47	544.65	3.96	3.44	0.68	438.18	0.52
B_120	75	TR=200	6.90	542.01	0.68	542.69	542.85	-0.16	1.47	543.24	3.30	3.19	0.50	336.46	0.43
B_120	45	TR=200	6.90	539.30	0.78	540.08	540.30	-0.22	1.54	540.84	3.88	3.87	0.51	460.20	0.62
B_120	37	TR=200	6.90	539.00	1.02	540.02	539.86	0.16	0.76	540.31	2.35	2.35	0.97	136.90	0.98
B_120	27		Bridge												
B_120	15	TR=200	6.90	538.30	0.95	539.25	539.25	0.00	0.99	539.66	2.95	2.79	0.87	222.55	0.82
B_120	10	TR=200	6.90	537.96	0.42	538.38	538.63	-0.25	2.37	539.32	4.44	4.08	0.36	680.43	0.27

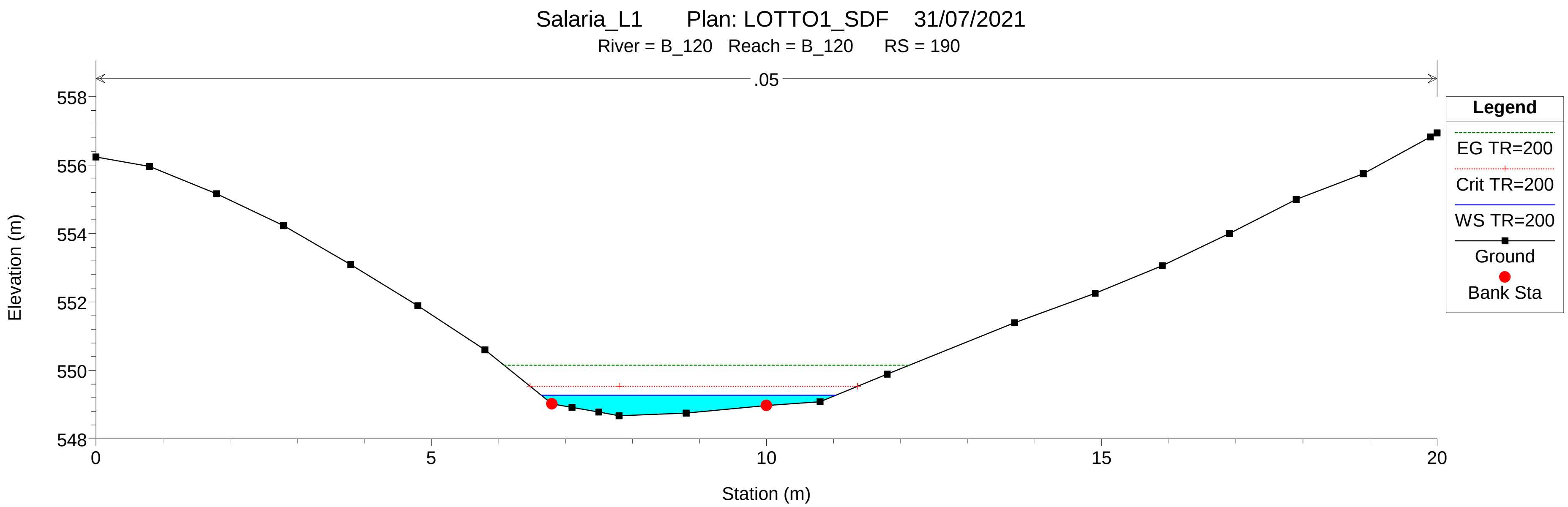

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 330
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

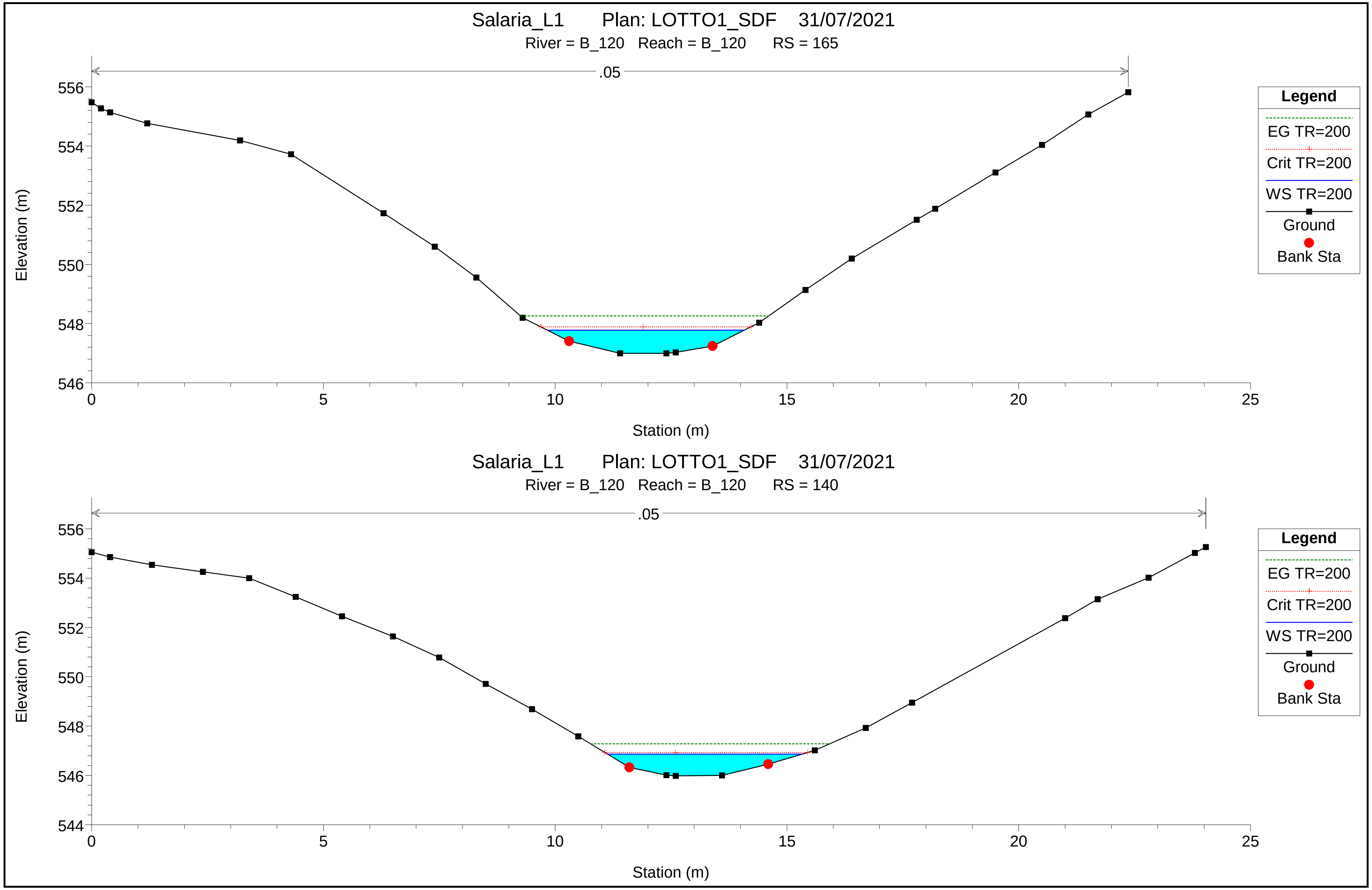

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 300
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

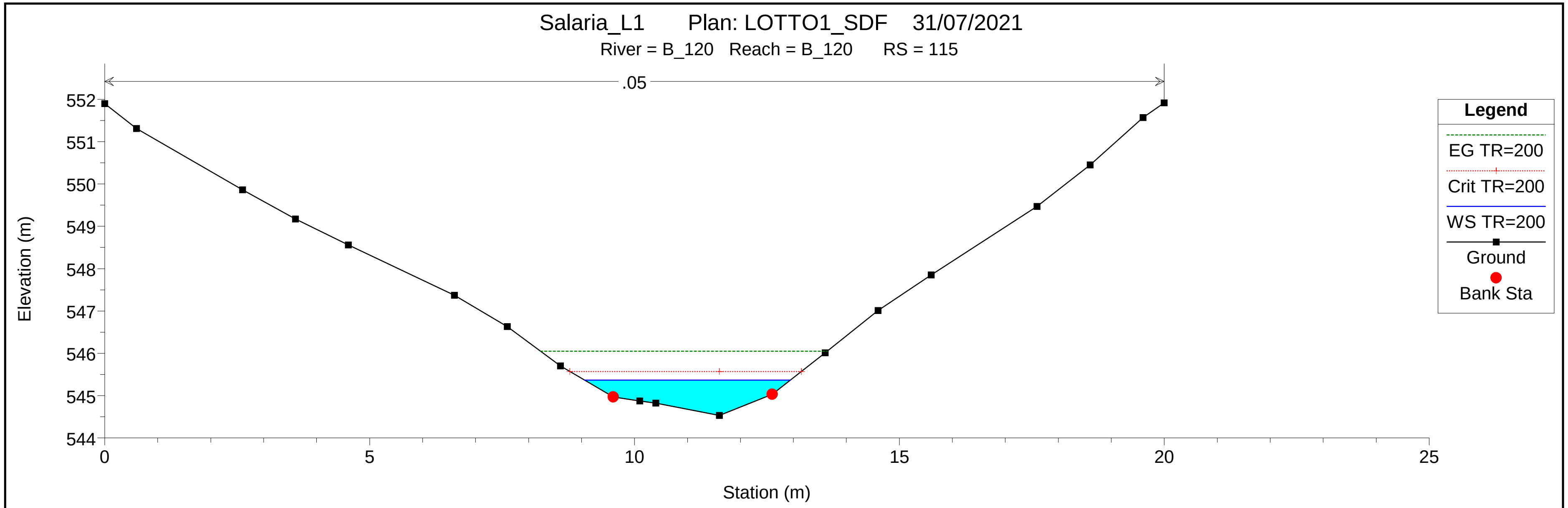

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 270
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
562
561
560
559
558
557
556
555
554
0
5
10
15
20
25
30


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 240
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
559
558
557
556
555
554
553
552
0
5
10
15
20
25

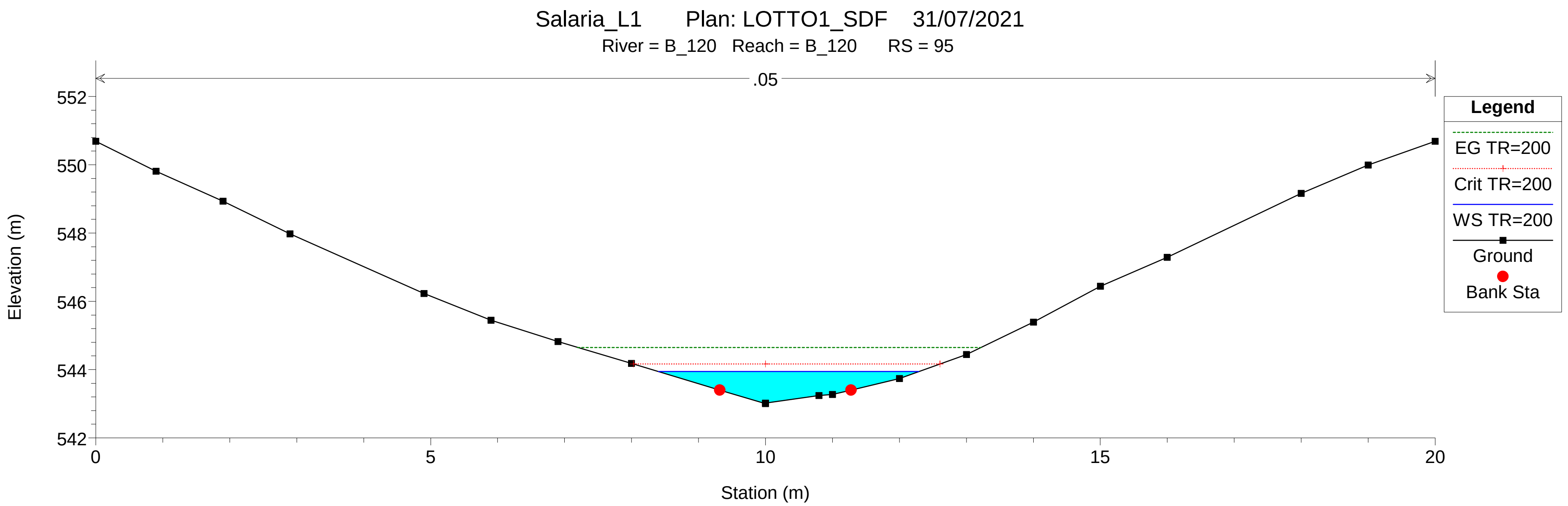

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 215
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 190
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

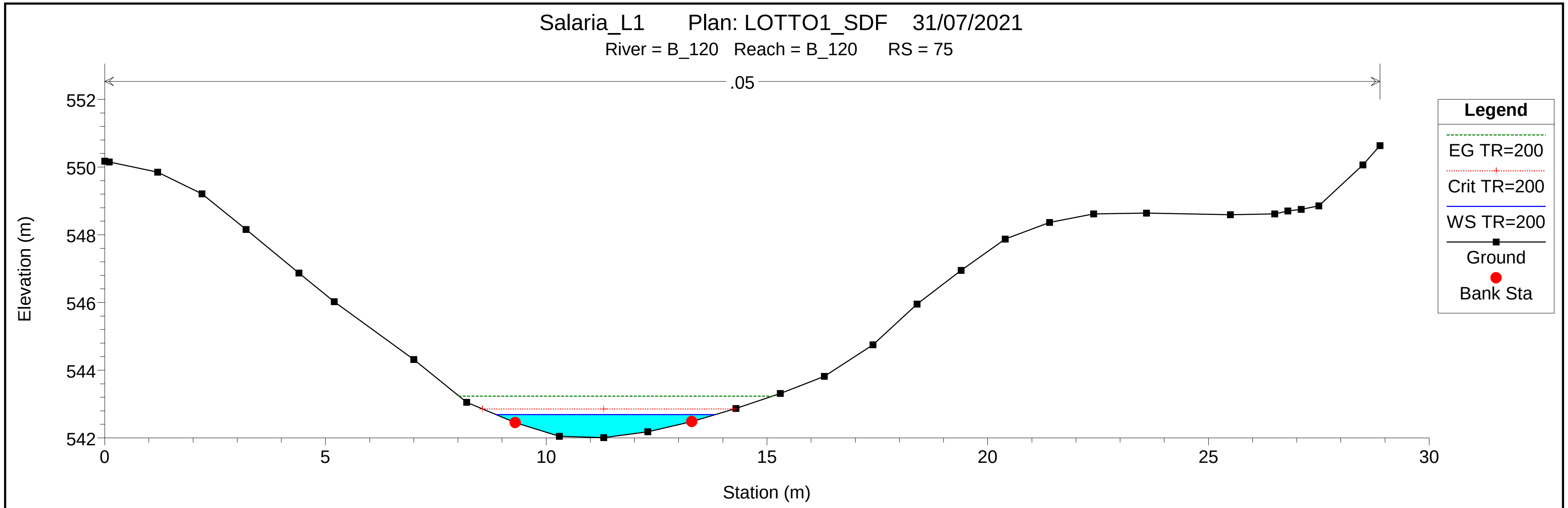

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 165
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 140
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

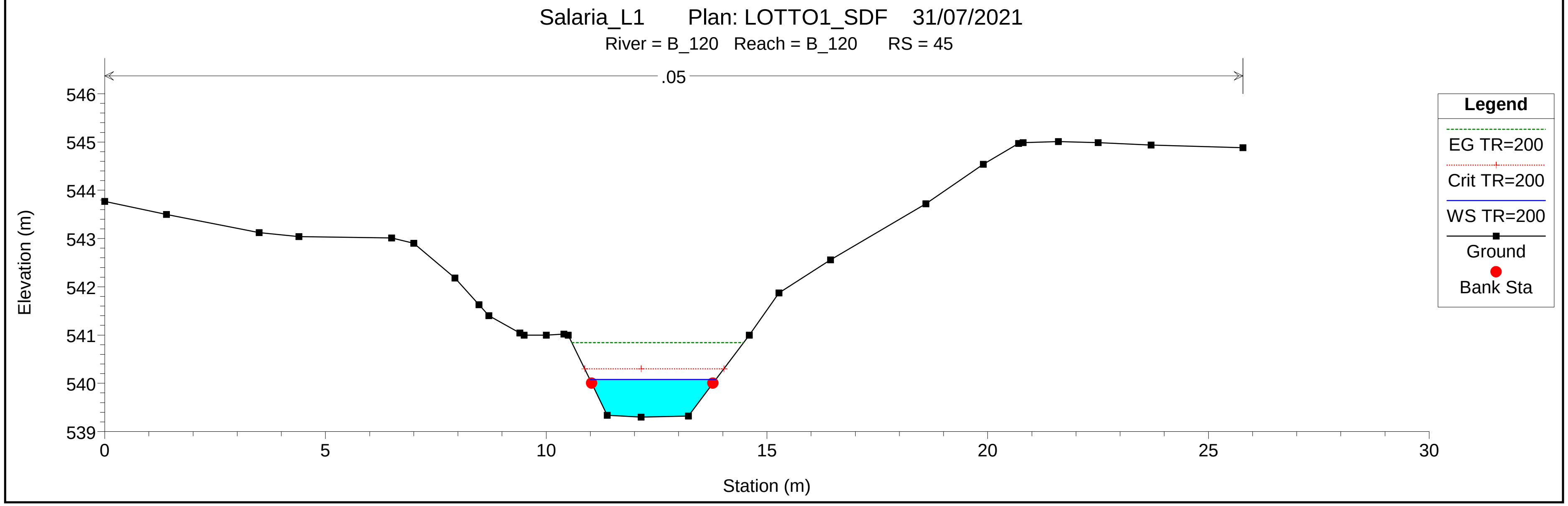


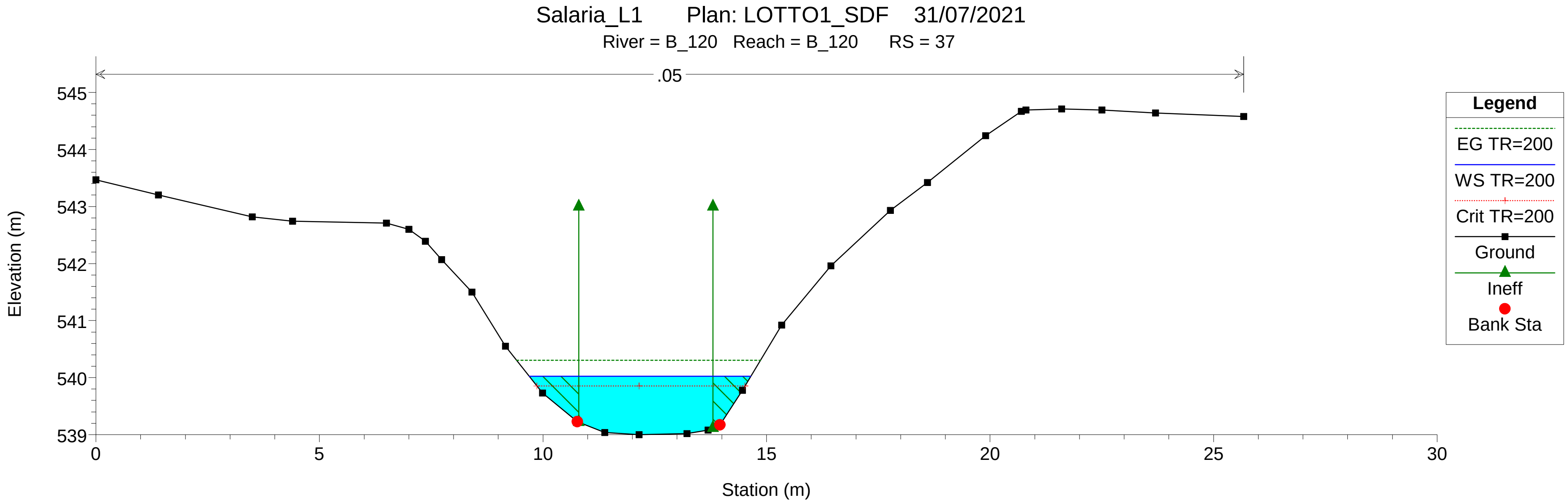
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 115
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



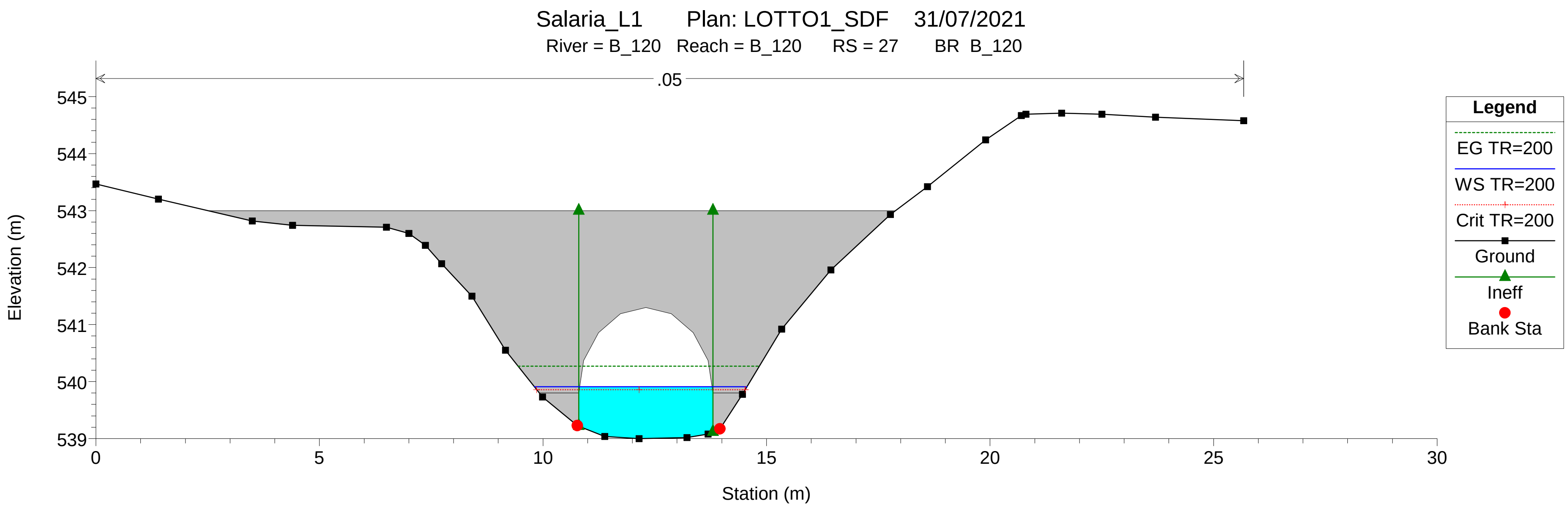
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 95
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 75
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
552
550
548
546
544
542
0
5
10
15
20
25
30

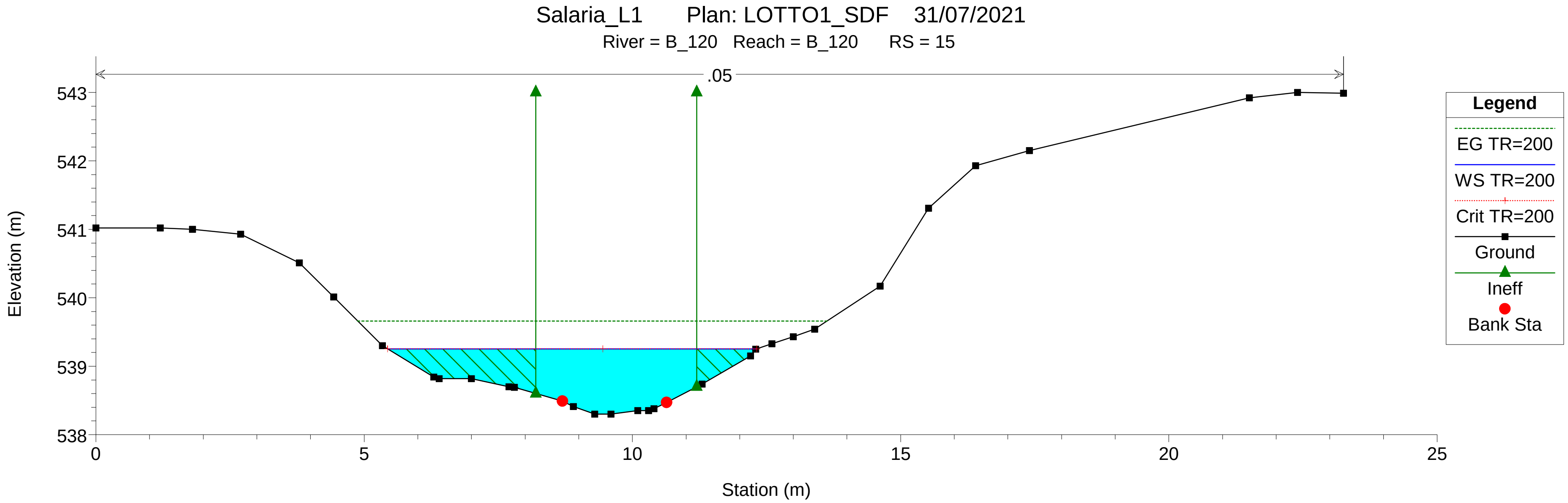

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 45
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
546
545
544
543
542
541
540
539
0
5
10
15
20
25
30



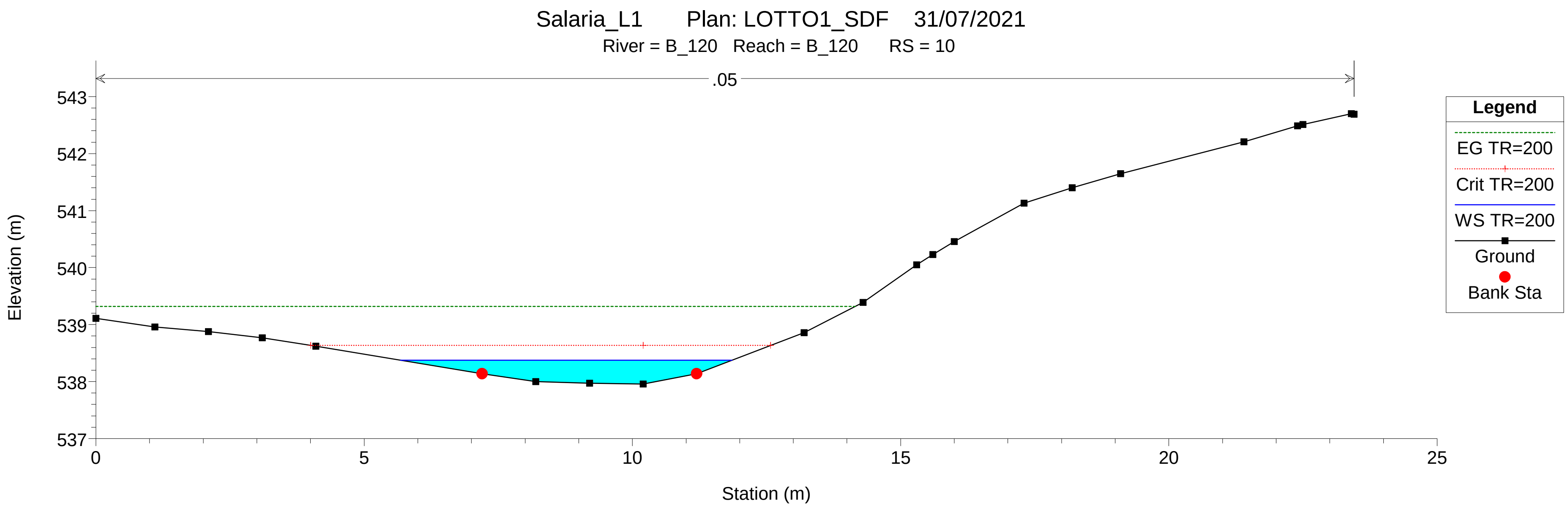
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 37
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 27 BR B_120
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



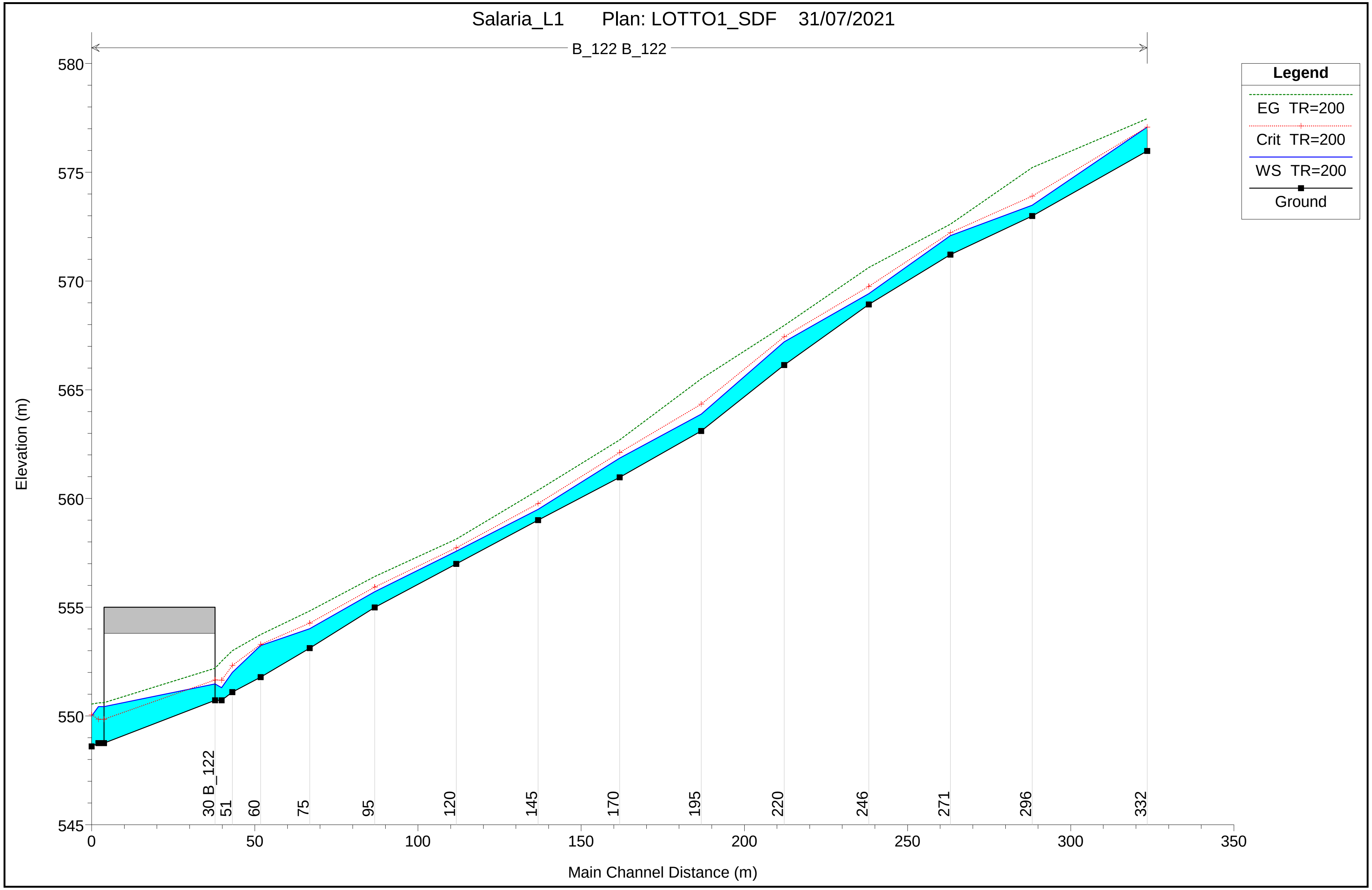
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 15
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 10
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

2.1.8. STATO DI FATTO

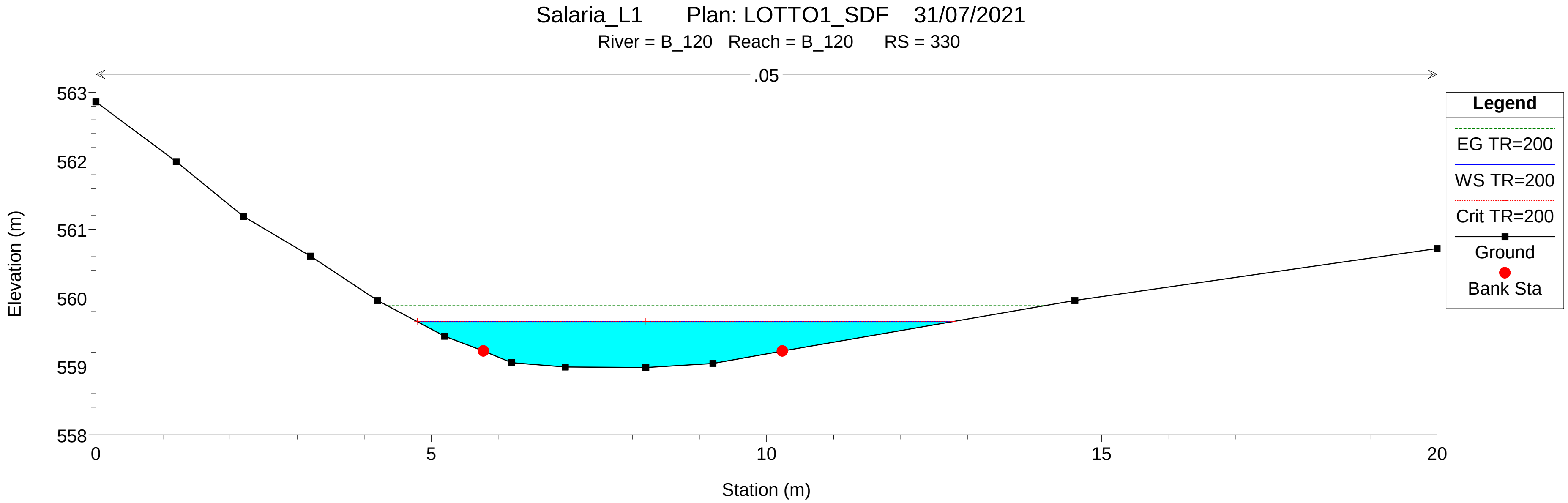
B.122 - Progr.6+386

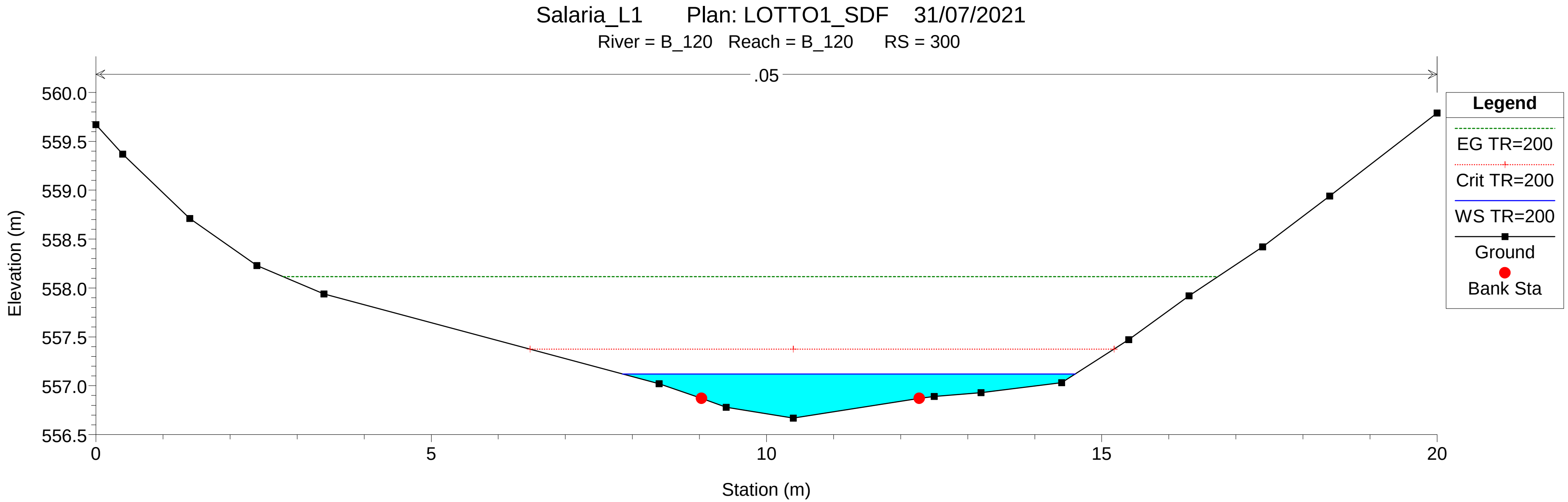


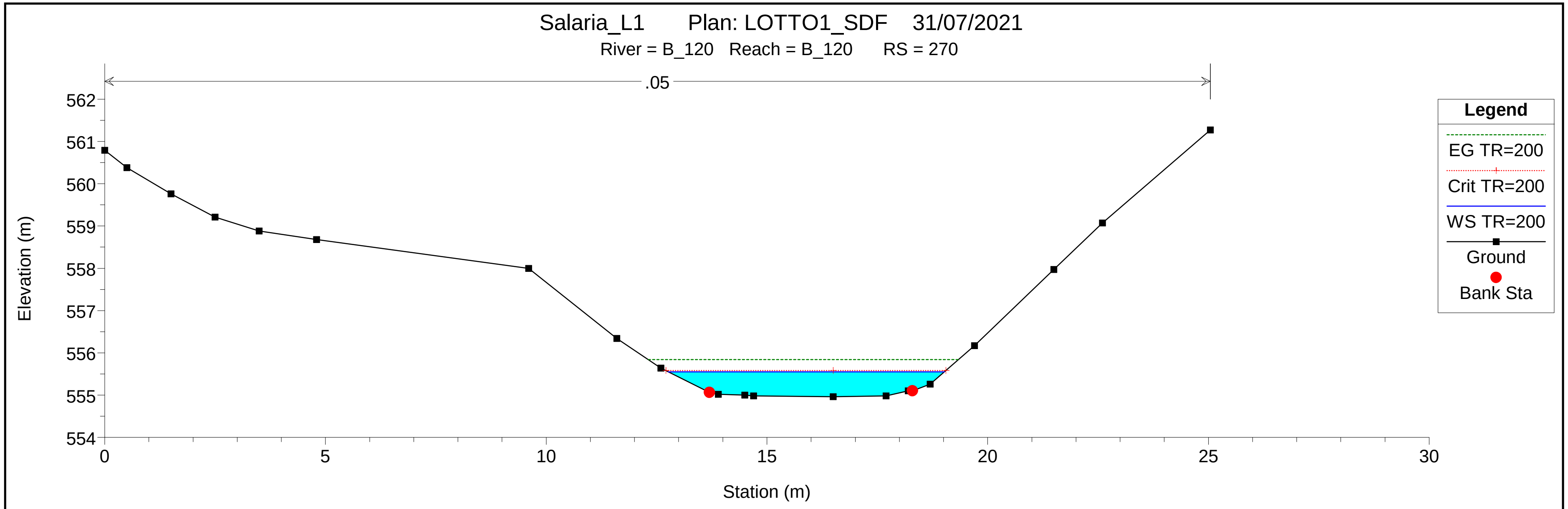
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
B_122 B_122
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
Main Channel Distance (m)
580
575
570
565
560
555
550
545
0
50
100
150
200
250
300
350
30 B_122
51
60
75
95
120
145
170
195
220
246
271
296
332

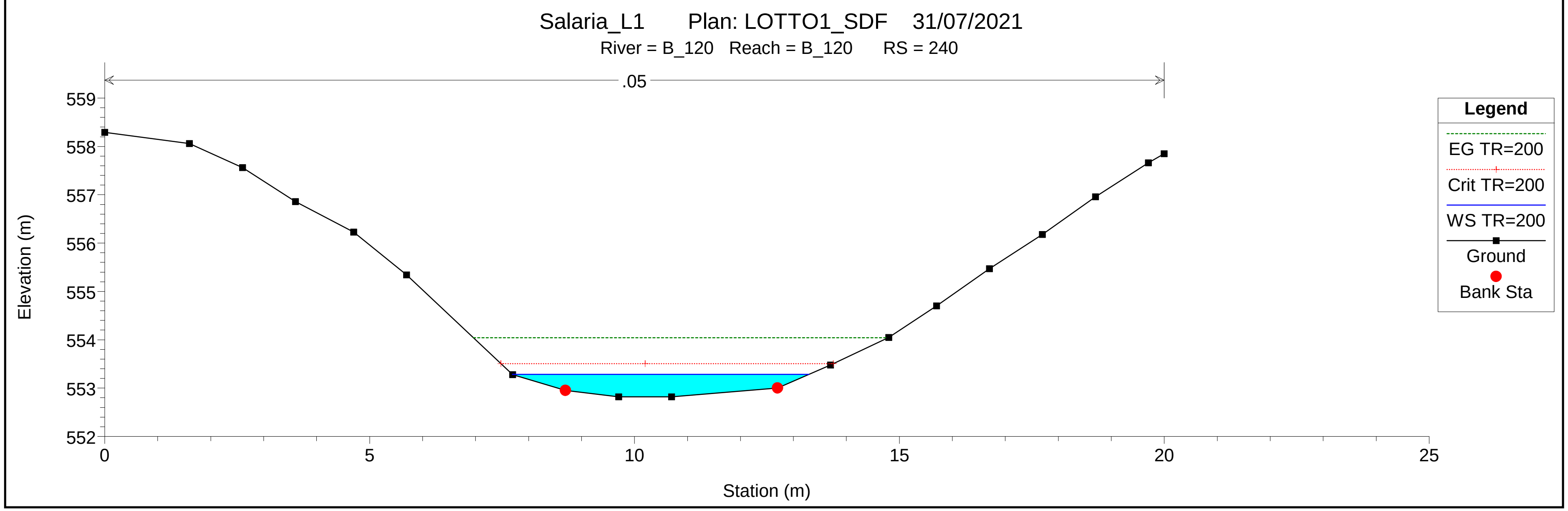
HEC-RAS Plan: L1_SDF River: B_122 Reach: B_122 Profile: TR=200

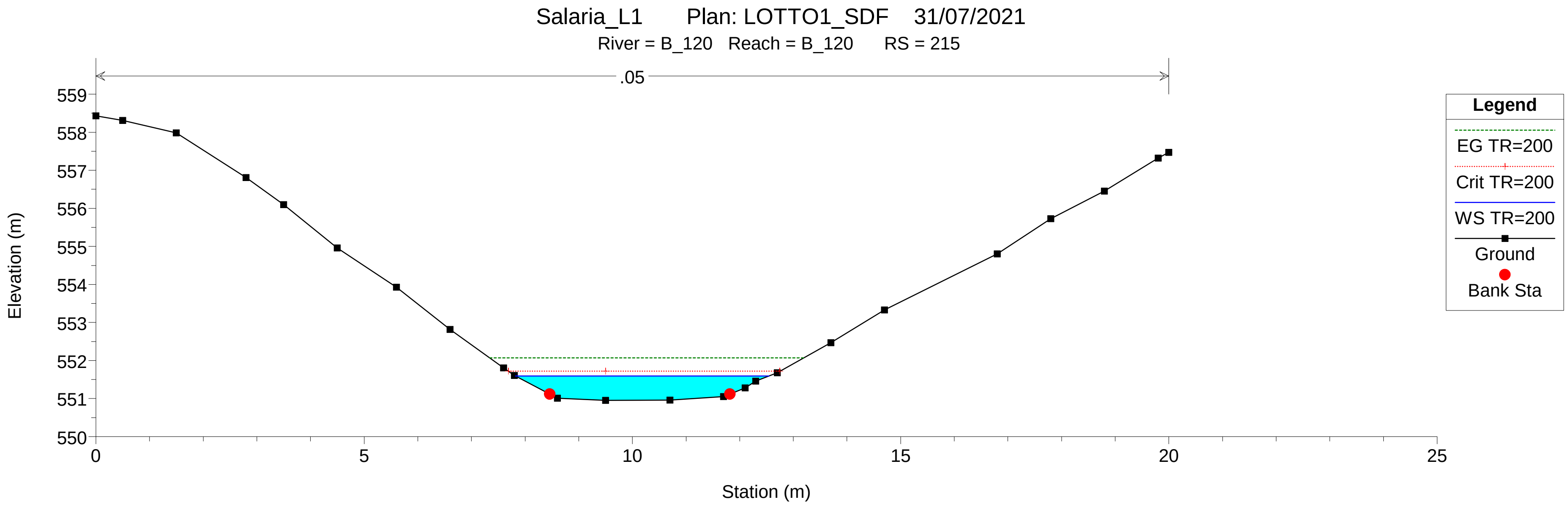
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_122	332	TR=200	7.20	575.98	1.09	577.07	577.07	0.00	0.95	577.46	2.87	2.59	0.87	211.97	0.73
B_122	296	TR=200	7.20	572.99	0.50	573.49	573.90	-0.41	2.96	575.22	5.87	5.71	0.39	1155.07	0.36
B_122	271	TR=200	7.20	571.21	0.87	572.08	572.23	-0.15	1.23	572.61	3.41	2.97	0.75	312.65	0.57
B_122	246	TR=200	7.20	568.92	0.49	569.41	569.75	-0.34	2.37	570.62	4.98	4.69	0.45	794.21	0.40
B_122	220	TR=200	7.20	566.14	1.06	567.20	567.43	-0.23	1.41	567.95	4.05	3.53	0.74	445.28	0.59
B_122	195	TR=200	7.20	563.10	0.78	563.88	564.33	-0.45	2.25	565.51	5.98	5.17	0.66	1005.59	0.51
B_122	170	TR=200	7.20	560.97	0.89	561.86	562.12	-0.26	1.56	562.69	4.20	3.79	0.69	489.60	0.57
B_122	145	TR=200	7.20	559.00	0.50	559.50	559.76	-0.26	1.97	560.38	4.29	4.01	0.49	575.17	0.42
B_122	120	TR=200	7.20	556.99	0.58	557.57	557.73	-0.16	1.44	558.13	3.38	3.19	0.54	343.14	0.48
B_122	95	TR=200	7.20	554.99	0.72	555.71	555.93	-0.22	1.55	556.41	3.87	3.49	0.61	433.19	0.48
B_122	75	TR=200	7.20	553.12	0.89	554.01	554.27	-0.26	1.60	554.83	4.05	3.92	0.58	482.28	0.55
B_122	60	TR=200	7.20	551.79	1.45	553.24	553.29	-0.05	1.09	553.75	3.16	3.16	0.57	295.36	0.86
B_122	51	TR=200	7.20	551.10	0.90	552.01	552.32	-0.31	1.82	553.00	4.43	4.43	0.48	613.89	0.60
B_122	48	TR=200	7.20	550.72	0.58	551.30	551.65	-0.35	2.21	552.52	4.96	4.83	0.51	756.19	0.50
B_122	30		Bridge												
B_122	10	TR=200	7.20	548.75	1.68	550.43	549.85	0.58	0.49	550.60	1.95	1.67	1.58	79.92	1.43
B_122	8	TR=200	7.20	548.60	1.41	550.01	550.05	-0.04	1.07	550.55	3.27	3.27	0.56	316.72	0.95


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 330
.05
Elevation (m)
563
562
561
560
559
558
0
5
10
15
20
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

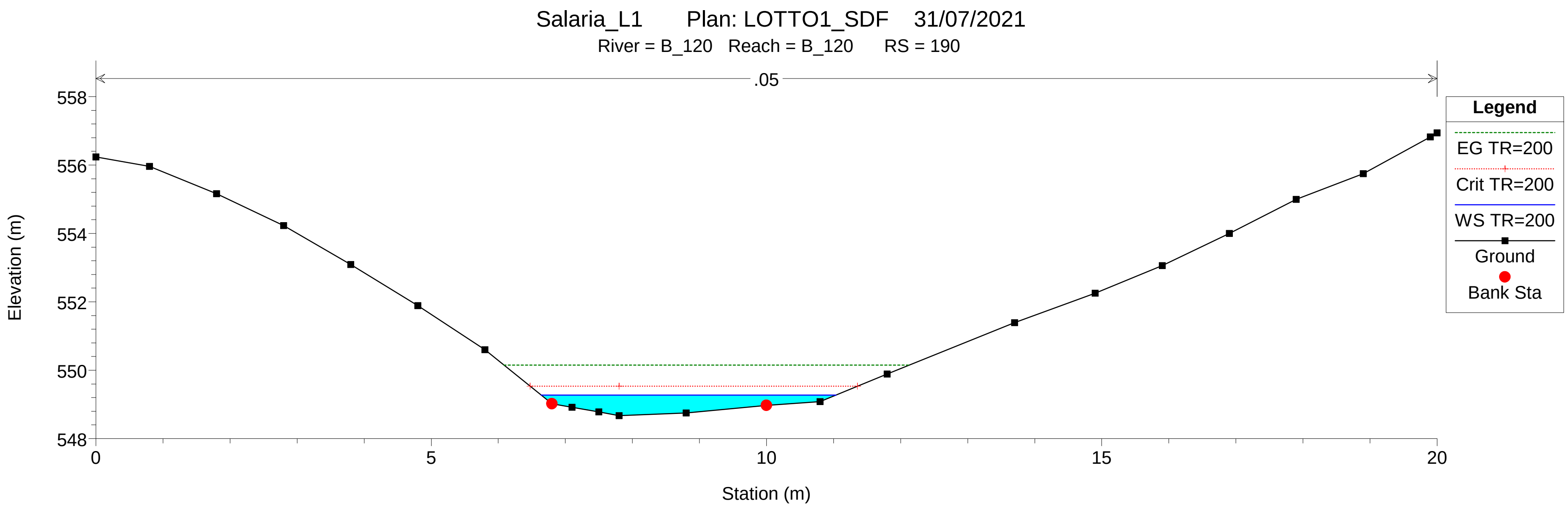

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 300
.05
Elevation (m)
560.0
559.5
559.0
558.5
558.0
557.5
557.0
556.5
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 270
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

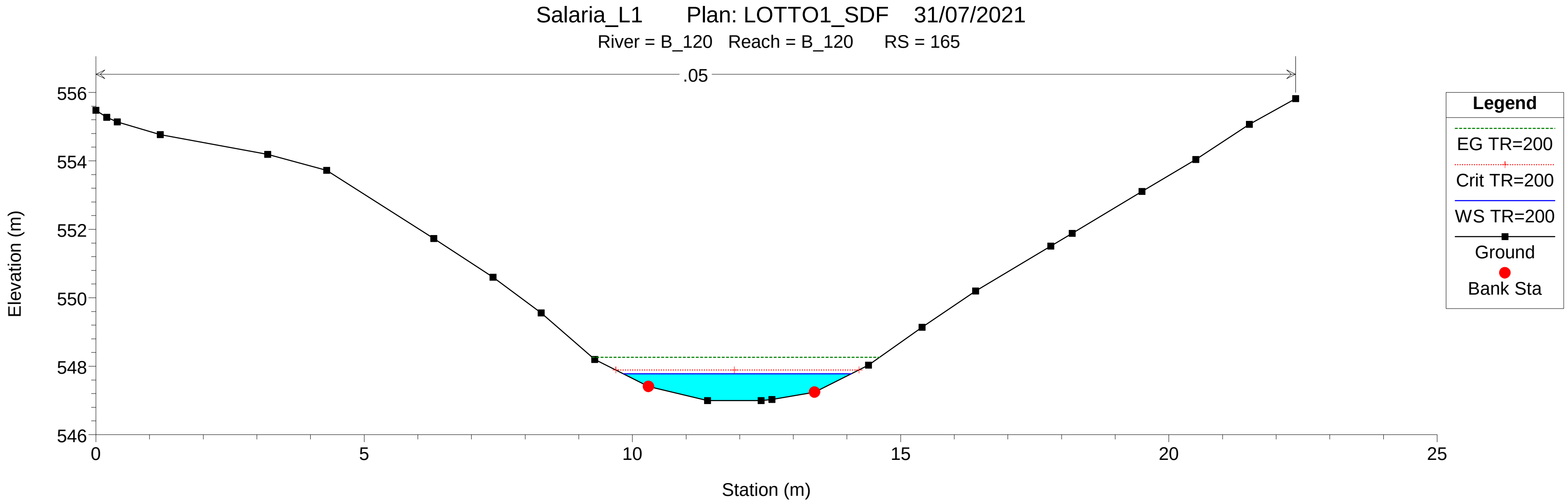

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 240
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



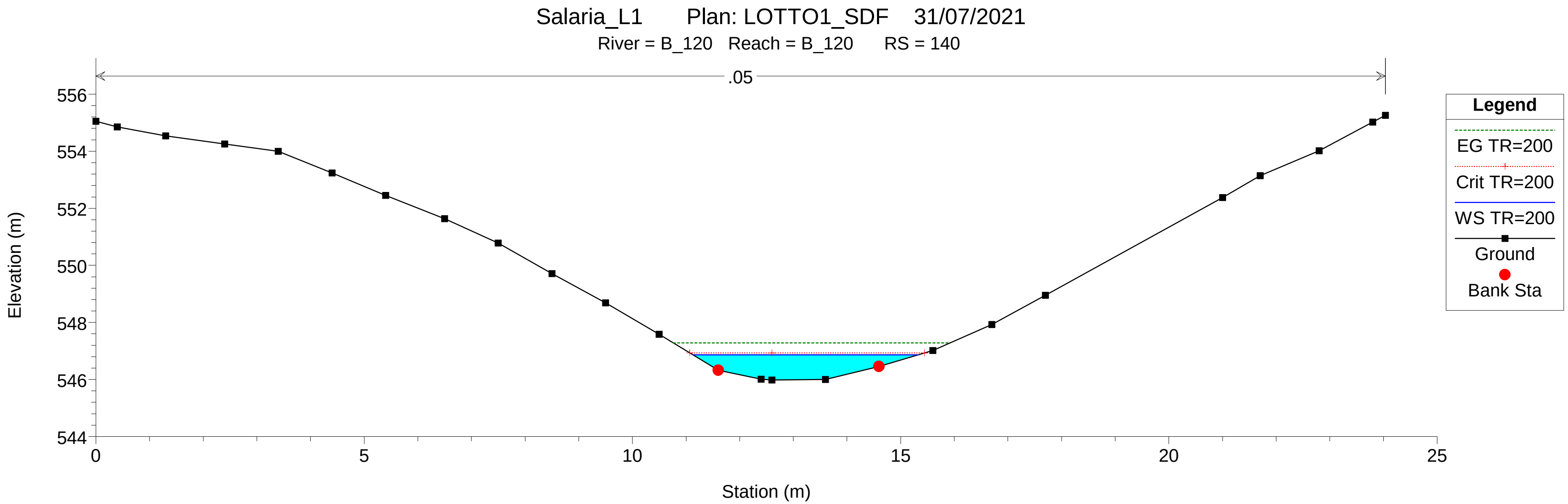
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 215
.05
Elevation (m)
559
558
557
556
555
554
553
552
551
550
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



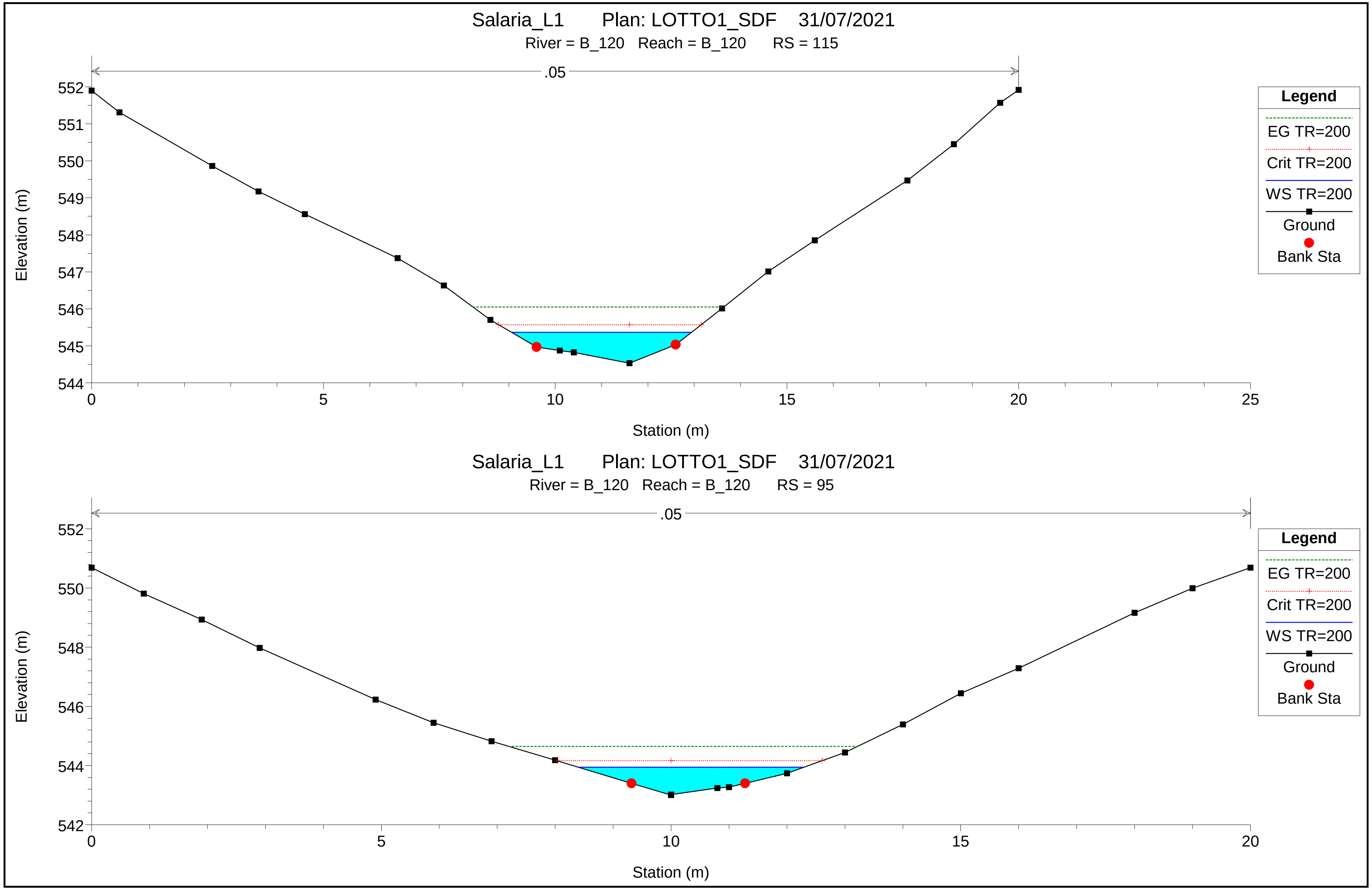
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 190
.05
Elevation (m)
558
556
554
552
550
548
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

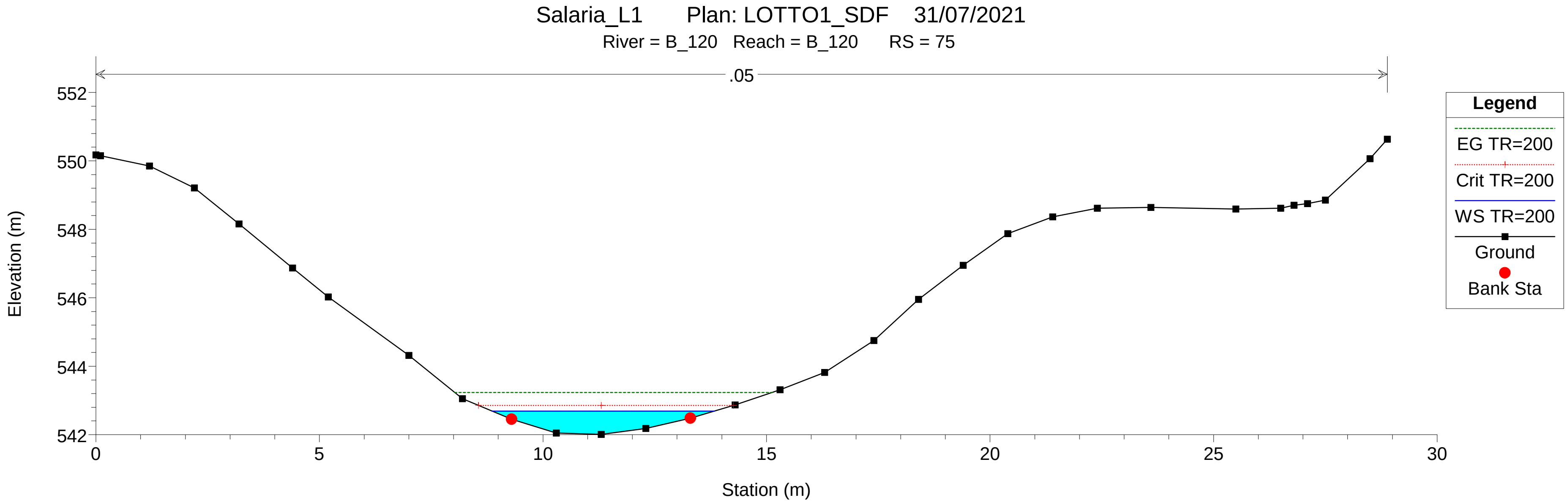


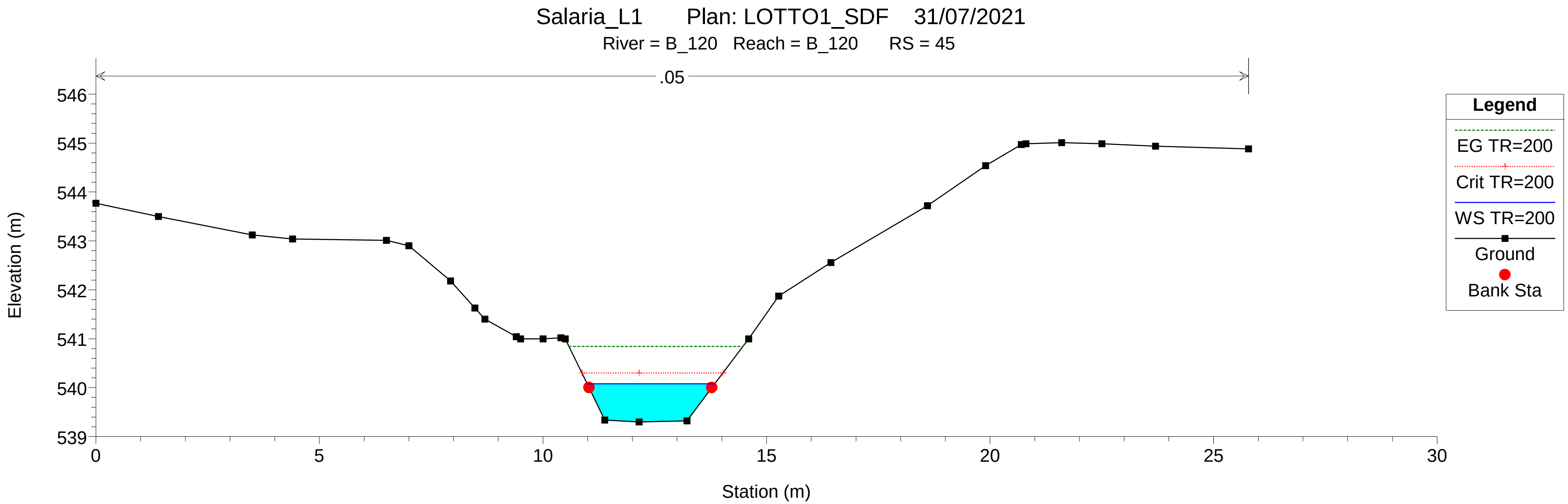
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 165
.05
Elevation (m)
556
554
552
550
548
546
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

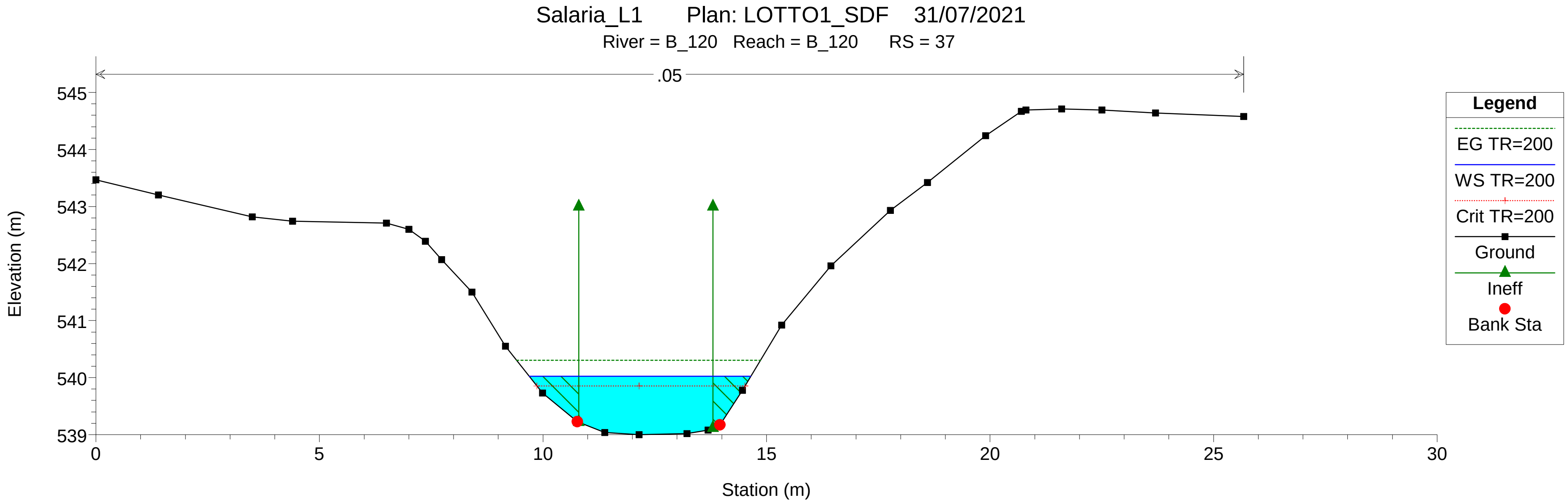


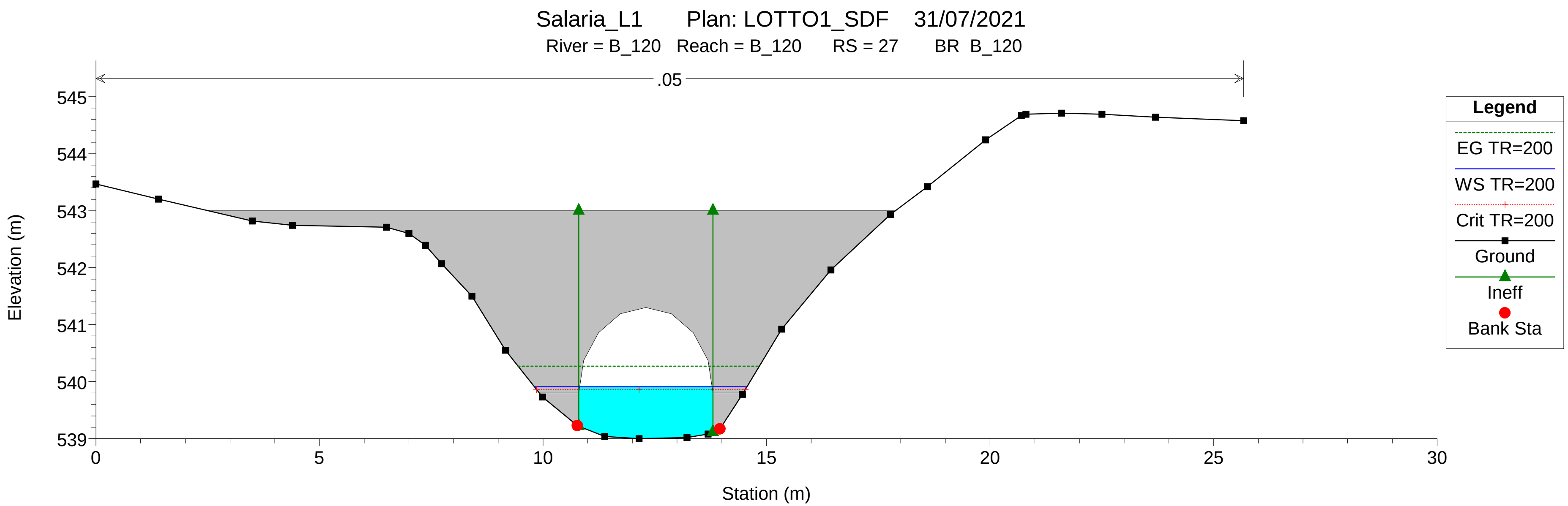
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 140
.05
Elevation (m)
556
554
552
550
548
546
544
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

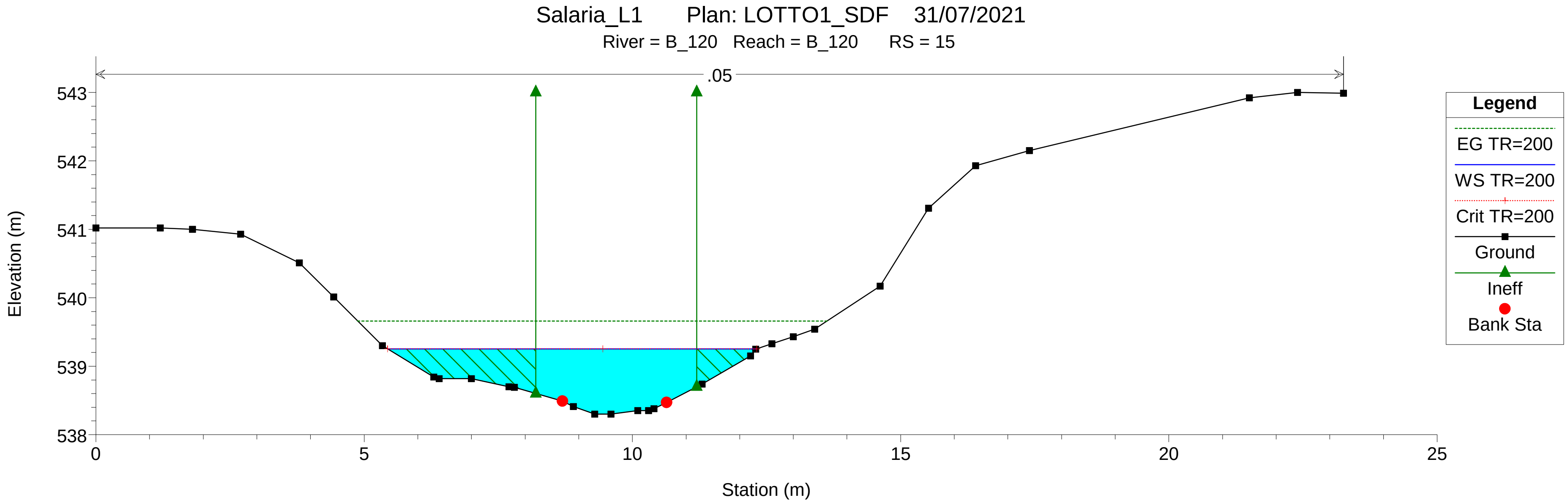

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 115
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
552
551
550
549
548
547
546
545
544
0
5
10
15
20
25
Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 95
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
552
550
548
546
544
542
0
5
10
15
20

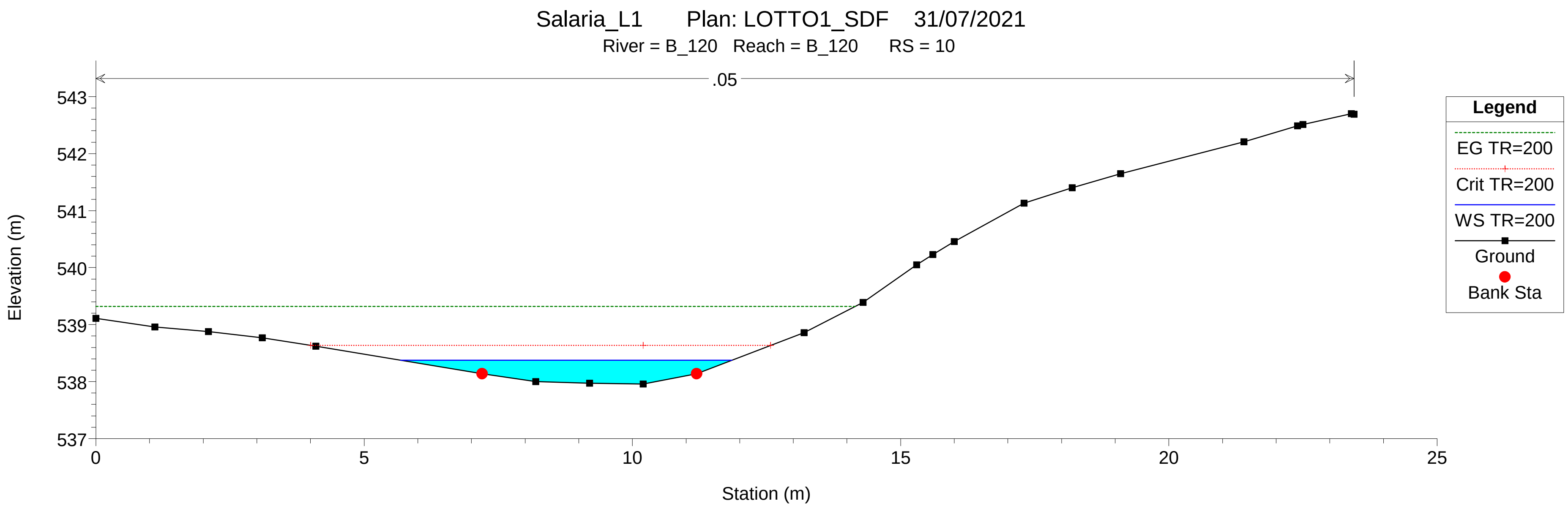

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 75
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 45
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 37
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

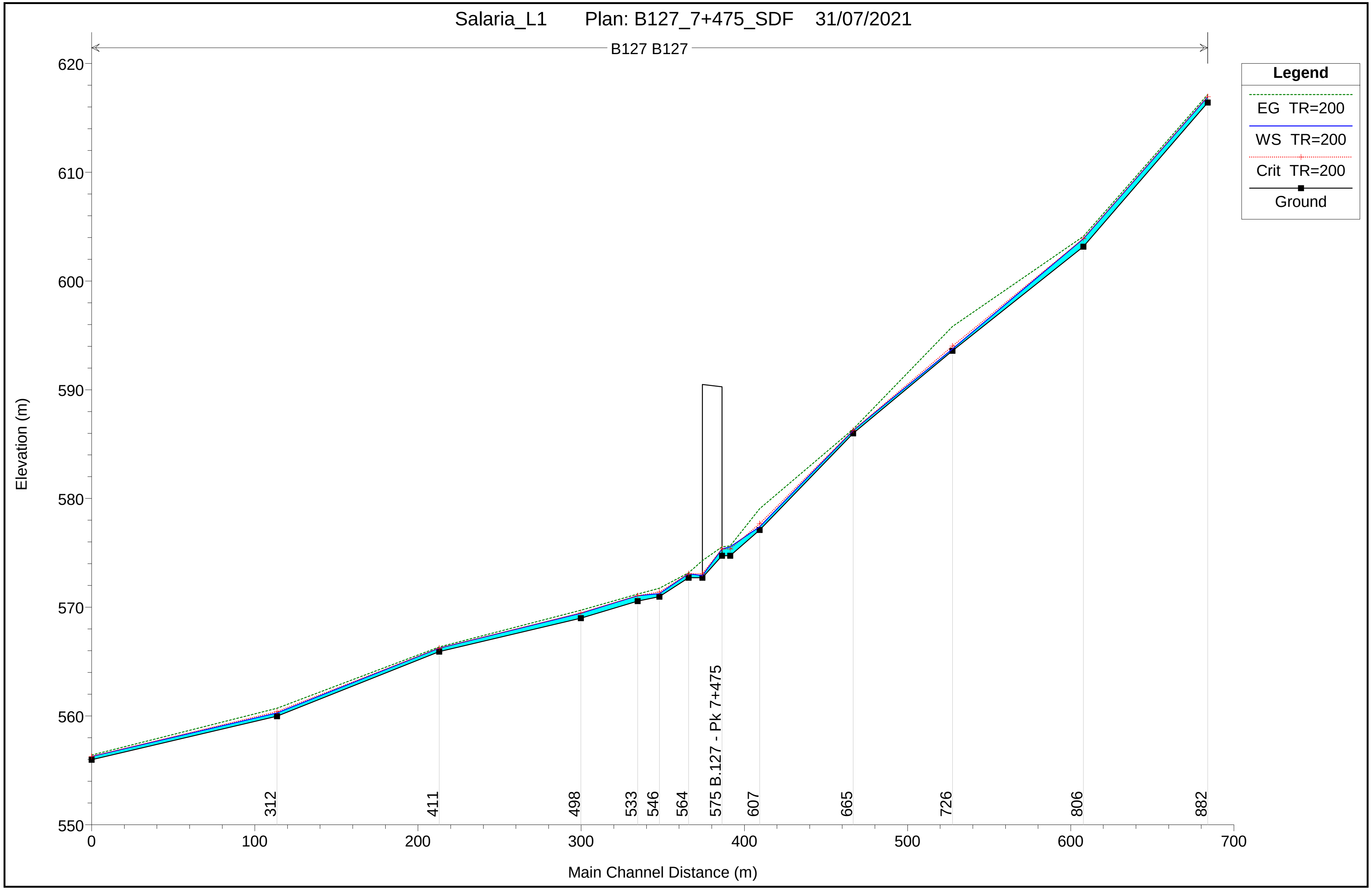

Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 27 BR B_120
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 15
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_SDF 31/07/2021
River = B_120 Reach = B_120 RS = 10
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

2.1.9. STATO DI FATTO

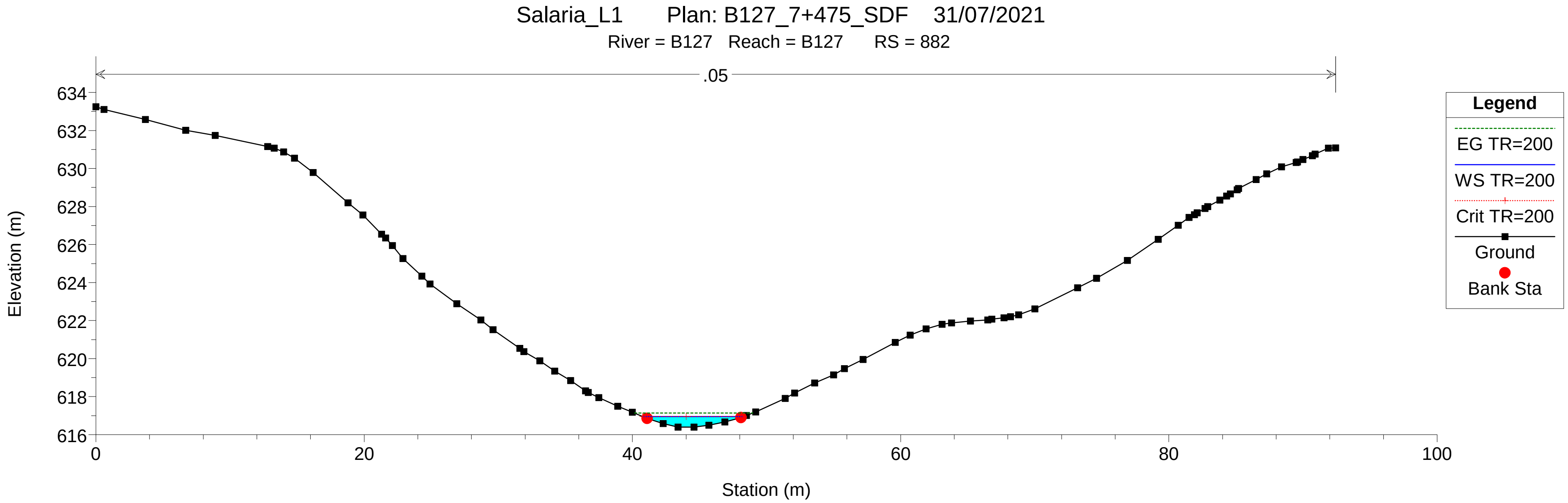
B.127 - Progr.7+475

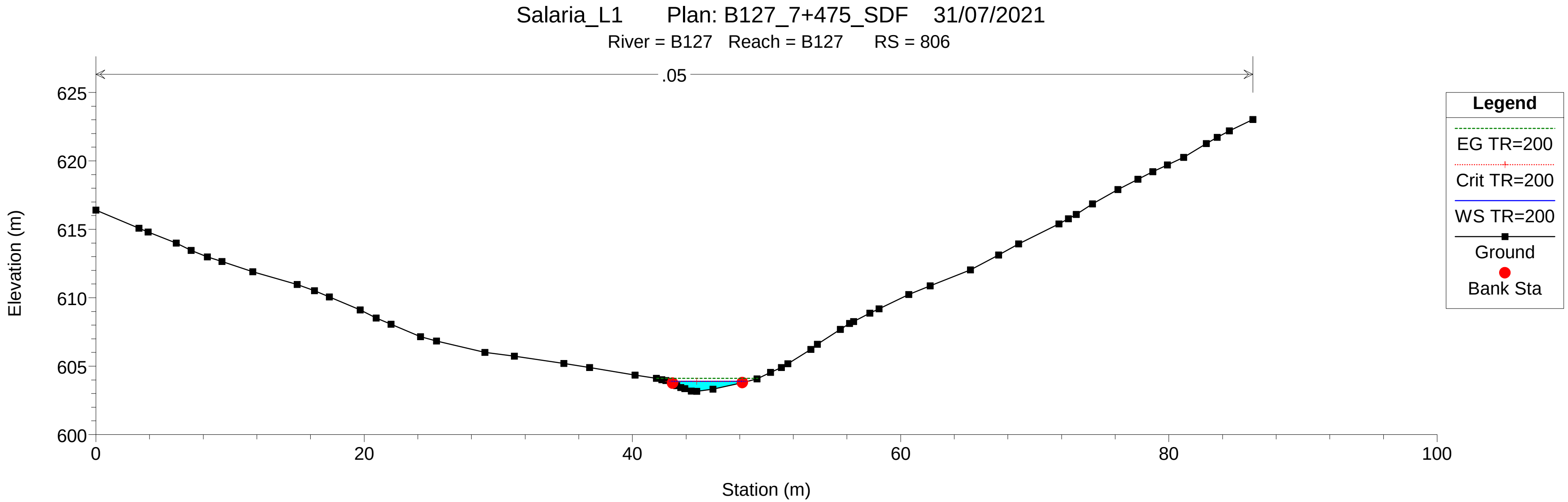


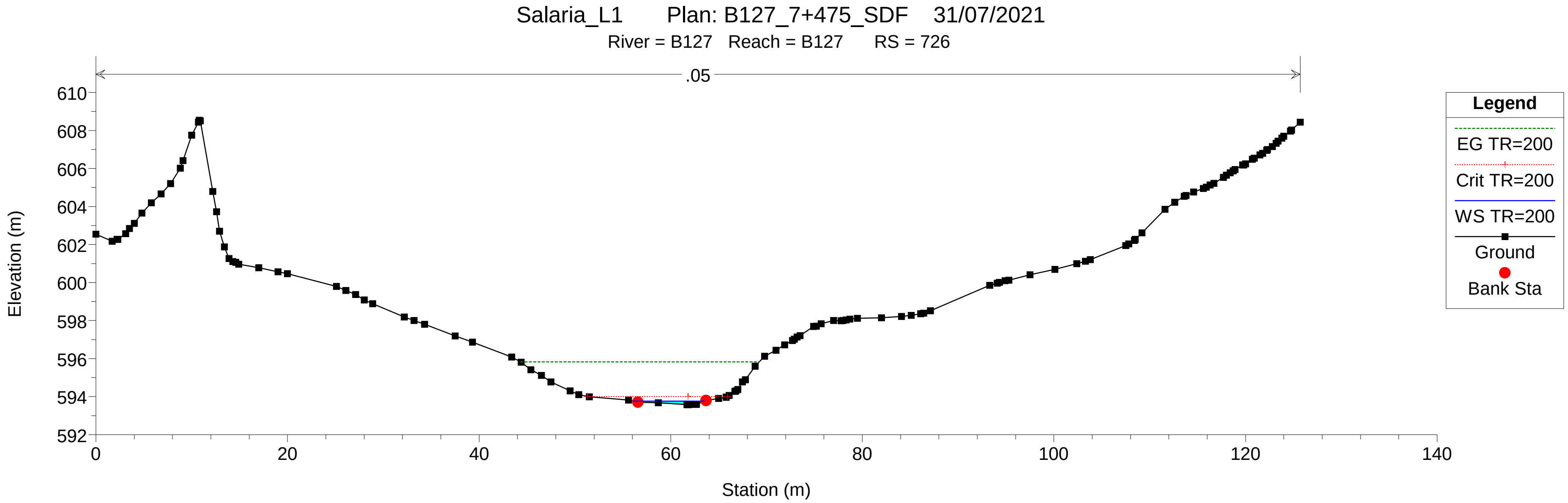
Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
B127 B127
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Elevation (m)
620
610
600
590
580
570
560
550
Main Channel Distance (m)
0
100
200
300
400
500
600
700
312
411
498
533
546
564
575 B.127 - Pk 7+475
607
665
726
806
882

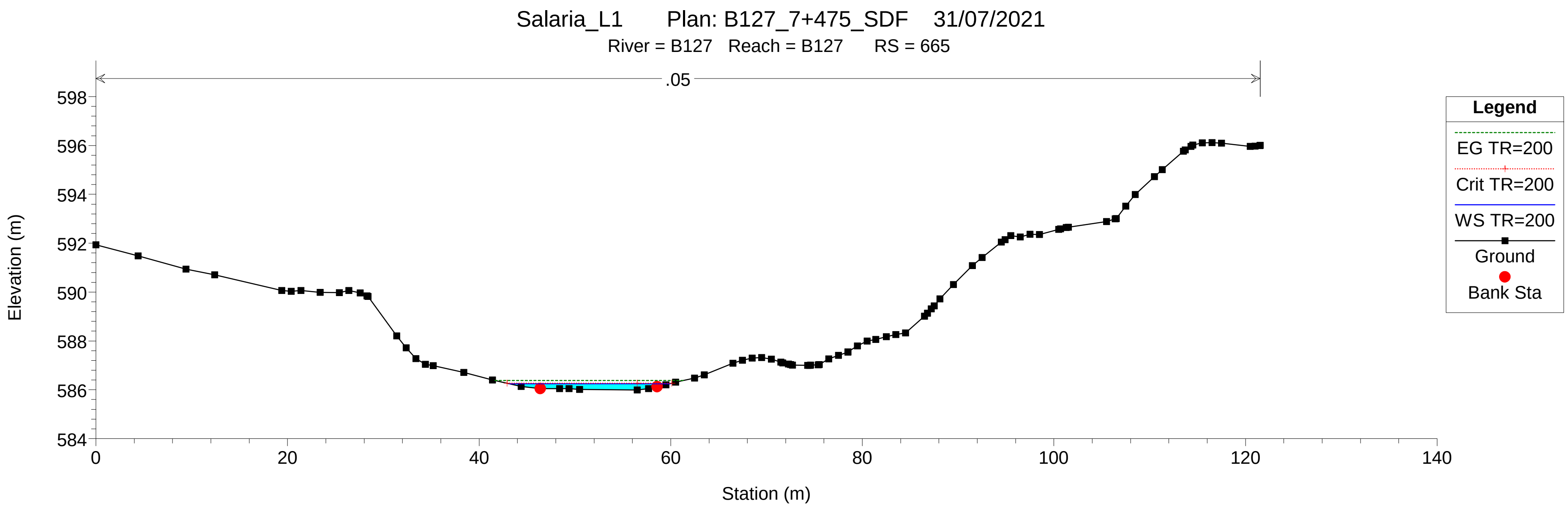
HEC-RAS Plan: B127_7+475_SDF River: B127 Reach: B127 Profile: TR=200

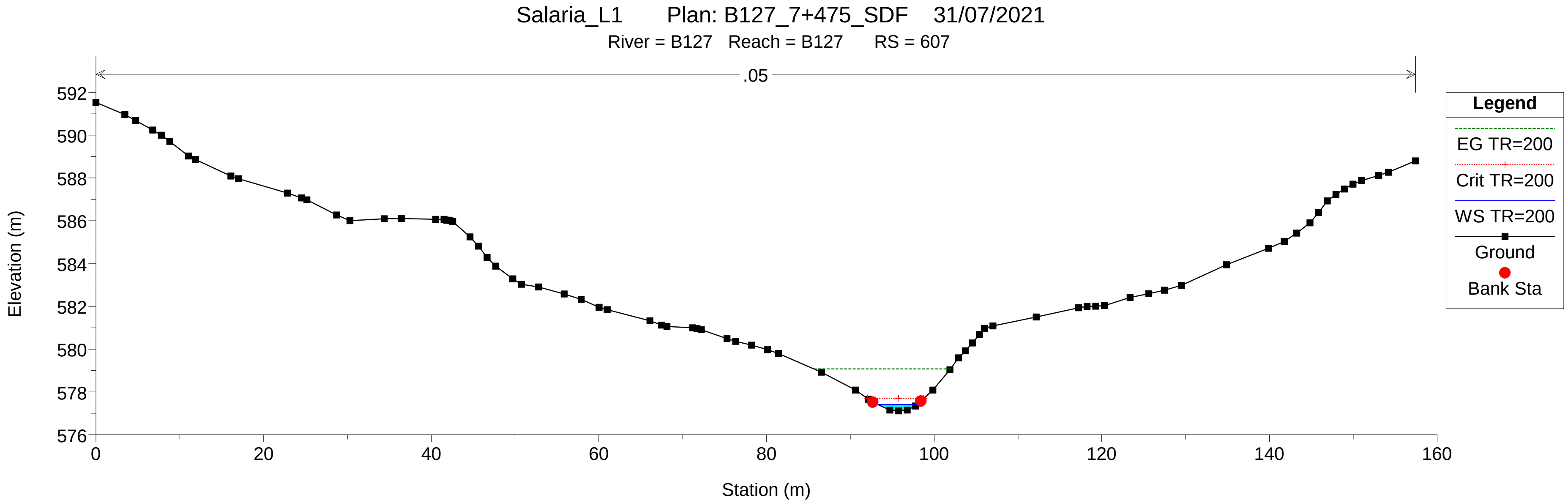
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B127	882	TR=200	5.00	616.40	0.55	616.95	616.95	0.00	1.00	617.13	1.91	1.89	0.37	124.05	0.35
B127	806	TR=200	5.00	603.16	0.72	603.88	603.88	0.00	0.99	604.11	2.09	2.07	0.44	140.39	0.41
B127	726	TR=200	5.00	593.58	0.18	593.76	594.01	-0.25	6.07	595.83	6.38	6.32	0.11	2069.49	0.11
B127	665	TR=200	5.00	585.99	0.26	586.25	586.27	-0.02	1.10	586.38	1.64	1.55	0.23	108.90	0.19
B127	607	TR=200	5.00	577.11	0.29	577.40	577.69	-0.29	4.20	579.07	5.73	5.73	0.19	1404.64	0.19
B127	589	TR=200	5.00	574.74	0.82	575.56	575.36	0.20	0.52	575.64	1.27	1.19	0.59	47.08	0.47
B127	575		Bridge												
B127	564	TR=200	5.00	572.71	0.37	573.08	573.08	0.00	0.99	573.18	1.41	1.41	0.21	82.49	0.20
B127	546	TR=200	5.00	570.97	0.28	571.25	571.39	-0.14	2.21	571.74	3.11	3.10	0.20	404.31	0.20
B127	533	TR=200	5.00	570.57	0.48	571.05	571.05	0.00	0.99	571.20	1.73	1.72	0.31	108.56	0.30
B127	498	TR=200	5.00	568.99	0.45	569.44	569.50	-0.06	1.21	569.72	2.37	2.29	0.38	189.86	0.36
B127	411	TR=200	5.00	565.92	0.31	566.23	566.23	0.00	0.96	566.35	1.55	1.48	0.27	91.13	0.23
B127	312	TR=200	5.00	559.98	0.31	560.29	560.42	-0.13	1.70	560.70	2.90	2.76	0.30	308.69	0.25
B127	198	TR=200	5.00	555.98	0.30	556.28	556.28	0.00	0.96	556.41	1.59	1.54	0.28	95.28	0.25


Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 882
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

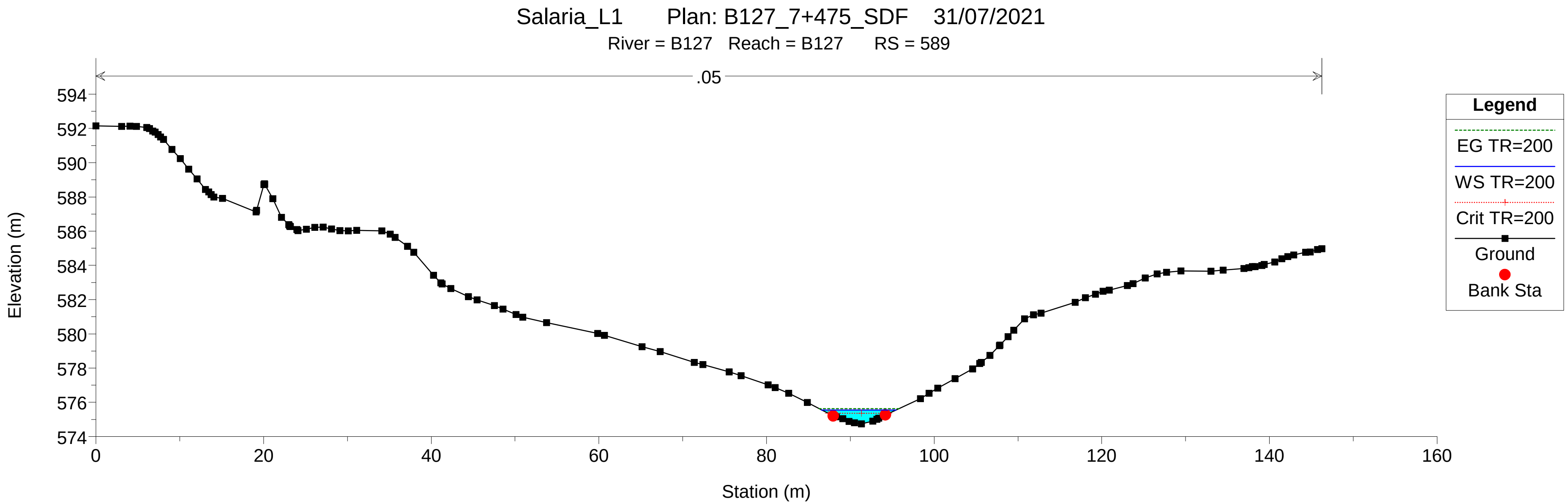

Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 806
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 726
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

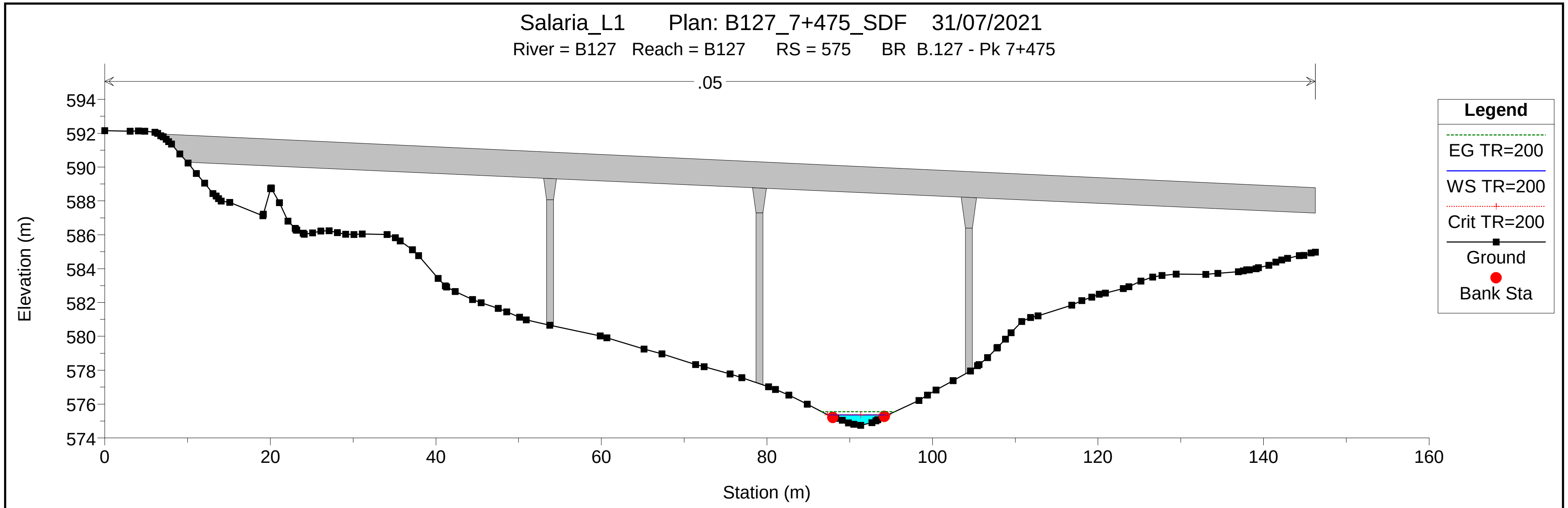

Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 665
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

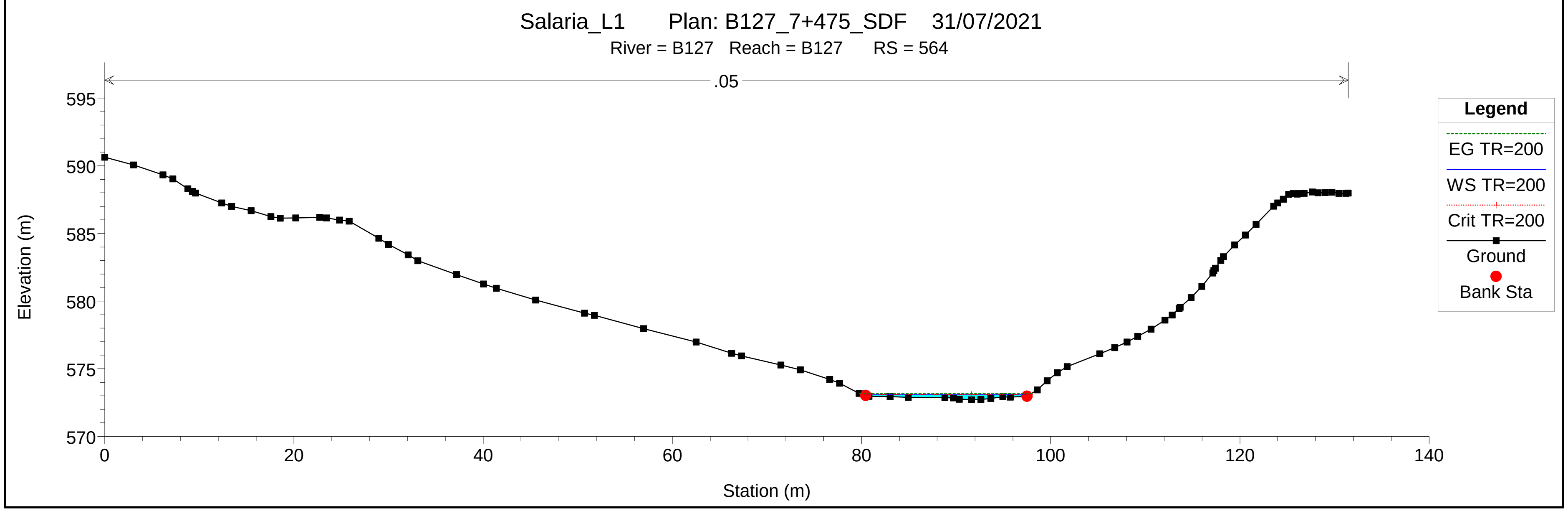


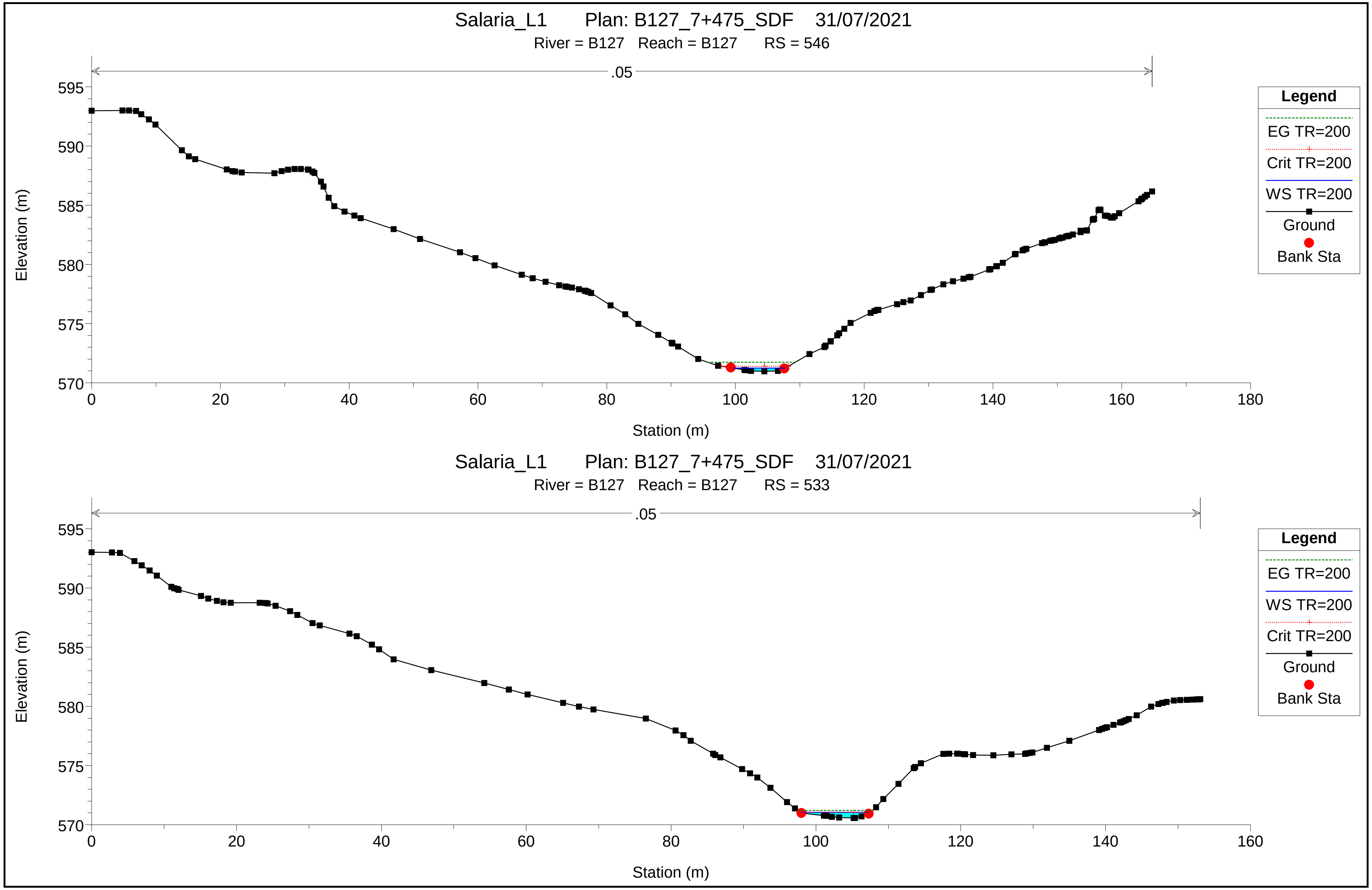
Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 607
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

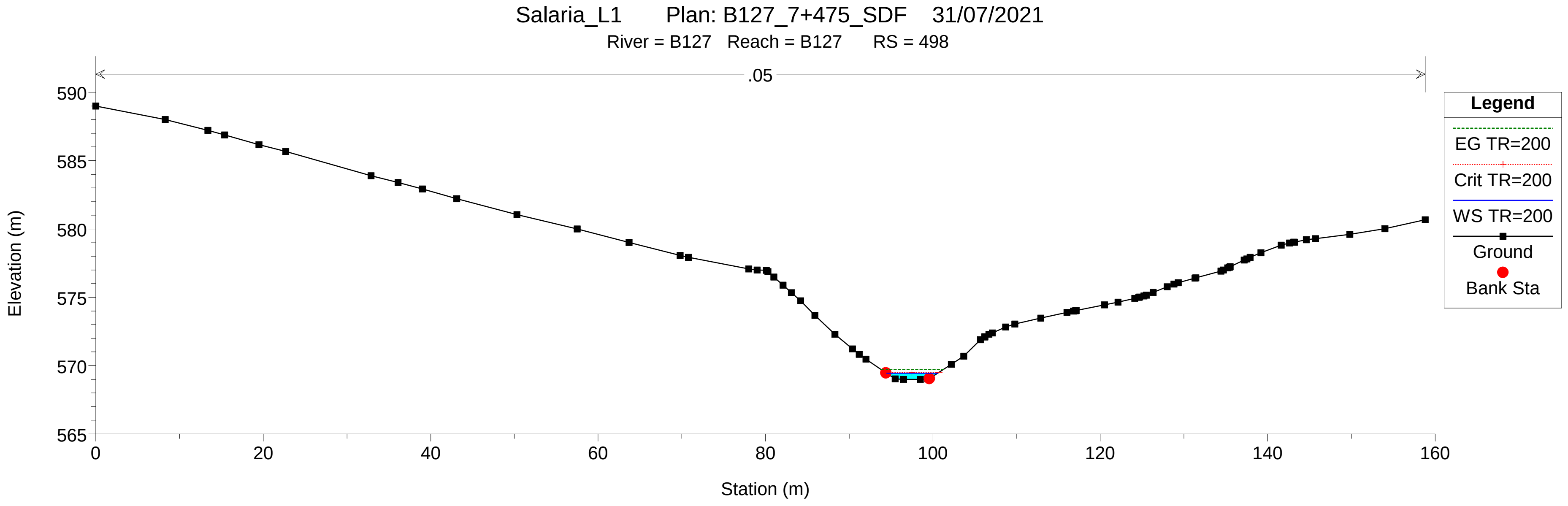


Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 589
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

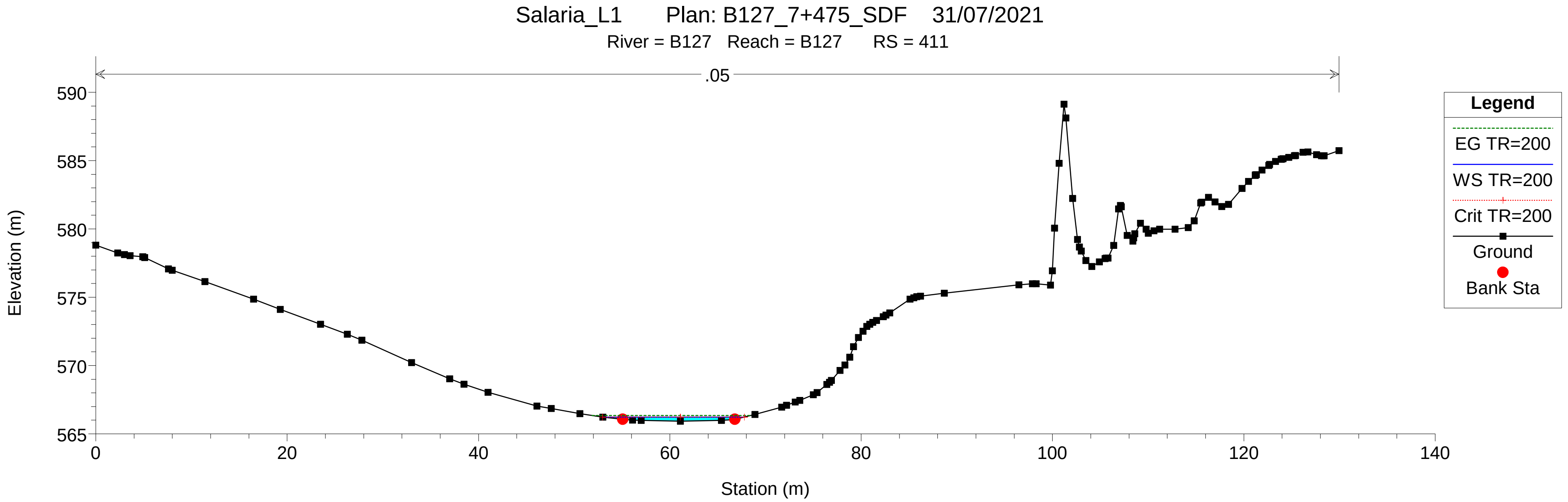

Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 575 BR B.127 - Pk 7+475
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 564
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

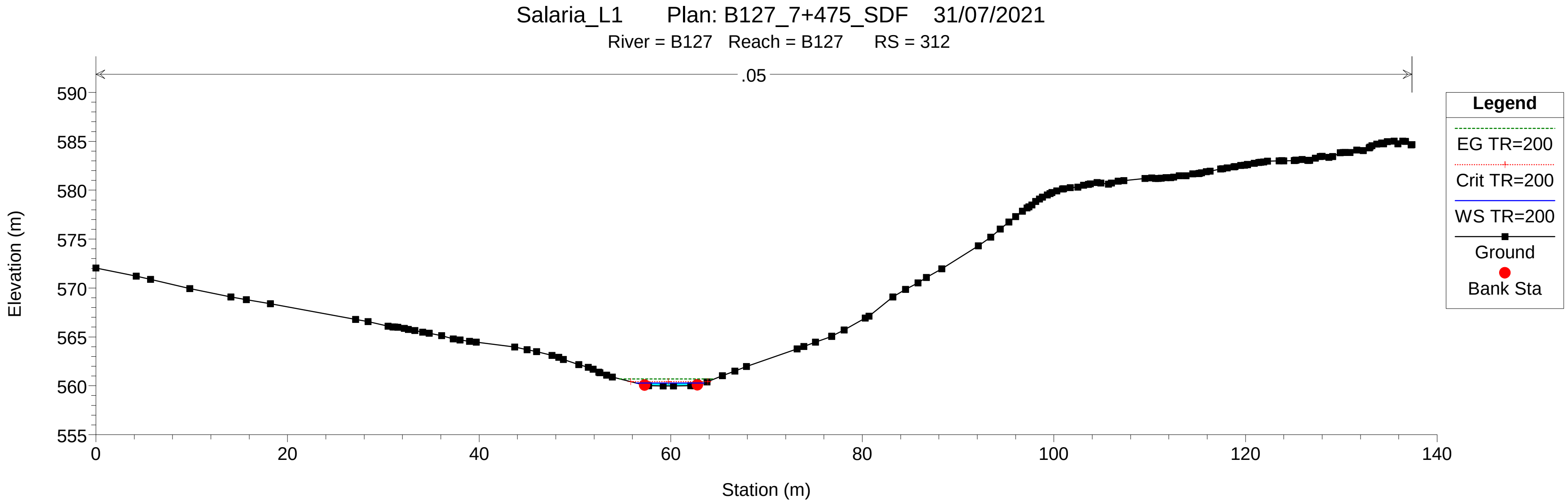

Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 546
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 533
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

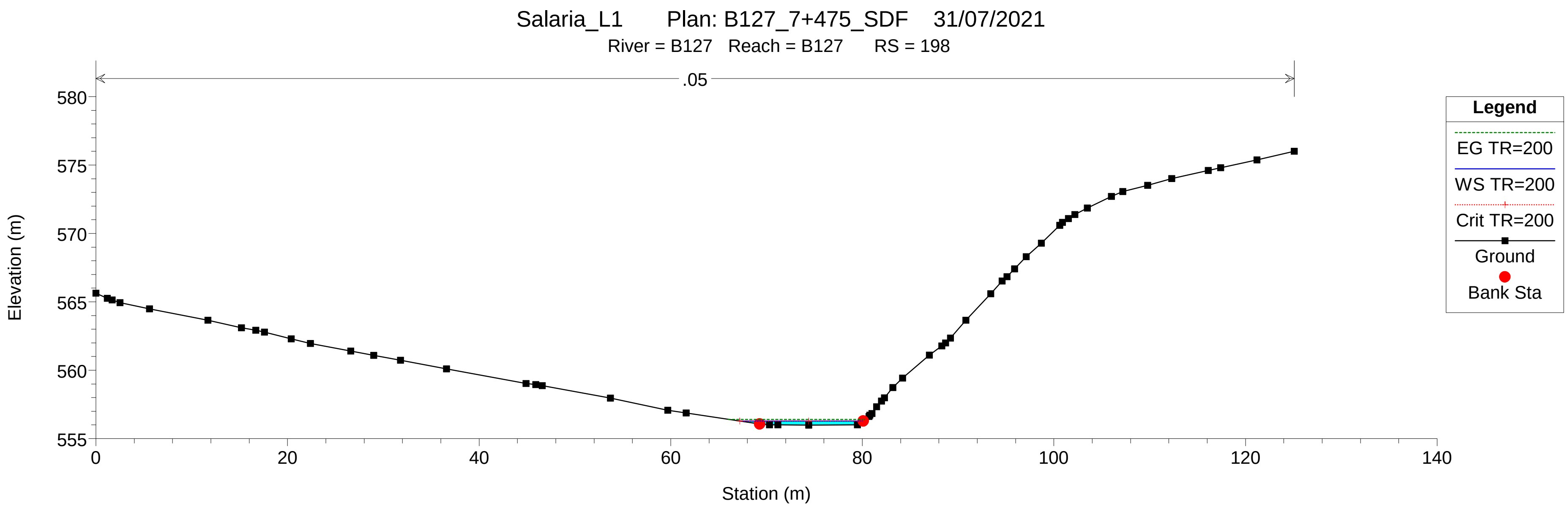


Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 498
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)



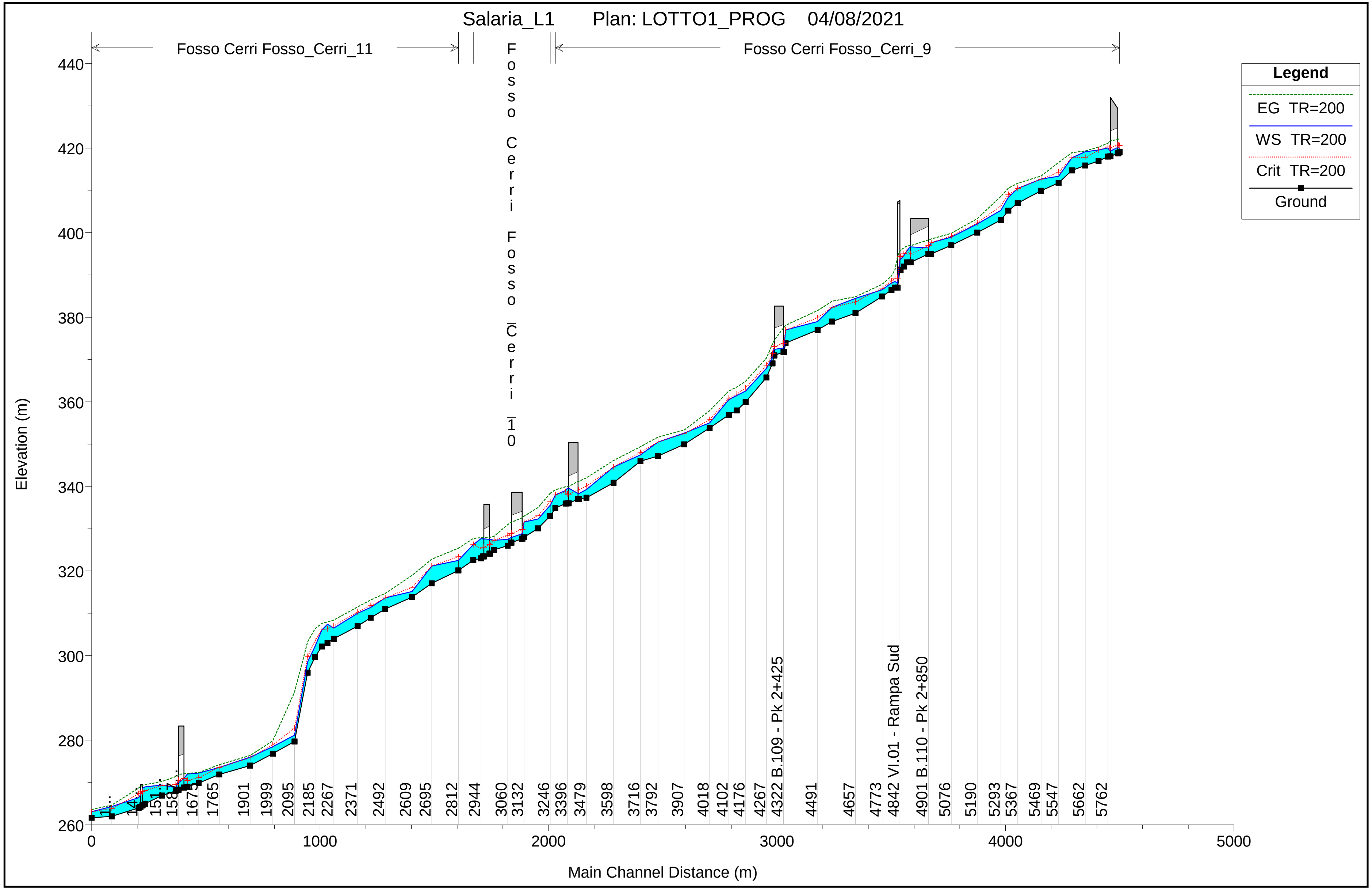
Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 411
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)


Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 312
.05
Elevation (m)
590
585
580
575
570
565
560
555
0
20
40
60
80
100
120
140
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

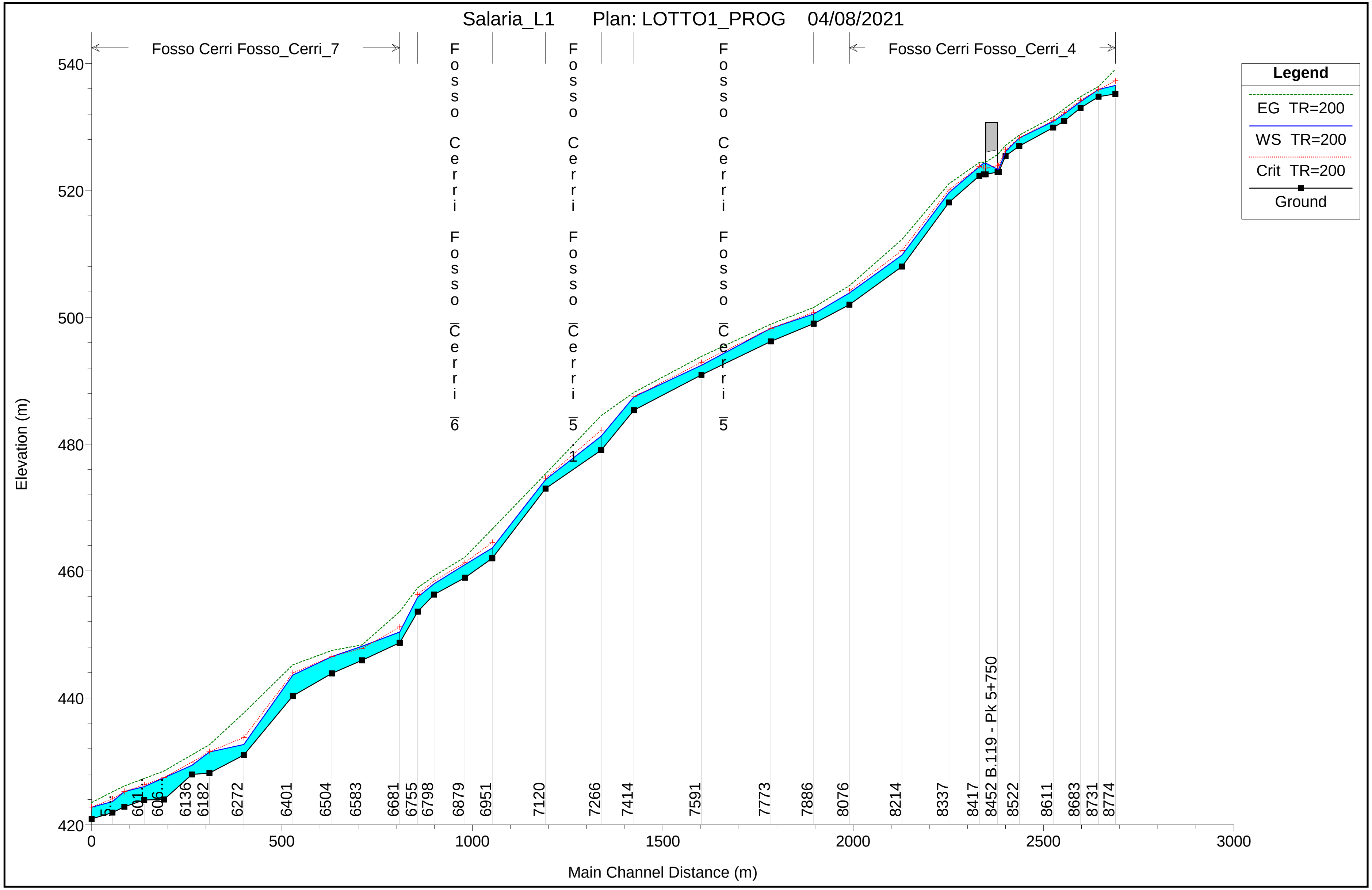

Salaria_L1 Plan: B127_7+475_SDF 31/07/2021
River = B127 Reach = B127 RS = 198
.05
Elevation (m)
580
575
570
565
560
555
0
20
40
60
80
100
120
140
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

2.2 SCENARIO DI PROGETTO TR200 MOTO PERMANENTE

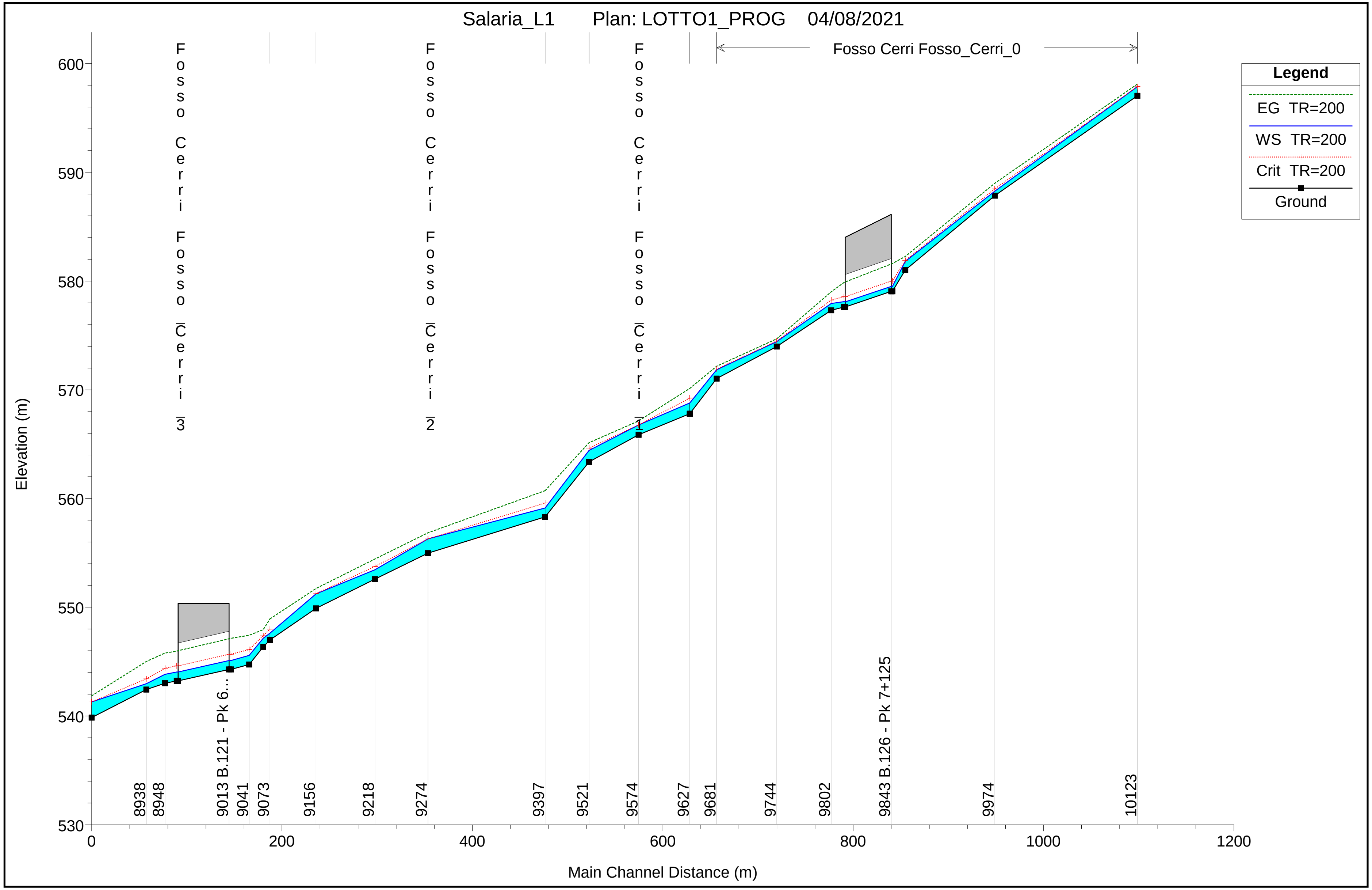
2.2.1. PROGETTO
Fosso dei Cerri



Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
Fosso Cerri Fosso_Cerri_11
Fosso Cerri Fosso_Cerri_10
Fosso Cerri Fosso_Cerri_9
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Elevation (m)
Main Channel Distance (m)
B.109 - Pk 2+425
VI.01 - Rampa Sud
B.110 - Pk 2+850



Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
Fosso Cerri Fosso_Cerri_7
Fosso Cerri Fosso_Cerri_6
Fosso Cerri Fosso_Cerri_5
1
Fosso Cerri Fosso_Cerri_5
Fosso Cerri Fosso_Cerri_4
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Elevation (m)
Main Channel Distance (m)
540
520
500
480
460
440
420
0
500
1000
1500
2000
2500
3000
6136
6182
6272
6401
6504
6583
6681
6755
6798
6879
6951
7120
7266
7414
7591
7773
7886
8076
8214
8337
8417
8452 B.119 - Pk 5+750
8522
8611
8683
8731
8774



Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
Fosso Cerri Fosso_Cerri_0
Fosso Cerri Fosso_Cerri_3
Fosso Cerri Fosso_Cerri_2
Fosso Cerri Fosso_Cerri_1
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Elevation (m)
Main Channel Distance (m)
9013 B.121 - Pk 6...
9843 B.126 - Pk 7+125
8938
8948
9041
9073
9156
9218
9274
9397
9521
9574
9627
9681
9744
9802
9974
10123

HEC-RAS Plan: L1_PROG Profile: TR=200

Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
Fosso_Cerri_0	10123	TR=200	14.60	597.03	0.83	597.86	597.86	0.00	0.97	598.10	2.20	2.15	0.52	147.76	0.44
Fosso_Cerri_0	9974	TR=200	14.60	587.85	0.40	588.25	588.46	-0.21	2.28	588.98	3.80	3.78	0.28	540.45	0.26
Fosso_Cerri_0	9880	TR=200	14.60	581.00	0.80	581.80	581.89	-0.09	1.16	582.24	3.14	2.77	0.75	266.43	0.55
Fosso_Cerri_0	9857	TR=200	14.60	579.05	0.45	579.50	580.00	-0.50	3.05	581.62	6.44	6.44	0.45	147.54	0.45
Fosso_Cerri_0	9843		Bridge												
Fosso_Cerri_0	9819	TR=200	14.60	577.60	0.50	578.10	578.55	-0.45	2.67	579.86	5.88	5.88	0.50	119.45	0.50
Fosso_Cerri_0	9802	TR=200	14.60	577.31	0.62	577.93	578.25	-0.32	1.89	579.01	4.61	4.61	0.51	652.98	0.61
Fosso_Cerri_0	9744	TR=200	14.60	573.98	0.43	574.41	574.47	-0.06	1.16	574.67	2.31	2.18	0.40	177.09	0.34
Fosso_Cerri_0	9681	TR=200	14.60	571.02	0.82	571.84	571.90	-0.06	1.08	572.15	2.51	2.38	0.54	189.13	0.42
Fosso_Cerri_1	9627	TR=200	21.20	567.79	0.99	568.78	569.24	-0.46	2.04	570.11	5.11	5.11	0.60	758.38	0.64
Fosso_Cerri_1	9574	TR=200	21.20	565.85	0.91	566.76	566.77	-0.01	0.99	567.13	2.73	2.64	0.77	199.92	0.67
Fosso_Cerri_1	9521	TR=200	21.20	563.37	1.04	564.41	564.63	-0.22	1.44	565.13	3.79	3.59	0.69	399.13	0.54
Fosso_Cerri_2	9397	TR=200	21.20	558.31	0.83	559.14	559.59	-0.45	2.36	560.73	5.60	5.55	0.56	932.97	0.53
Fosso_Cerri_2	9274	TR=200	21.20	554.97	1.32	556.29	556.29	0.00	0.97	556.84	3.29	3.21	1.04	261.67	1.02
Fosso_Cerri_2	9218	TR=200	21.20	552.60	0.86	553.46	553.75	-0.29	1.69	554.44	4.43	4.33	0.68	546.14	0.63
Fosso_Cerri_2	9156	TR=200	21.20	549.90	1.33	551.23	551.25	-0.02	0.98	551.73	3.16	3.04	1.00	244.76	0.89
Fosso_Cerri_3	9073	TR=200	25.60	546.99	0.62	547.61	547.99	-0.38	2.30	548.94	5.12	5.01	0.50	808.33	0.44
Fosso_Cerri_3	9066	TR=200	25.60	546.34	0.81	547.15	547.38	-0.23	1.69	547.94	3.93	3.92	0.55	464.25	0.54
Fosso_Cerri_3	9041	TR=200	25.60	544.74	0.84	545.58	546.11	-0.53	2.11	547.43	6.05	5.69	0.84	106.15	0.79
Fosso_Cerri_3	9031	TR=200	25.60	544.29	0.81	545.10	545.67	-0.57	2.24	547.14	6.32	6.32	0.81	117.34	0.81
Fosso_Cerri_3	9013		Bridge												
Fosso_Cerri_3	8955	TR=200	25.60	543.22	0.84	544.06	544.60	-0.54	2.13	545.96	6.11	6.11	0.84	108.49	0.84
Fosso_Cerri_3	8948	TR=200	25.60	543.02	0.81	543.83	544.39	-0.56	2.20	545.79	6.22	5.80	0.81	113.39	0.76
Fosso_Cerri_3	8938	TR=200	25.60	542.42	0.56	542.98	543.42	-0.44	3.27	545.01	6.36	6.16	0.38	1362.42	0.33
Fosso_Cerri_3	8881	TR=200	25.60	539.85	1.45	541.30	541.30	0.00	0.96	541.84	3.31	3.17	1.14	257.18	1.02
Fosso_Cerri_4	8774	TR=200	31.30	535.19	1.36	536.55	537.25	-0.70	2.30	539.06	7.15	6.72	0.90	1299.88	0.75
Fosso_Cerri_4	8731	TR=200	31.30	534.77	1.13	535.90	535.90	0.00	0.99	536.37	3.07	3.01	0.97	233.69	0.91
Fosso_Cerri_4	8683	TR=200	31.30	533.01	0.98	533.99	534.18	-0.19	1.33	534.75	3.90	3.80	0.85	394.56	0.79
Fosso_Cerri_4	8640	TR=200	31.30	530.94	1.10	532.04	532.24	-0.20	1.28	532.83	4.00	3.83	0.96	397.72	0.85
Fosso_Cerri_4	8611	TR=200	31.30	529.89	0.98	530.86	531.04	-0.18	1.29	531.56	3.75	3.61	0.86	363.19	0.75
Fosso_Cerri_4	8522	TR=200	31.30	526.97	1.29	528.26	528.28	-0.02	0.97	528.70	3.05	2.83	0.98	229.26	0.80
Fosso_Cerri_4	8486	TR=200	31.30	525.43	0.68	526.11	526.40	-0.29	1.85	527.08	4.38	4.36	0.57	567.88	0.56
Fosso_Cerri_4	8463	TR=200	31.30	522.88	0.44	523.32	523.88	-0.56	3.37	525.85	7.04	7.04	0.44	177.51	0.44
Fosso_Cerri_4	8452		Bridge												
Fosso_Cerri_4	8440	TR=200	31.30	522.51	1.77	524.28	523.51	0.77	0.42	524.44	1.77	1.77	1.77	7.04	1.77
Fosso_Cerri_4	8417	TR=200	31.30	522.30	1.43	523.73	523.78	-0.05	1.06	524.38	3.59	3.56	1.07	308.46	1.11
Fosso_Cerri_4	8337	TR=200	31.30	518.08	1.56	519.64	520.08	-0.44	1.56	521.04	5.46	4.92	1.16	693.80	0.94
Fosso_Cerri_4	8214	TR=200	60.00	507.99	1.81	509.80	510.55	-0.75	1.83	512.25	7.22	6.50	1.49	1120.28	1.21
Fosso_Cerri_4	8076	TR=200	60.00	501.98	1.85	503.83	504.15	-0.32	1.26	504.95	4.90	4.36	1.49	516.10	1.08
Fosso_Cerri_5	7886	TR=200	60.00	498.98	1.51	500.49	500.76	-0.27	1.27	501.53	4.64	4.29	1.33	481.03	1.07
Fosso_Cerri_5	7773	TR=200	60.00	496.19	2.07	498.26	498.26	0.00	0.92	498.92	3.76	3.35	1.68	292.38	1.24
Fosso_Cerri_5	7591	TR=200	60.00	490.90	1.54	492.44	492.86	-0.42	1.46	493.82	5.36	4.94	1.32	642.55	1.07
Fosso_Cerri_5	7414	TR=200	60.00	485.34	2.12	487.46	487.49	-0.03	0.97	488.14	3.79	3.49	1.48	308.76	1.23
Fosso_Cerri_5.1	7266	TR=200	60.00	479.04	2.21	481.25	482.23	-0.98	1.99	484.48	8.11	7.55	1.48	1416.50	1.38

HEC-RAS Plan: L1_PROG Profile: TR=200 (Continued)

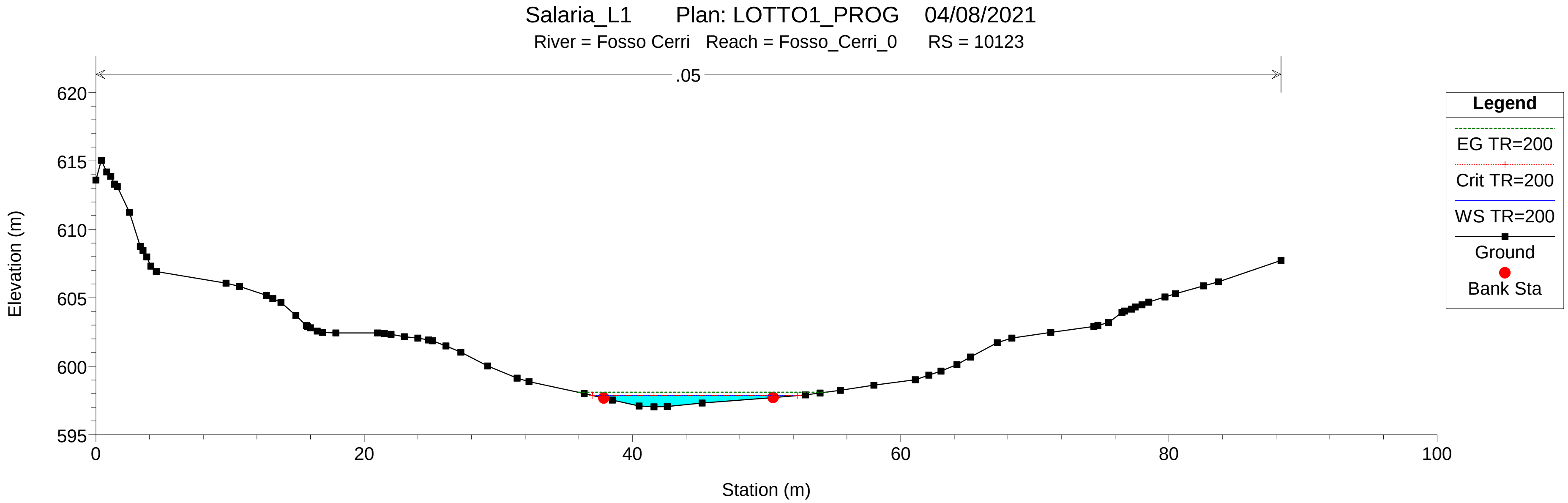
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
Fosso_Cerri_5.1	7120	TR=200	60.00	472.98	1.40	474.38	474.62	-0.24	1.28	475.30	4.43	4.07	1.20	453.21	0.97
Fosso_Cerri_6	6951	TR=200	60.00	461.99	1.65	463.64	464.50	-0.86	2.15	466.60	8.00	7.15	1.32	1428.69	1.05
Fosso_Cerri_6	6879	TR=200	60.00	458.93	2.09	461.02	461.30	-0.28	1.21	462.21	5.03	4.51	1.69	521.44	1.34
Fosso_Cerri_6	6798	TR=200	60.00	456.30	1.70	458.00	458.43	-0.43	1.41	459.21	5.38	4.33	1.45	625.79	0.86
Fosso_Cerri_6	6755	TR=200	60.00	453.58	2.29	455.87	456.29	-0.42	1.31	457.37	5.76	5.06	1.72	679.04	1.41
Fosso_Cerri_7	6681	TR=200	85.00	448.70	1.69	450.39	451.21	-0.82	2.35	453.60	8.14	7.39	1.13	1559.94	0.77
Fosso_Cerri_7	6583	TR=200	85.00	445.94	2.21	448.15	447.79	0.36	0.57	448.37	2.45	1.95	1.84	119.60	1.26
Fosso_Cerri_7	6504	TR=200	85.00	443.85	2.68	446.53	446.53	0.00	0.93	447.48	4.59	3.97	2.34	389.70	1.77
Fosso_Cerri_7	6401	TR=200	85.00	440.32	3.28	443.60	443.95	-0.35	1.12	445.24	5.99	5.15	2.46	650.29	2.03
Fosso_Cerri_7	6272	TR=200	85.00	431.00	1.65	432.65	433.75	-1.10	2.83	437.64	10.70	8.98	1.39	2519.30	0.95
Fosso_Cerri_7	6182	TR=200	85.00	428.15	3.32	431.47	431.53	-0.06	0.96	432.60	5.01	4.30	2.49	454.24	1.96
Fosso_Cerri_7	6136	TR=200	85.00	427.92	1.43	429.35	429.87	-0.52	1.75	431.04	5.98	5.46	1.18	830.37	0.91
Fosso_Cerri_7	6063	TR=200	85.00	424.00	3.40	427.40	427.46	-0.06	0.95	428.50	5.17	4.16	2.66	473.33	1.94
Fosso_Cerri_7	6011	TR=200	85.00	423.92	2.09	426.01	426.29	-0.28	1.19	427.29	5.20	4.73	1.90	534.93	1.54
Fosso_Cerri_7	5959	TR=200	85.00	422.83	2.39	425.22	425.22	0.00	0.96	426.13	4.41	3.96	2.12	371.23	1.72
Fosso_Cerri_7	5927	TR=200	85.00	421.92	1.72	423.65	424.11	-0.46	1.51	425.18	5.77	5.20	1.46	719.25	1.16
Fosso_Cerri_7	5873	TR=200	85.00	420.93	1.84	422.77	422.77	0.00	0.96	423.49	3.95	3.59	1.71	319.91	1.40
Fosso_Cerri_9	5813	TR=200	85.00	419.08	0.83	419.91	420.56	-0.65	2.41	422.30	6.85	6.80	0.83	136.74	0.82
Fosso_Cerri_9	5808	TR=200	85.00	418.78	1.36	420.14	420.72	-0.58	1.70	422.12	6.23	6.23	1.36	95.83	1.36
Fosso_Cerri_9	5791		Bridge												
Fosso_Cerri_9	5769	TR=200	85.00	418.06	1.26	419.32	420.00	-0.68	1.93	421.65	6.76	6.76	1.26	115.94	1.26
Fosso_Cerri_9	5762	TR=200	85.00	417.96	2.05	420.01	420.25	-0.24	1.17	421.15	4.98	4.45	1.82	498.05	1.43
Fosso_Cerri_9	5721	TR=200	85.00	416.91	2.60	419.51	419.54	-0.03	0.89	420.24	4.17	3.37	2.11	332.33	1.29
Fosso_Cerri_9	5662	TR=200	85.00	415.86	3.29	419.15	417.83	1.32	0.37	419.33	2.06	1.74	3.10	71.04	2.24
Fosso_Cerri_9	5604	TR=200	85.00	414.74	2.98	417.72	417.72	0.00	0.96	418.93	5.01	4.54	2.50	454.04	2.23
Fosso_Cerri_9	5547	TR=200	85.00	411.78	1.56	413.34	414.25	-0.91	2.24	416.58	8.38	7.49	1.39	1541.11	1.10
Fosso_Cerri_9	5469	TR=200	85.00	409.92	2.74	412.66	412.60	0.06	0.84	413.37	4.18	3.40	2.32	323.19	1.59
Fosso_Cerri_9	5367	TR=200	85.00	407.00	3.46	410.46	410.46	0.00	0.95	411.70	5.24	4.46	2.73	482.48	2.30
Fosso_Cerri_9	5326	TR=200	85.00	405.23	3.15	408.38	409.00	-0.62	1.34	410.53	6.92	5.91	2.26	894.92	1.90
Fosso_Cerri_9	5293	TR=200	85.00	403.00	2.28	405.28	406.30	-1.02	1.94	408.61	8.66	7.38	1.88	1487.68	1.46
Fosso_Cerri_9	5190	TR=200	85.00	399.98	2.06	402.04	402.33	-0.29	1.19	403.31	5.15	4.70	1.84	530.38	1.51
Fosso_Cerri_9	5076	TR=200	85.00	397.00	1.93	398.93	399.15	-0.22	1.17	399.84	4.55	3.90	1.49	444.55	1.03
Fosso_Cerri_9	4989	TR=200	85.00	395.00	2.64	397.64	397.64	0.00	0.91	398.51	4.42	3.80	2.27	364.98	1.68
Fosso_Cerri_9	4975	TR=200	85.00	395.00	1.39	396.39	396.94	-0.55	1.65	398.29	6.10	6.10	1.39	91.02	1.39
Fosso_Cerri_9	4901		Bridge												
Fosso_Cerri_9	4888	TR=200	85.00	393.00	3.65	396.65	394.94	1.71	0.39	396.93	2.33	2.33	3.65	9.64	3.65
Fosso_Cerri_9	4882	TR=200	85.00	392.96	2.72	395.68	395.71	-0.03	0.97	396.83	4.90	4.44	2.40	439.92	2.06
Fosso_Cerri_9	4868	TR=200	85.00	391.96	2.64	394.60	395.05	-0.45	1.27	396.42	6.27	5.48	2.34	727.09	1.97
Fosso_Cerri_9	4854	TR=200	85.00	391.16	2.53	393.69	394.35	-0.66	1.45	395.87	6.81	6.07	2.08	888.91	1.73
Fosso_Cerri_9	4842		Bridge												
Fosso_Cerri_9	4830	TR=200	85.00	387.00	1.43	388.43	389.23	-0.80	2.20	391.28	7.66	7.10	1.19	1354.72	0.94
Fosso_Cerri_9	4814	TR=200	85.00	386.48	1.63	388.11	388.61	-0.50	1.54	389.75	6.10	5.11	1.60	778.77	1.04
Fosso_Cerri_9	4773	TR=200	85.00	384.90	1.59	386.49	386.85	-0.36	1.41	387.76	5.17	4.77	1.35	591.62	1.10
Fosso_Cerri_9	4657	TR=200	94.80	380.98	3.46	384.44	383.61	0.83	0.54	384.83	3.05	2.54	3.11	156.63	2.32

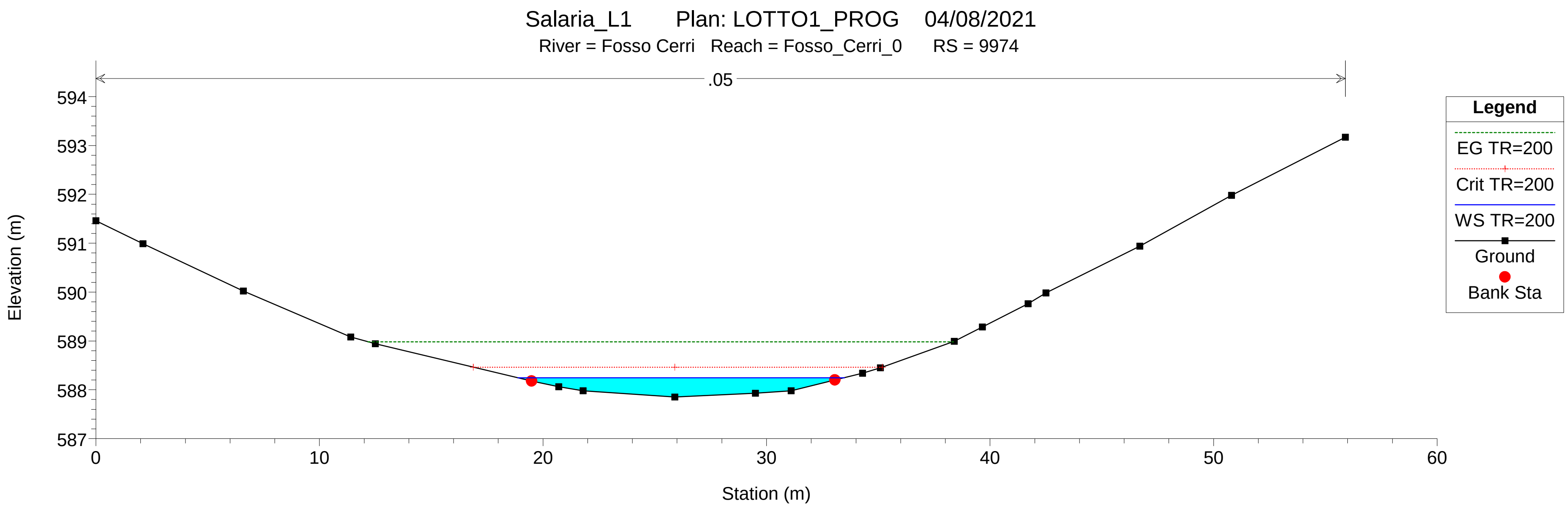
HEC-RAS Plan: L1_PROG Profile: TR=200 (Continued)

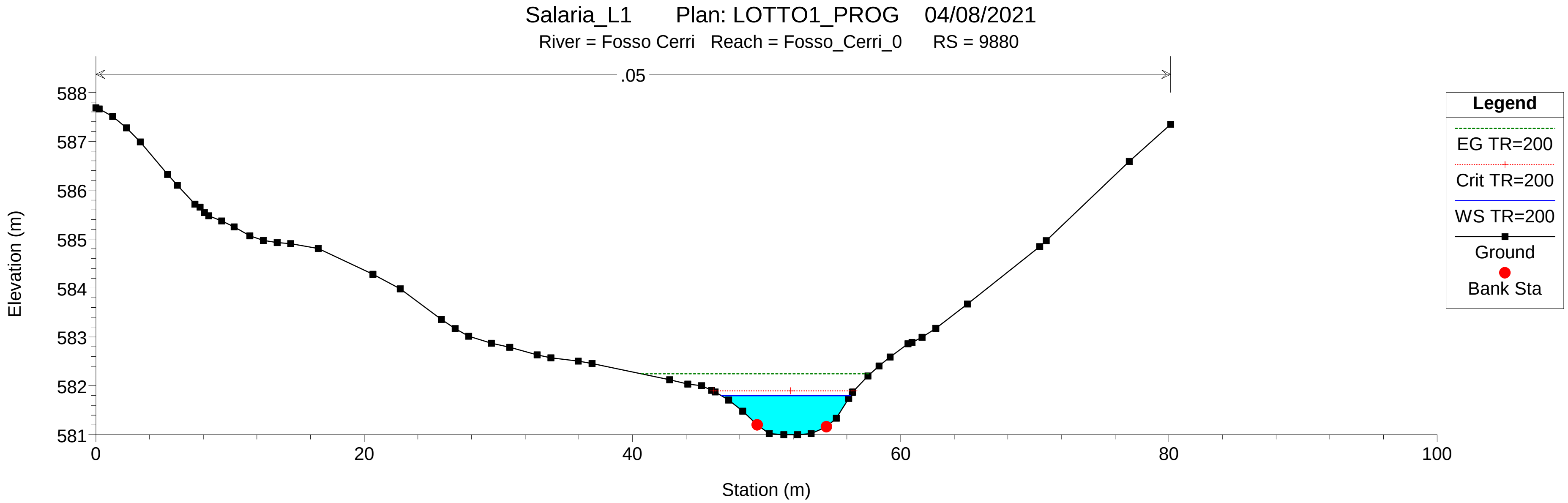
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
Fosso_Cerri_9	4555	TR=200	94.80	378.97	3.38	382.35	382.35	0.00	0.98	383.82	5.52	4.92	2.86	525.56	2.65
Fosso_Cerri_9	4491	TR=200	94.80	376.97	2.02	378.99	379.85	-0.86	1.82	381.60	7.56	6.64	1.68	1178.00	1.27
Fosso_Cerri_9	4351	TR=200	94.80	373.88	3.10	376.98	376.98	0.00	0.94	378.11	4.96	4.35	2.58	440.20	2.12
Fosso_Cerri_9	4329	TR=200	94.80	371.77	0.97	372.74	373.85	-1.11	3.16	377.59	9.75	9.75	0.97	262.57	0.97
Fosso_Cerri_9	4322		Bridge												
Fosso_Cerri_9	4298	TR=200	94.80	370.96	1.61	372.57	373.04	-0.47	1.49	374.34	5.90	5.90	1.61	729.94	1.61
Fosso_Cerri_9	4294	TR=200	94.80	369.07	1.48	370.48	371.42	-0.94	2.16	373.76	7.07	7.96	0.94	1250.49	1.23
Fosso_Cerri_9	4267	TR=200	94.80	365.79	2.15	367.94	368.66	-0.72	1.96	370.34	8.21	6.39	1.45	1460.75	0.98
Fosso_Cerri_9	4176	TR=200	94.80	359.94	2.62	362.56	363.26	-0.70	1.46	364.86	7.08	6.19	2.21	943.23	1.79
Fosso_Cerri_9	4137	TR=200	94.80	357.95	3.54	361.49	361.85	-0.36	1.14	363.48	6.52	5.62	2.84	735.95	2.61
Fosso_Cerri_9	4102	TR=200	94.80	356.89	3.64	360.53	360.84	-0.31	1.10	362.54	6.45	5.76	2.67	735.93	2.80
Fosso_Cerri_9	4018	TR=200	98.70	353.83	1.20	355.03	355.80	-0.77	2.37	357.91	7.70	7.24	1.07	1421.70	0.89
Fosso_Cerri_9	3907	TR=200	98.70	349.95	2.67	352.62	352.41	0.21	0.81	353.34	3.99	3.50	2.43	290.24	1.87
Fosso_Cerri_9	3792	TR=200	98.70	347.19	3.31	350.50	350.50	0.00	0.95	351.68	5.15	4.36	2.86	458.53	2.20
Fosso_Cerri_9	3716	TR=200	98.70	345.94	1.50	347.44	348.03	-0.59	1.73	349.37	6.31	5.92	1.34	886.09	1.13
Fosso_Cerri_9	3598	TR=200	98.70	340.88	3.68	344.56	344.56	0.00	0.98	346.14	5.77	4.98	3.13	558.18	2.84
Fosso_Cerri_9	3479	TR=200	98.70	337.31	1.95	339.26	340.08	-0.82	1.94	342.06	7.69	6.99	1.55	1252.99	1.24
Fosso_Cerri_9	3446	TR=200	98.70	336.99	1.30	338.29	339.13	-0.84	2.13	341.23	7.59	7.59	1.30	144.47	1.30
Fosso_Cerri_9	3417		Bridge												
Fosso_Cerri_9	3396	TR=200	98.70	336.00	3.59	339.59	338.14	1.45	0.46	339.98	2.75	2.75	3.59	13.50	3.59
Fosso_Cerri_9	3388	TR=200	98.70	335.95	3.07	339.02	338.70	0.32	0.80	339.92	4.33	3.90	2.79	326.83	2.40
Fosso_Cerri_9	3343	TR=200	98.70	334.90	3.08	337.98	337.98	0.00	0.96	339.23	5.13	4.63	2.62	467.11	2.33
Fosso_Cerri_10	3246	TR=200	101.70	333.00	2.57	335.57	336.40	-0.83	1.60	338.39	7.53	7.09	2.01	1102.35	2.03
Fosso_Cerri_10	3193	TR=200	101.70	330.08	2.20	332.28	333.08	-0.80	1.85	334.99	8.07	6.70	1.87	1296.13	1.33
Fosso_Cerri_10	3132	TR=200	101.70	328.00	3.59	331.59	331.59	0.00	0.97	332.98	5.33	4.99	2.44	517.54	2.61
Fosso_Cerri_10	3125	TR=200	101.70	327.63	1.18	328.81	329.81	-1.00	2.54	332.61	8.63	8.63	1.18	192.80	1.18
Fosso_Cerri_10	3100		Bridge												
Fosso_Cerri_10	3075	TR=200	101.70	326.71	1.21	327.92	328.89	-0.97	2.43	331.51	8.38	8.38	1.21	180.27	1.21
Fosso_Cerri_10	3060	TR=200	101.70	326.00	1.47	327.47	328.45	-0.98	2.32	330.98	8.53	7.96	1.35	1615.90	1.15
Fosso_Cerri_10	3001	TR=200	101.70	325.00	2.26	327.26	327.26	0.00	0.96	328.19	4.37	4.09	2.04	369.48	1.77
Fosso_Cerri_10	2983	TR=200	101.70	324.10	3.39	327.49	326.33	1.16	0.53	327.96	3.04	3.04	3.33	16.94	3.34
Fosso_Cerri_10	2957		Bridge												
Fosso_Cerri_10	2952	TR=200	101.70	323.43	4.16	327.59	325.61	1.98	0.38	327.89	2.45	2.45	4.16	10.19	4.16
Fosso_Cerri_10	2944	TR=200	101.70	323.00	4.63	327.63	325.18	2.45	0.33	327.87	2.19	2.09	4.63	7.90	4.42
Fosso_Cerri_10	2909	TR=200	101.70	322.55	3.69	326.25	326.25	0.00	0.97	327.73	5.54	4.97	2.88	529.40	2.71
Fosso_Cerri_11	2812	TR=200	102.40	320.15	2.34	322.49	323.39	-0.90	1.83	325.41	7.88	7.11	1.73	1266.75	1.41
Fosso_Cerri_11	2695	TR=200	102.40	317.11	4.08	321.19	321.19	0.00	0.96	322.78	5.76	5.09	2.98	564.58	2.86
Fosso_Cerri_11	2609	TR=200	102.40	313.82	1.34	315.16	316.17	-1.01	2.52	318.96	8.82	8.34	1.23	1780.98	1.09
Fosso_Cerri_11	2492	TR=200	102.40	310.98	2.66	313.65	313.65	0.00	0.96	314.70	4.76	4.26	2.38	416.65	1.99
Fosso_Cerri_11	2428	TR=200	102.40	308.96	2.45	311.41	311.85	-0.44	1.28	313.15	6.12	5.43	2.26	700.59	1.84
Fosso_Cerri_11	2371	TR=200	102.40	306.98	3.03	310.01	310.28	-0.27	1.11	311.48	5.72	4.96	2.46	593.49	1.98
Fosso_Cerri_11	2267	TR=200	102.40	303.99	2.53	306.52	307.04	-0.52	1.32	308.43	6.40	5.67	2.27	764.46	1.87
Fosso_Cerri_11	2239	TR=200	102.40	303.00	4.38	307.38	306.32	1.06	0.57	307.94	3.59	2.96	3.78	203.35	2.89
Fosso_Cerri_11	2214	TR=200	102.40	302.14	3.92	306.06	306.06	0.00	0.97	307.61	5.75	4.99	3.13	553.79	2.86

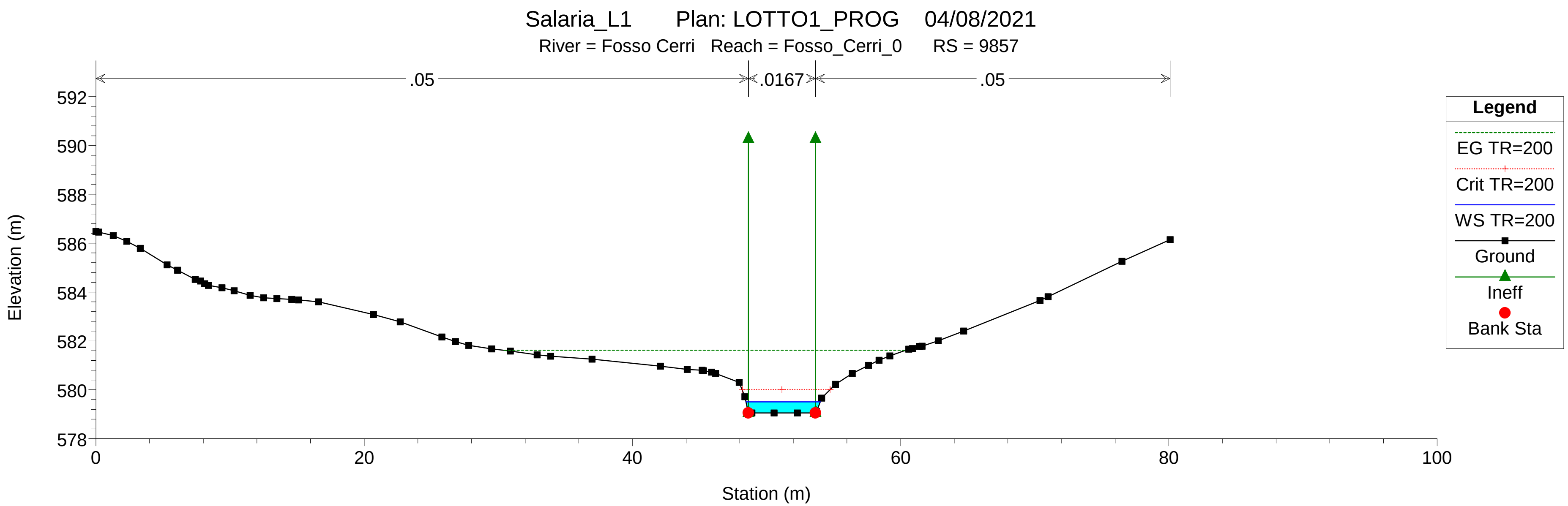
HEC-RAS Plan: L1_PROG Profile: TR=200 (Continued)

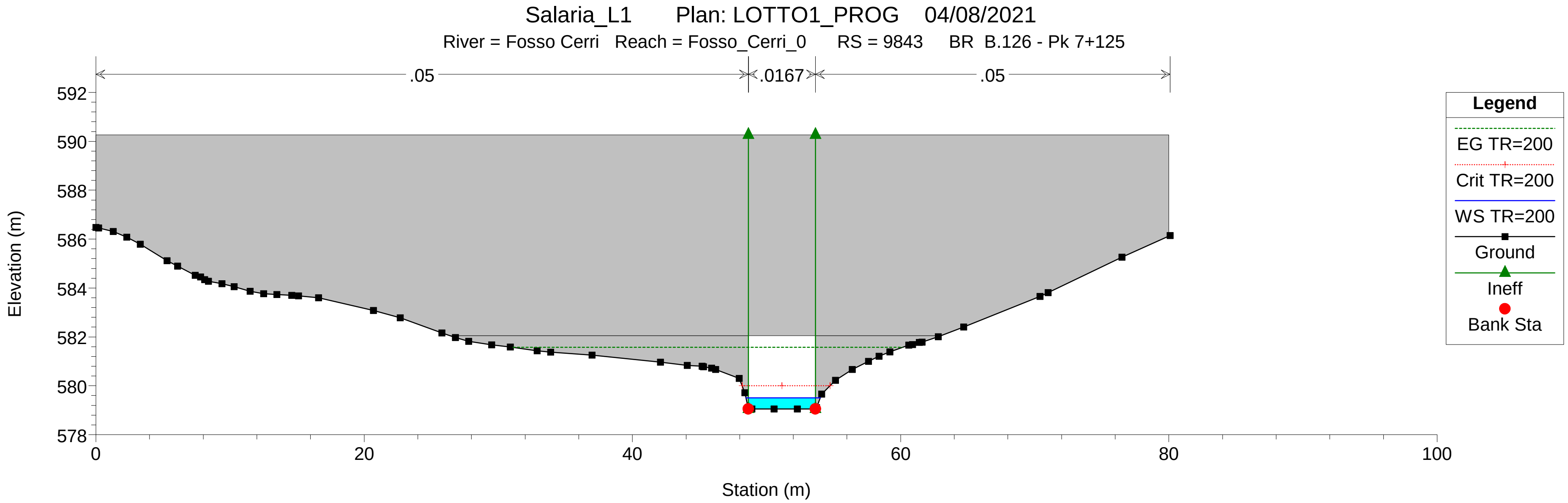
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
Fosso_Cerri_11	2185	TR=200	102.40	299.65	2.54	302.19	303.45	-1.26	1.97	306.38	9.53	8.25	2.21	1708.53	1.89
Fosso_Cerri_11	2152	TR=200	102.40	295.98	2.52	298.50	299.77	-1.27	2.25	303.23	10.41	8.74	1.88	2154.84	1.40
Fosso_Cerri_11	2095	TR=200	102.40	279.67	1.49	281.16	282.86	-1.70	4.15	291.39	15.15	13.10	1.33	5113.17	1.00
Fosso_Cerri_11	1999	TR=200	102.40	276.81	1.69	278.50	278.87	-0.37	1.37	279.83	5.31	4.89	1.51	603.06	1.23
Fosso_Cerri_11	1901	TR=200	102.40	274.00	2.00	276.00	275.82	0.18	0.75	276.35	2.95	2.51	1.54	184.87	1.15
Fosso_Cerri_11	1765	TR=200	102.40	271.90	1.65	273.55	273.55	0.00	0.96	274.23	3.80	3.49	1.59	304.20	1.32
Fosso_Cerri_11	1675	TR=200	102.40	269.84	2.36	272.20	271.17	1.03	0.35	272.31	1.64	1.39	2.22	50.66	1.66
Fosso_Cerri_11	1626	TR=200	102.40	269.00	3.01	272.01	270.48	1.53	0.35	272.19	1.88	1.83	3.01	59.85	2.93
Fosso_Cerri_11	1612	TR=200	102.40	268.77	2.31	271.08	270.96	0.12	0.93	272.08	4.43	4.43	2.31	40.66	2.31
Fosso_Cerri_11	1593		Bridge												
Fosso_Cerri_11	1587	TR=200	102.40	268.29	2.19	270.49	270.49	0.00	1.01	271.59	4.67	4.67	2.19	45.81	2.19
Fosso_Cerri_11	1575	TR=200	102.40	268.00	0.80	268.80	269.49	-0.69	2.55	271.37	7.12	7.06	0.80	1338.86	0.79
Fosso_Cerri_11	1515	TR=200	102.40	266.92	2.46	269.38	269.29	0.09	0.88	270.22	4.24	3.79	2.29	333.92	1.75
Fosso_Cerri_11	1440	TR=200	102.40	265.00	3.97	268.97	268.06	0.91	0.58	269.46	3.42	2.60	3.42	190.44	1.74
Fosso_Cerri_11	1429	TR=200	102.40	264.59	4.04	268.63	267.82	0.81	0.65	269.37	4.00	3.71	3.56	256.41	3.45
Fosso_Cerri_11	1424		Bridge												
Fosso_Cerri_11	1418	TR=200	102.40	264.24	2.69	266.93	267.45	-0.52	1.35	268.97	6.63	6.11	2.28	819.41	2.10
Fosso_Cerri_11	1412	TR=200	102.40	263.99	2.41	266.40	267.37	-0.97	1.58	268.68	7.32	5.91	2.03	1037.14	1.26
Fosso_Cerri_11	1295	TR=200	102.40	262.01	2.32	264.33	263.88	0.45	0.62	264.67	2.68	2.47	1.91	142.38	1.50
Fosso_Cerri_11	1206	TR=200	102.40	261.66	1.42	263.08	263.03	0.05	0.94	263.62	3.33	3.19	1.28	250.64	1.13

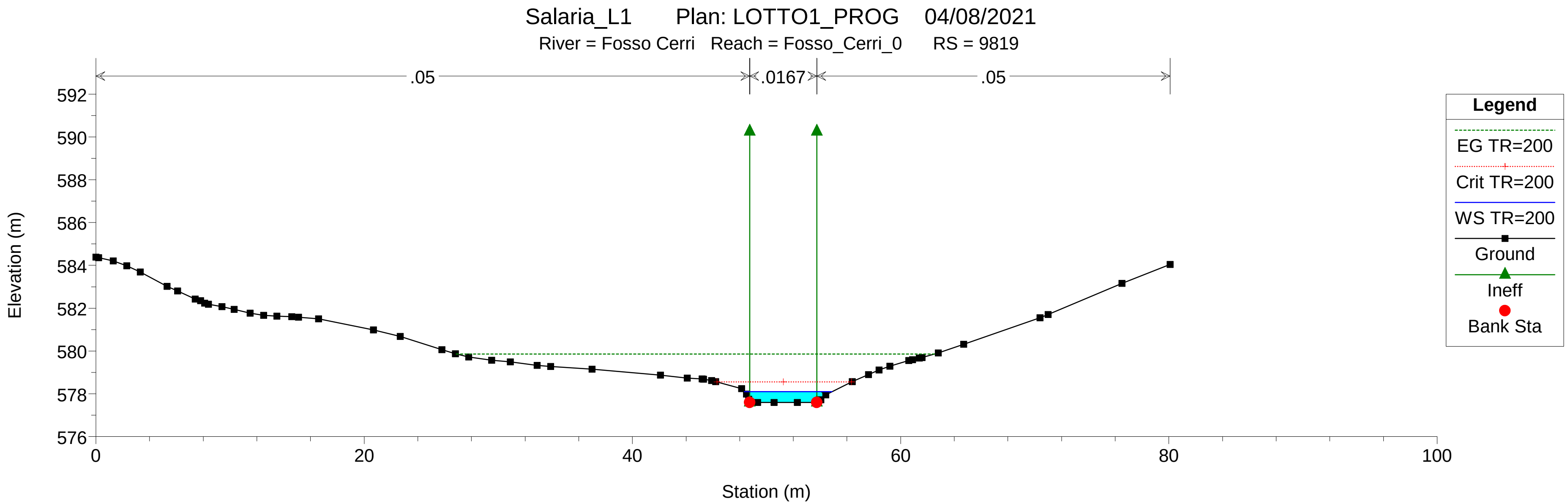

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 10123
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

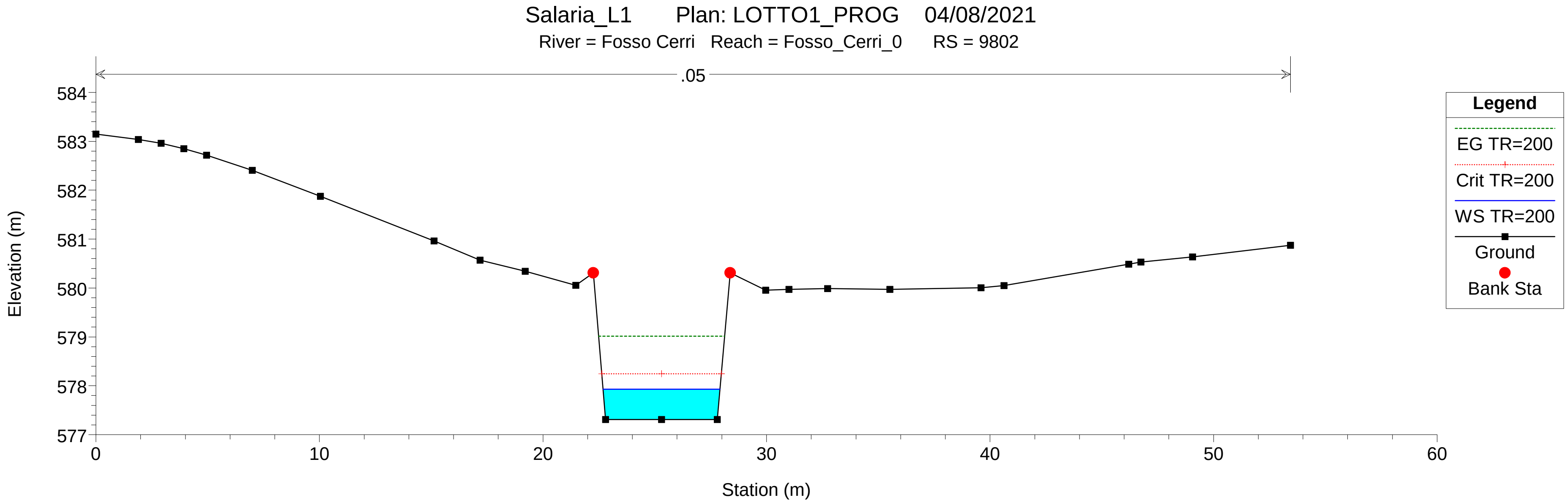

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9974
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9880
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

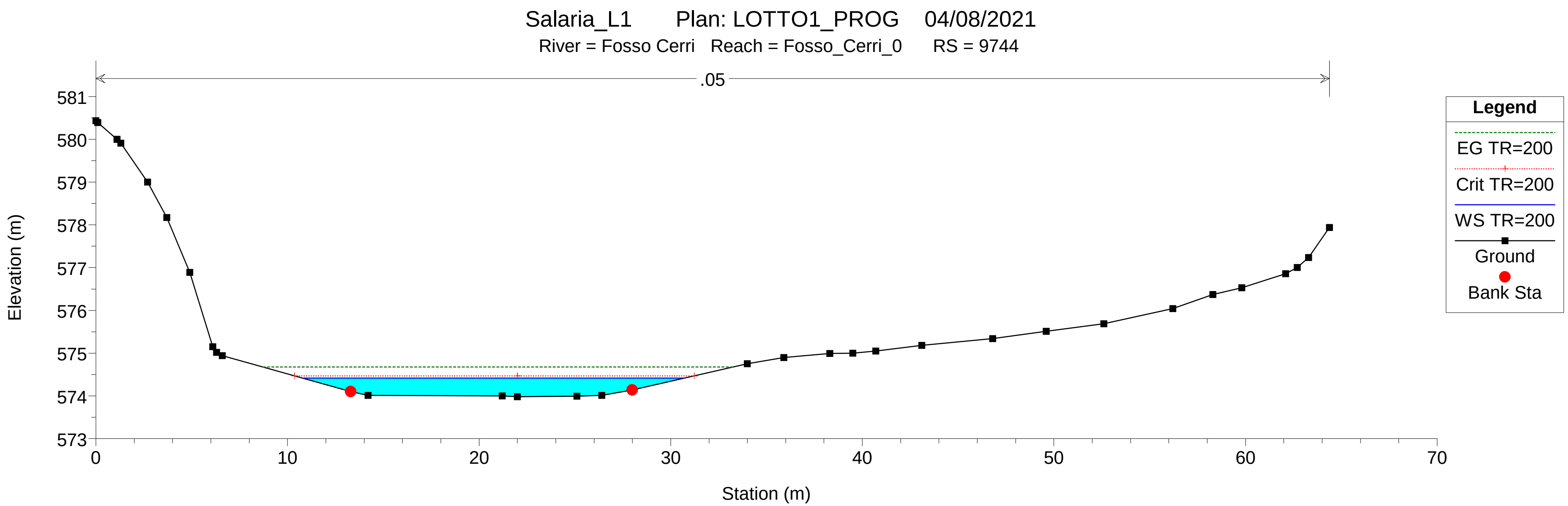

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9857
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9843 BR B.126 - Pk 7+125
.05
.0167
.05
Elevation (m)
592
590
588
586
584
582
580
578
0
20
40
60
80
100
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

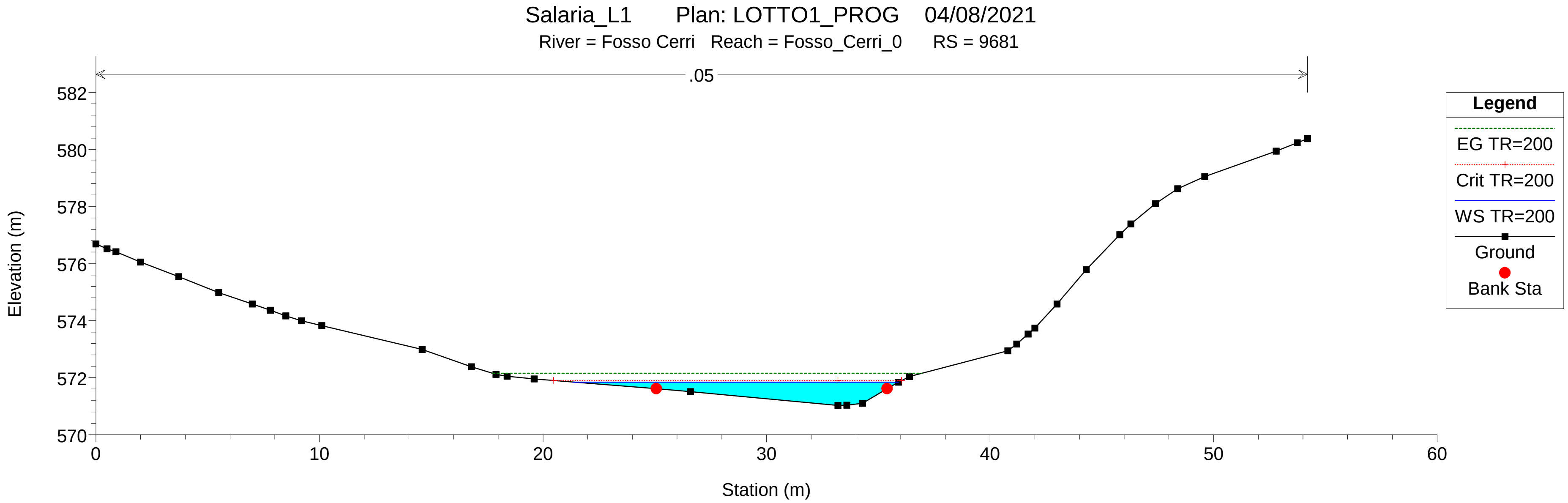

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9819
.05
.0167
.05
Elevation (m)
592
590
588
586
584
582
580
578
576
0
20
40
60
80
100
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

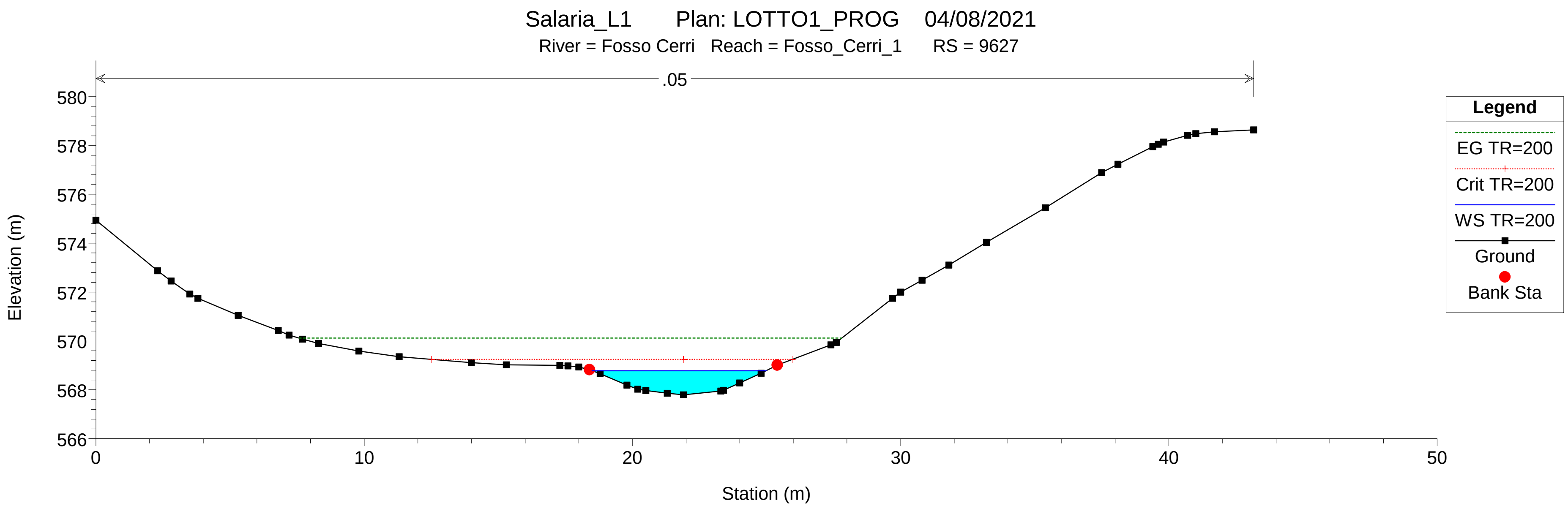


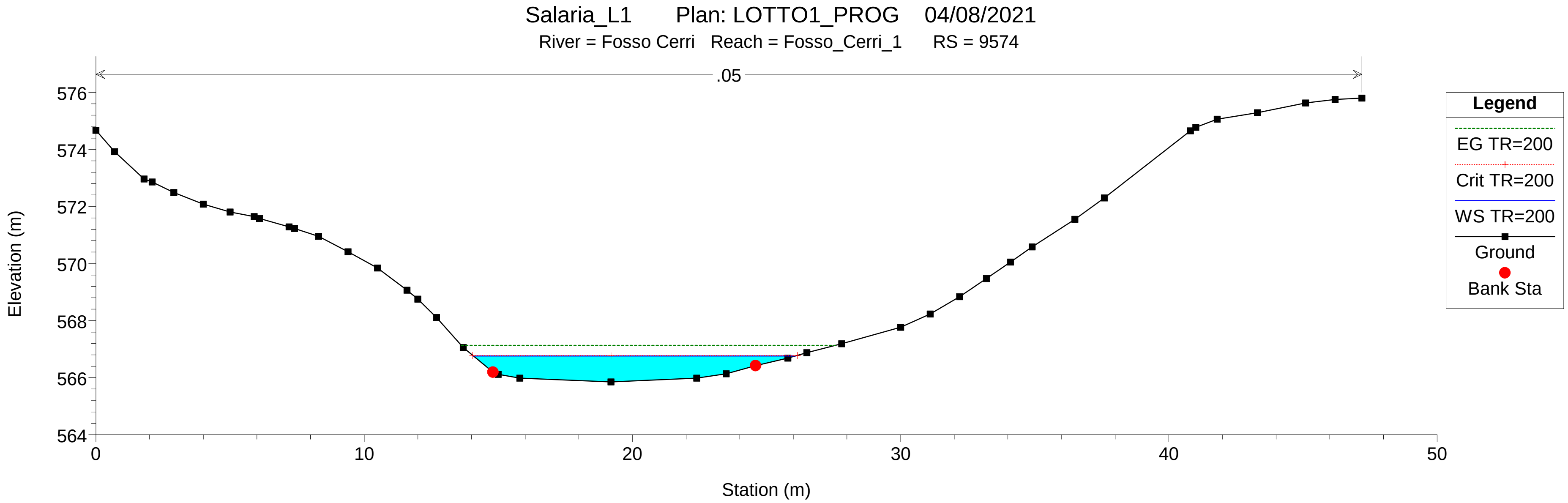
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9802
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

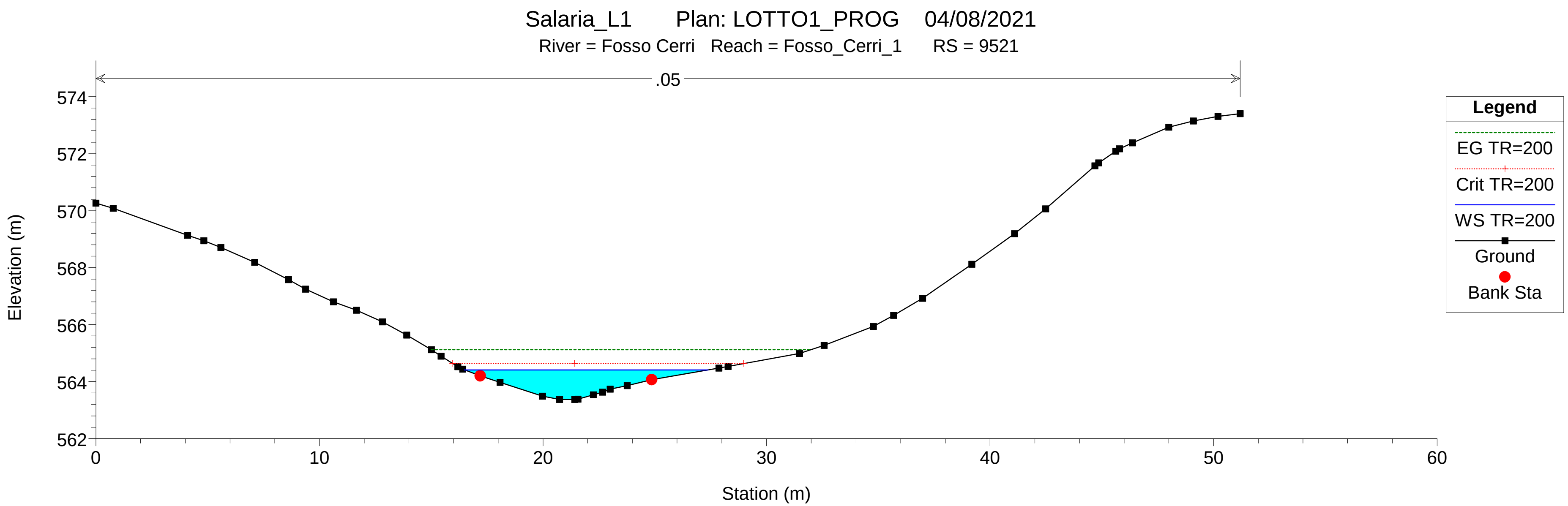


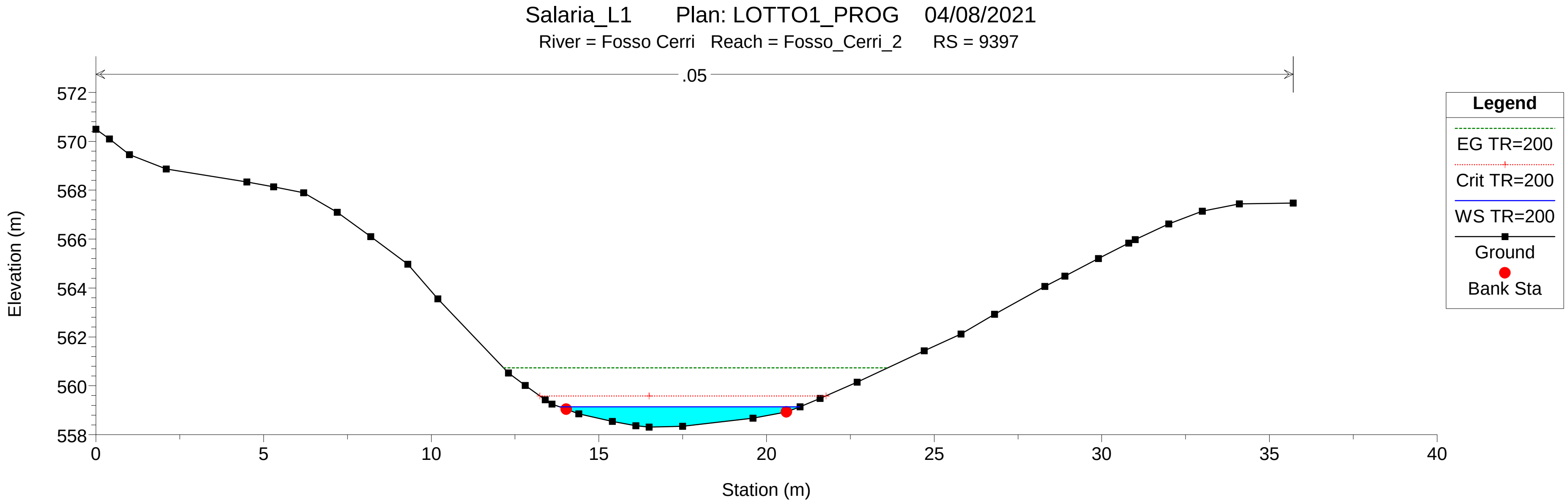
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9744
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_0 RS = 9681
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

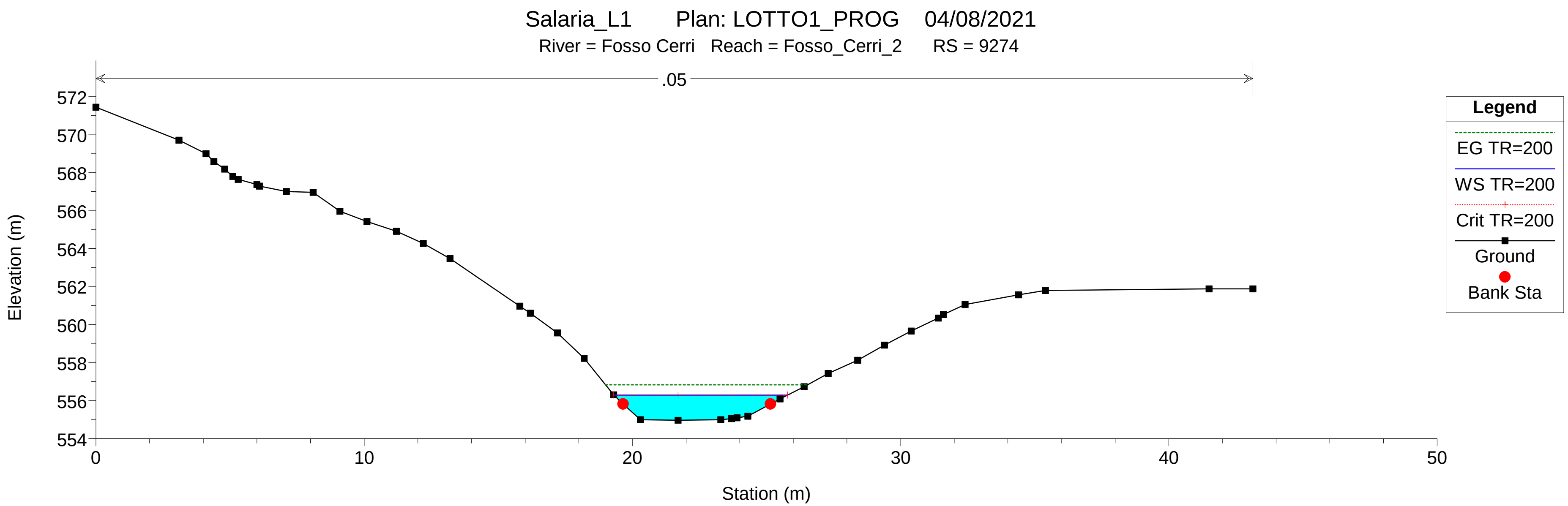

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_1 RS = 9627
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_1 RS = 9574
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

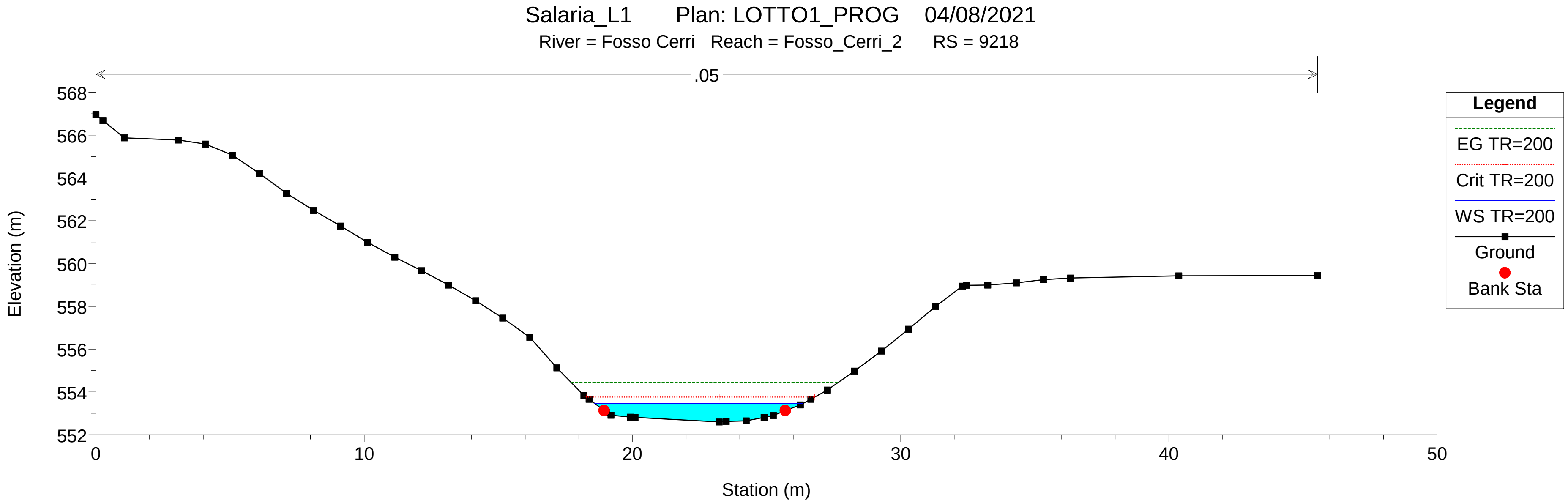

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_1 RS = 9521
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

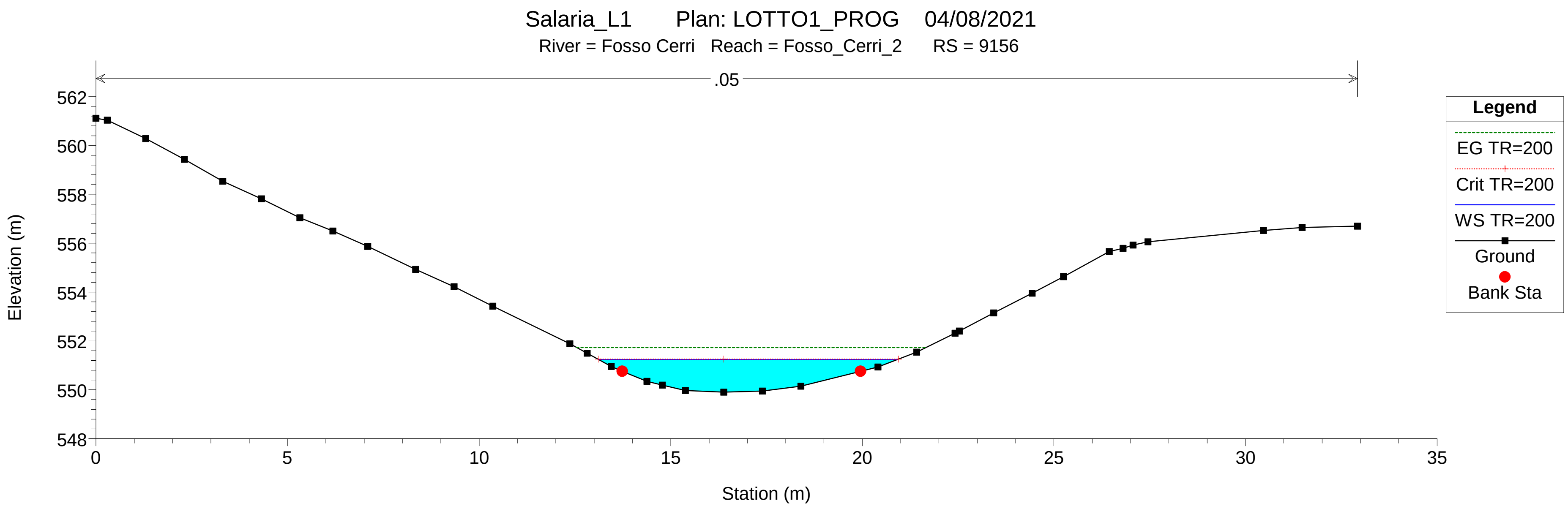


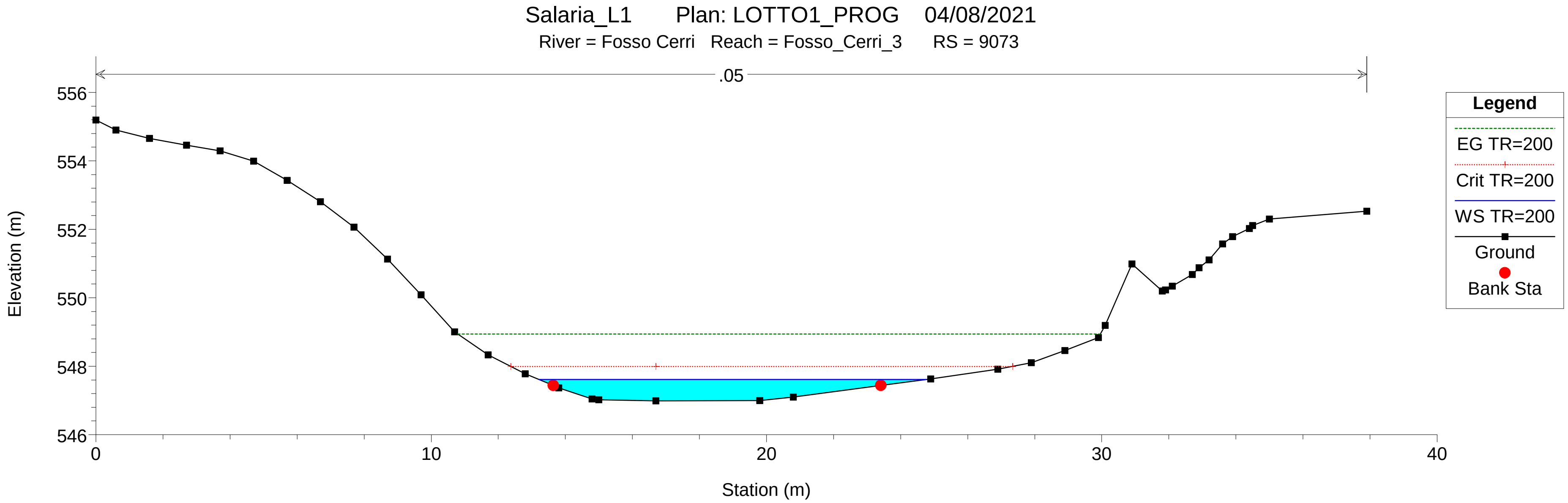
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_2 RS = 9397
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

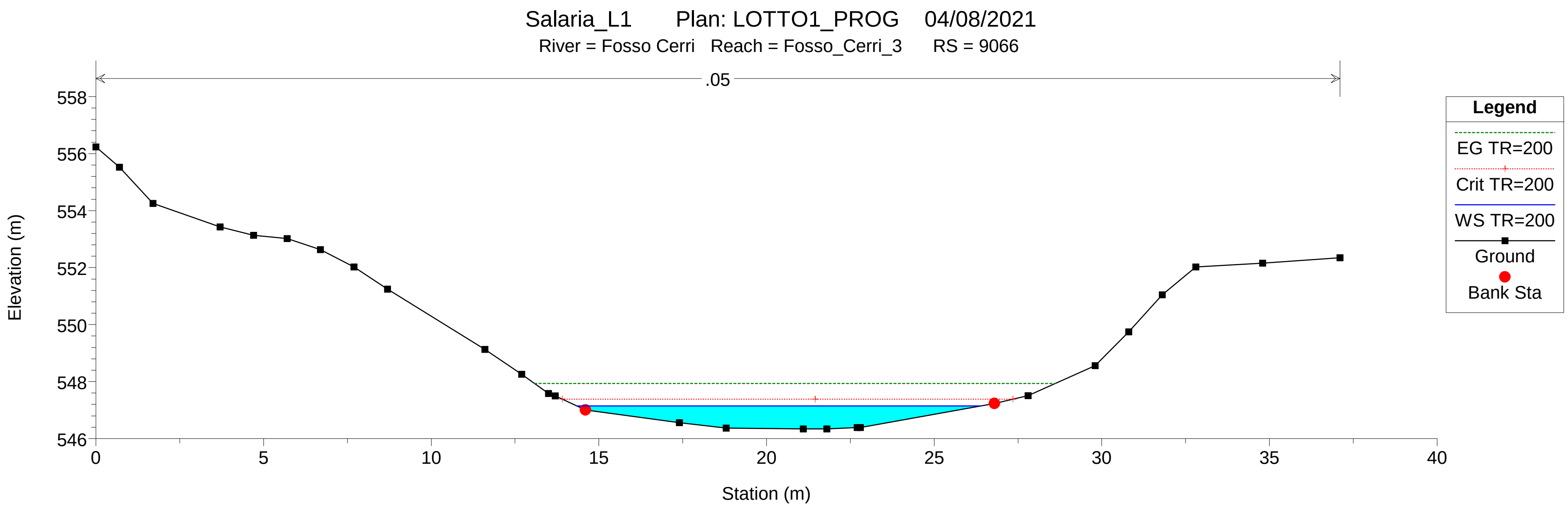


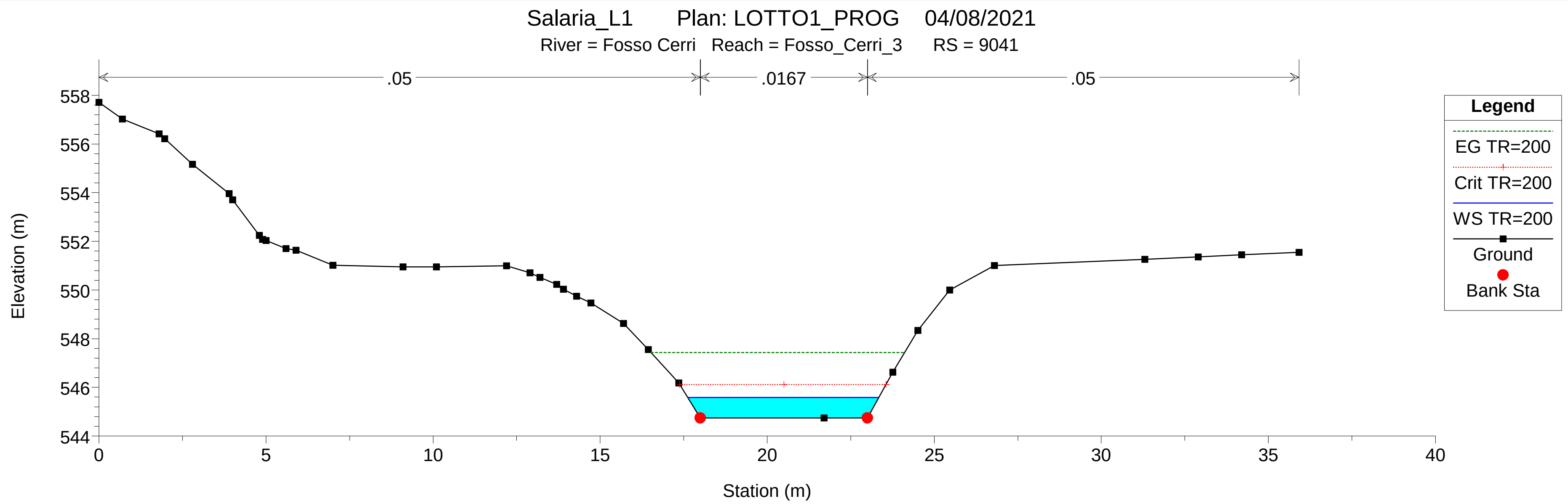
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_2 RS = 9274
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

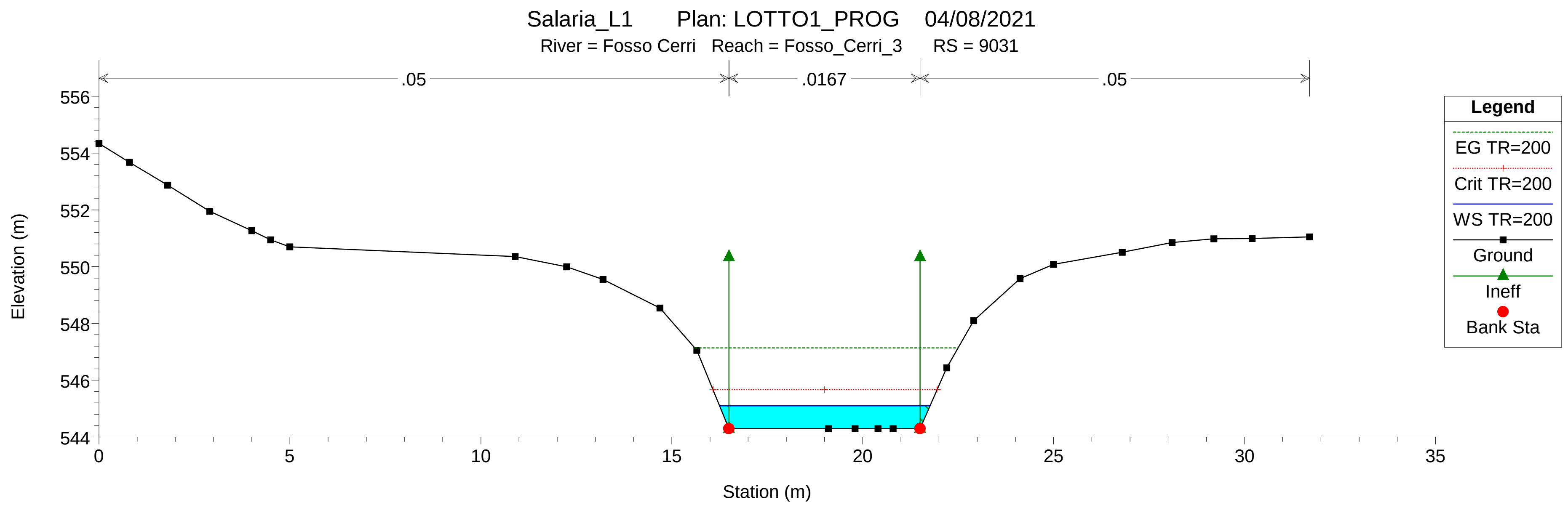

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_2 RS = 9218
.05
Elevation (m)
568
566
564
562
560
558
556
554
552
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

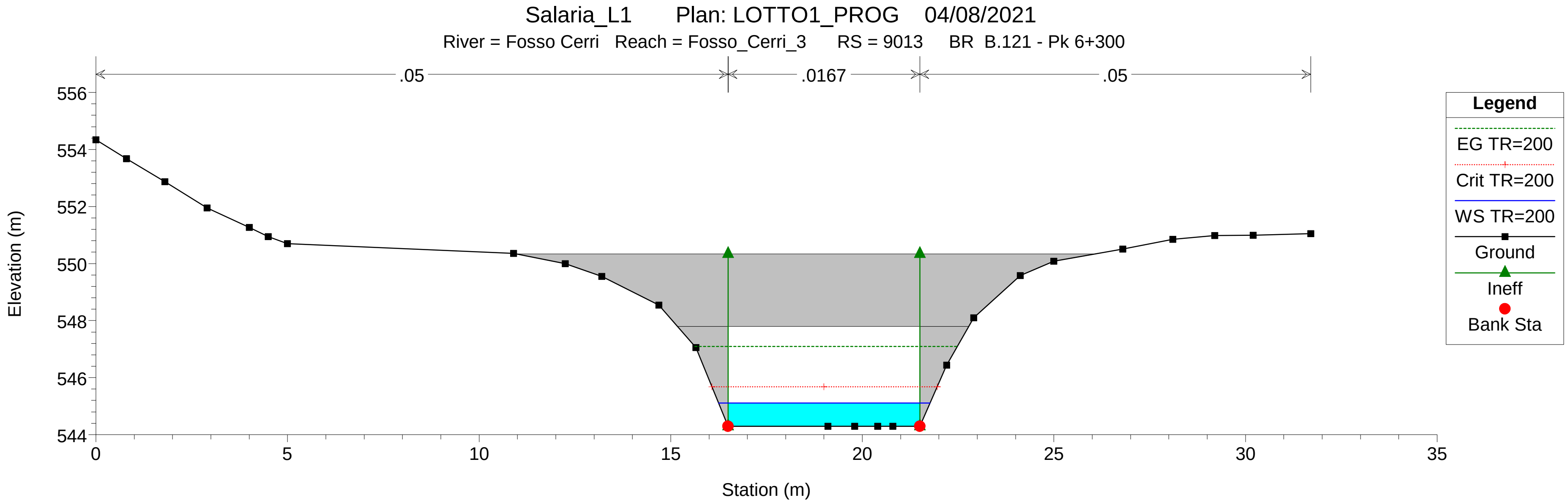

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_2 RS = 9156
.05
Elevation (m)
562
560
558
556
554
552
550
548
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9073
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

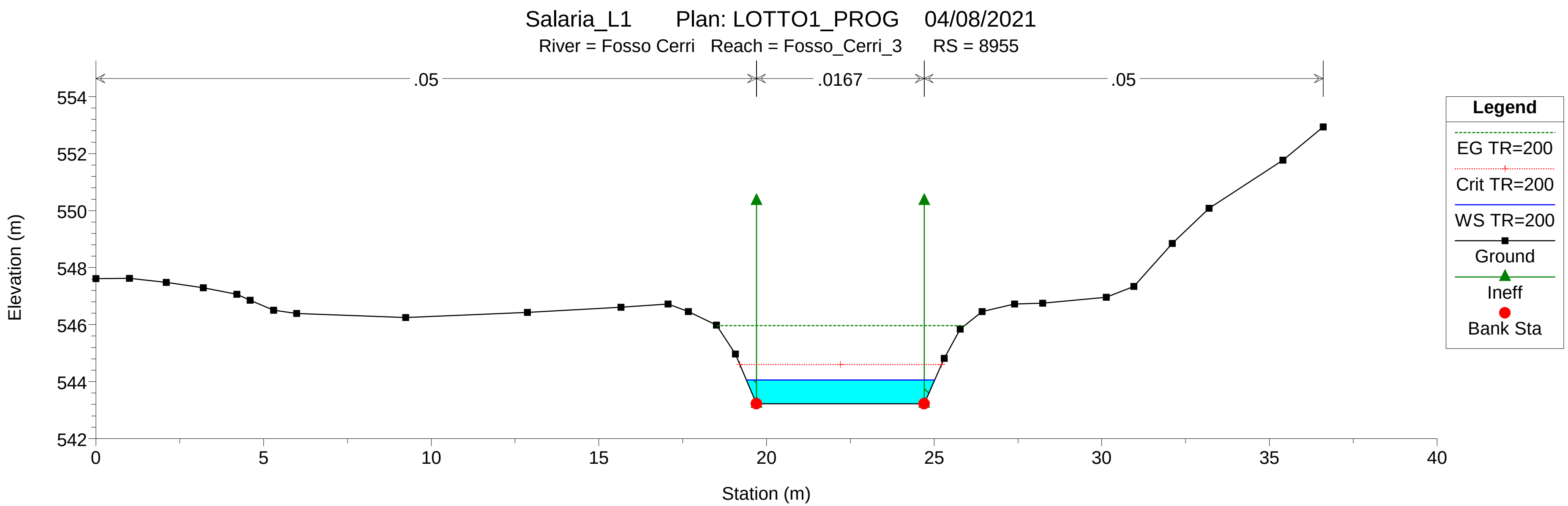

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9066
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9041
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

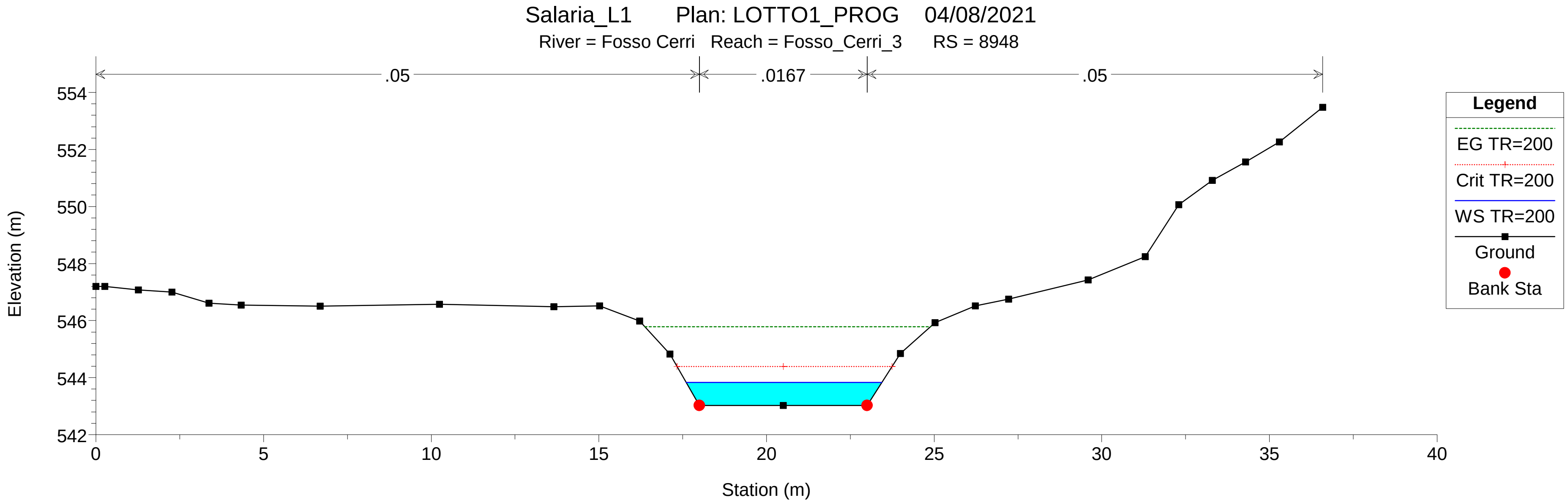

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9031
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

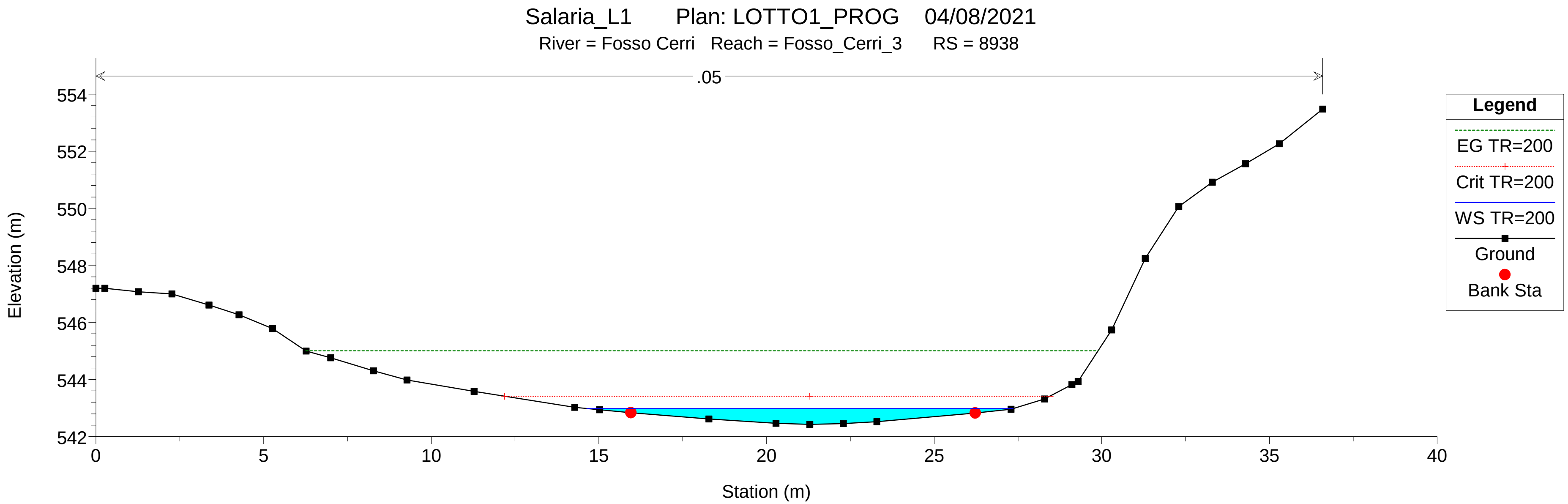


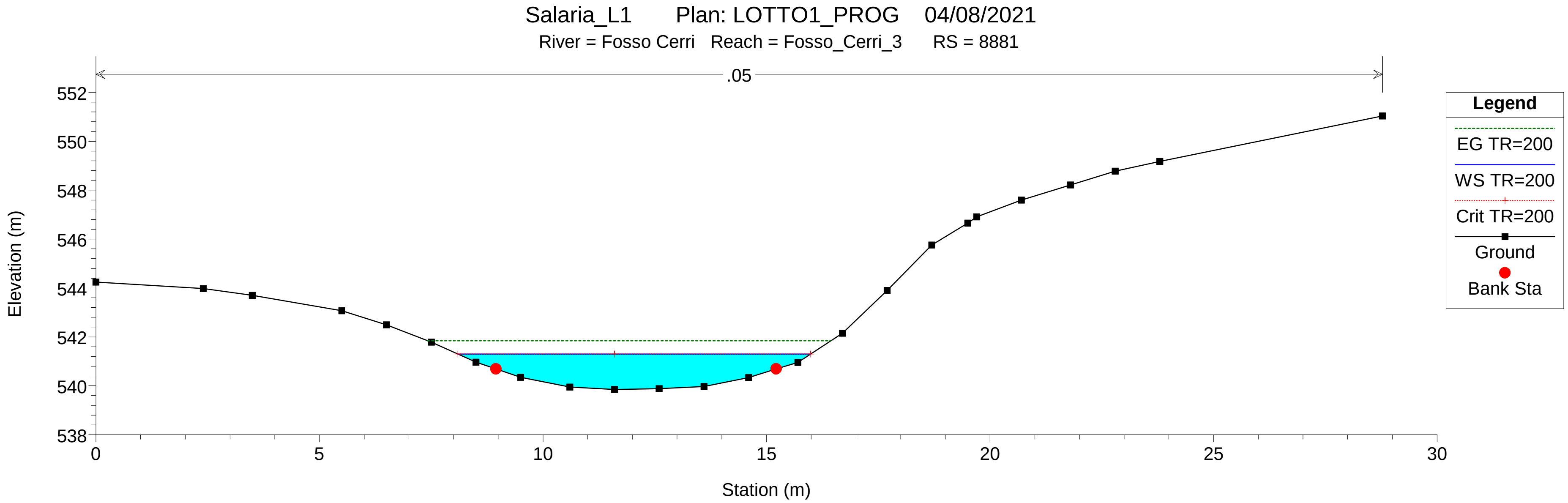
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 9013 BR B.121 - Pk 6+300
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta



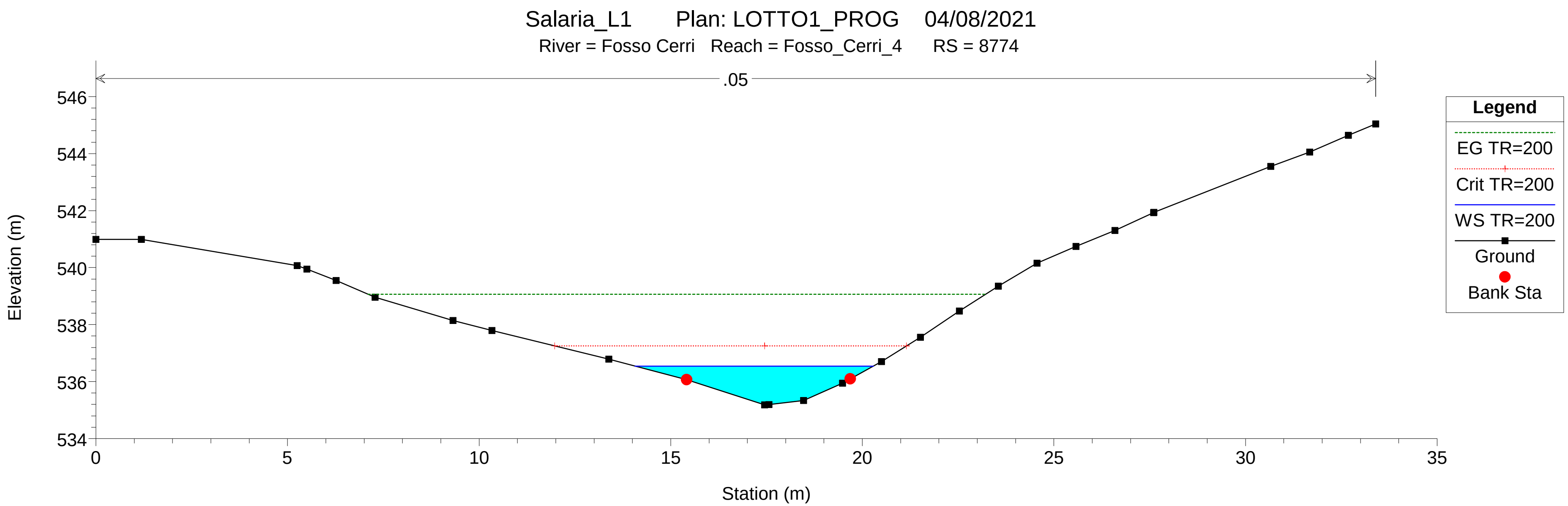
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 8955
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 8948
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

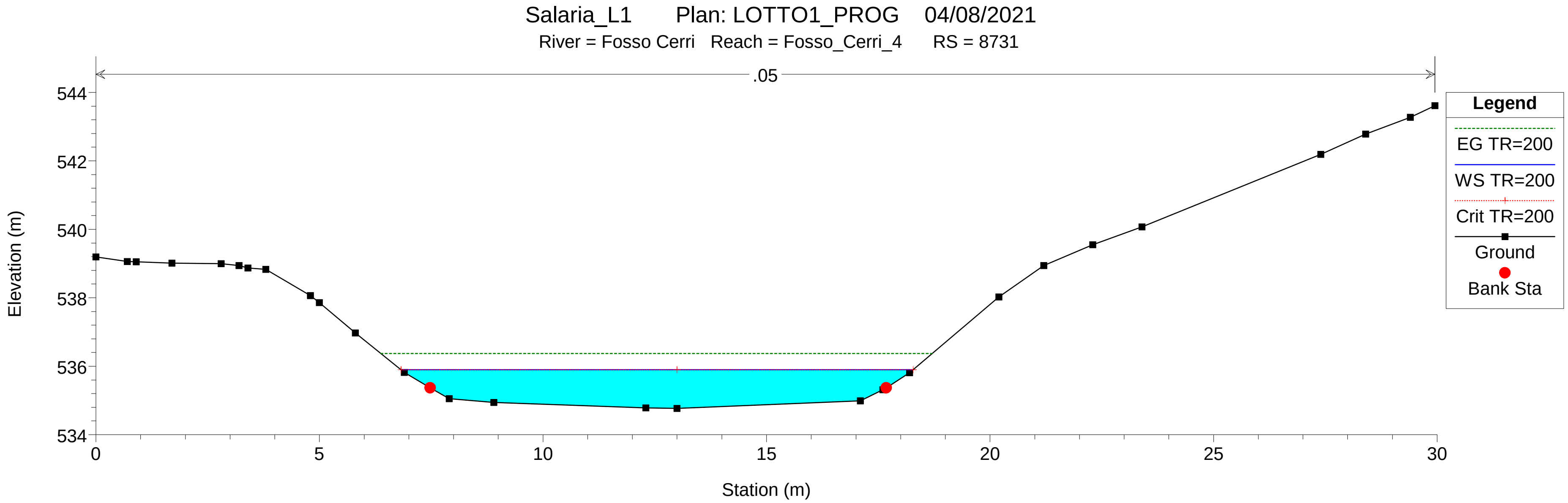

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 8938
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

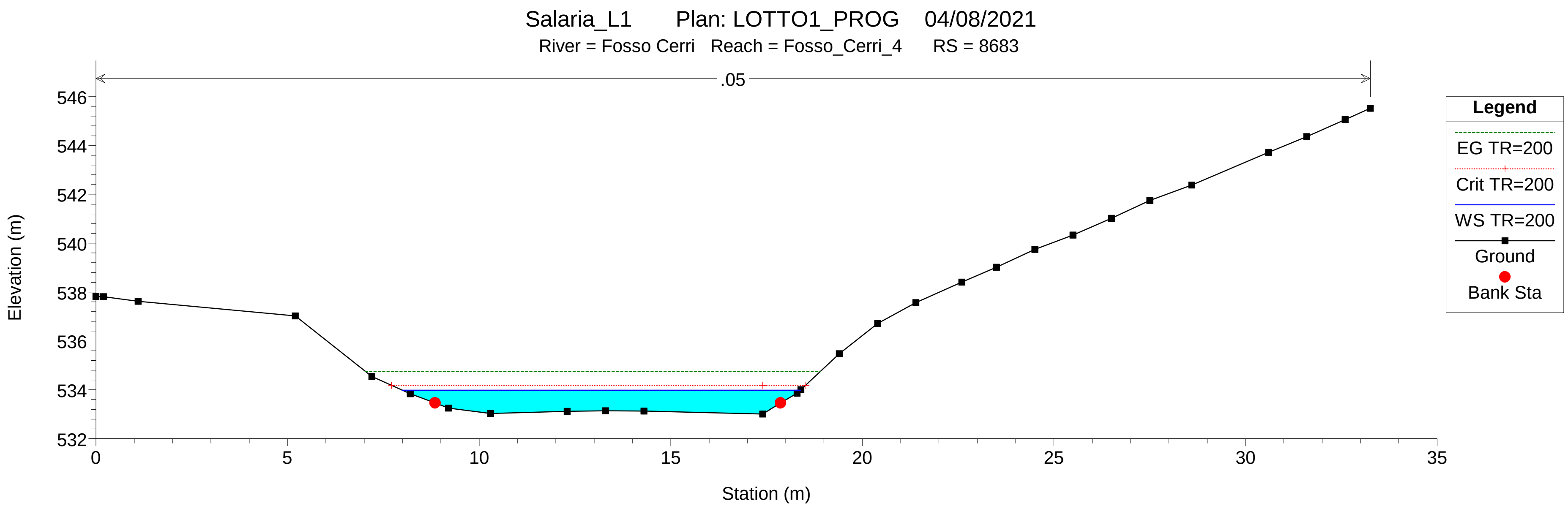


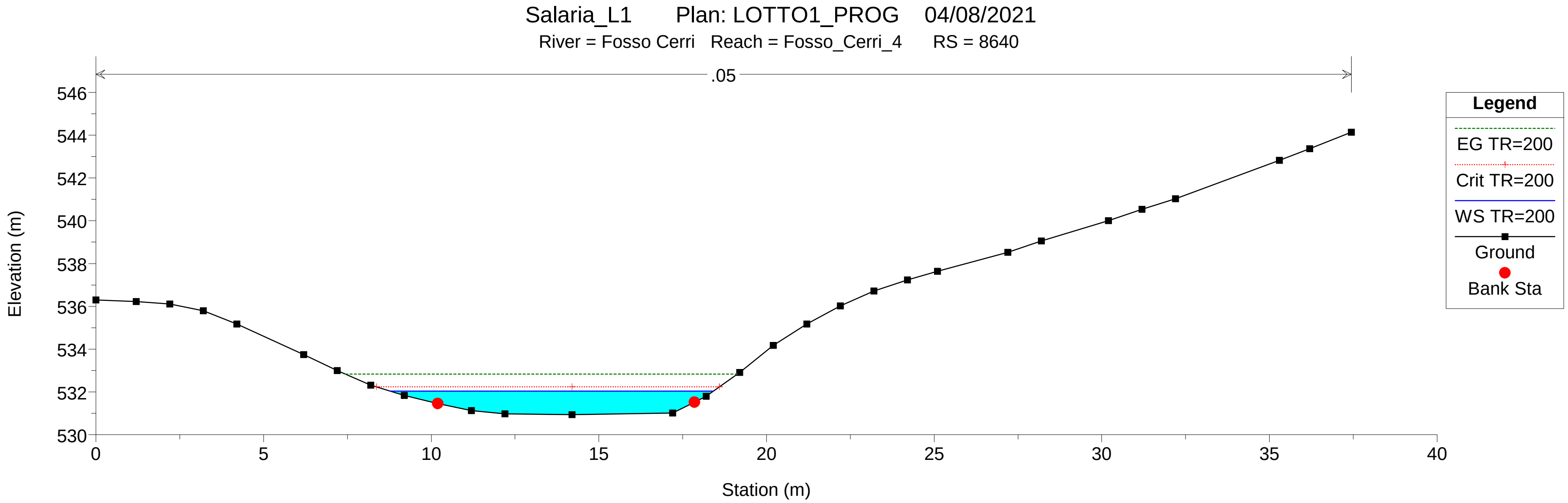
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_3 RS = 8881
.05
Elevation (m)
552
550
548
546
544
542
540
538
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

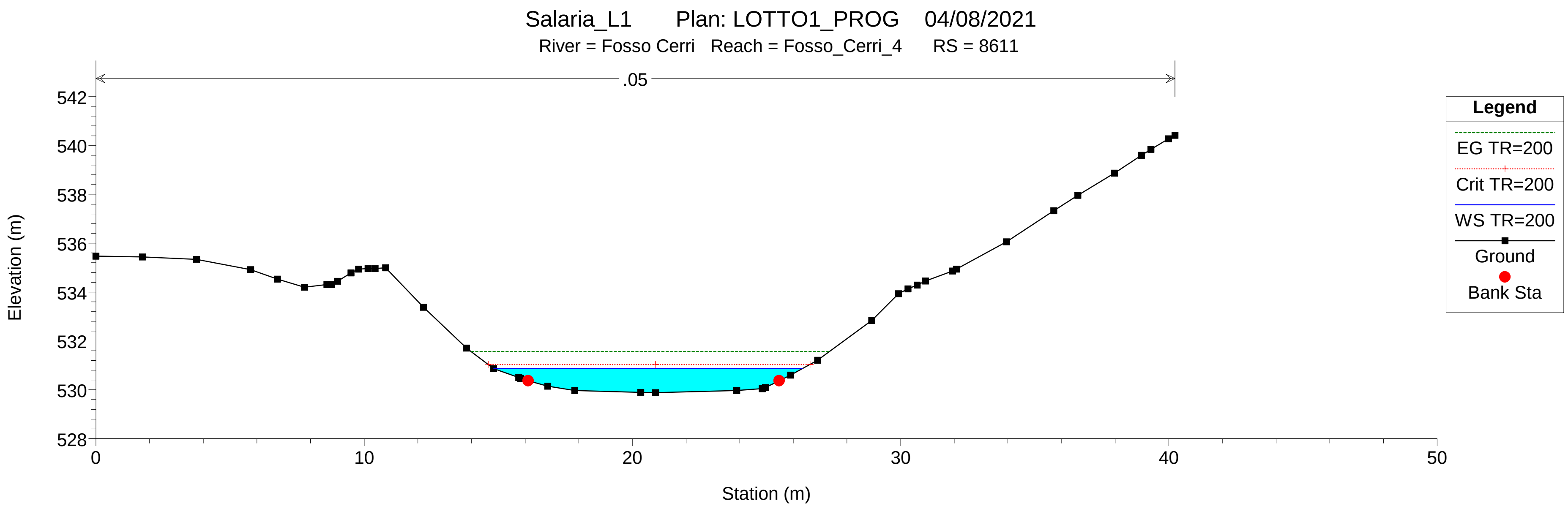


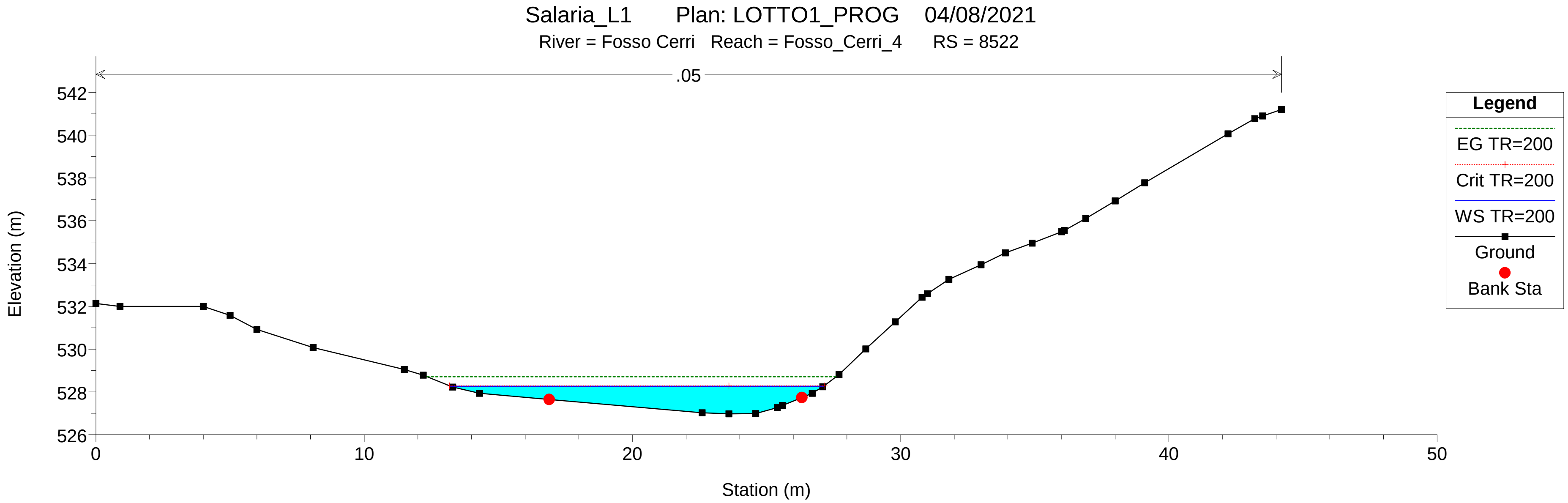
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8774
.05
Elevation (m)
546
544
542
540
538
536
534
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

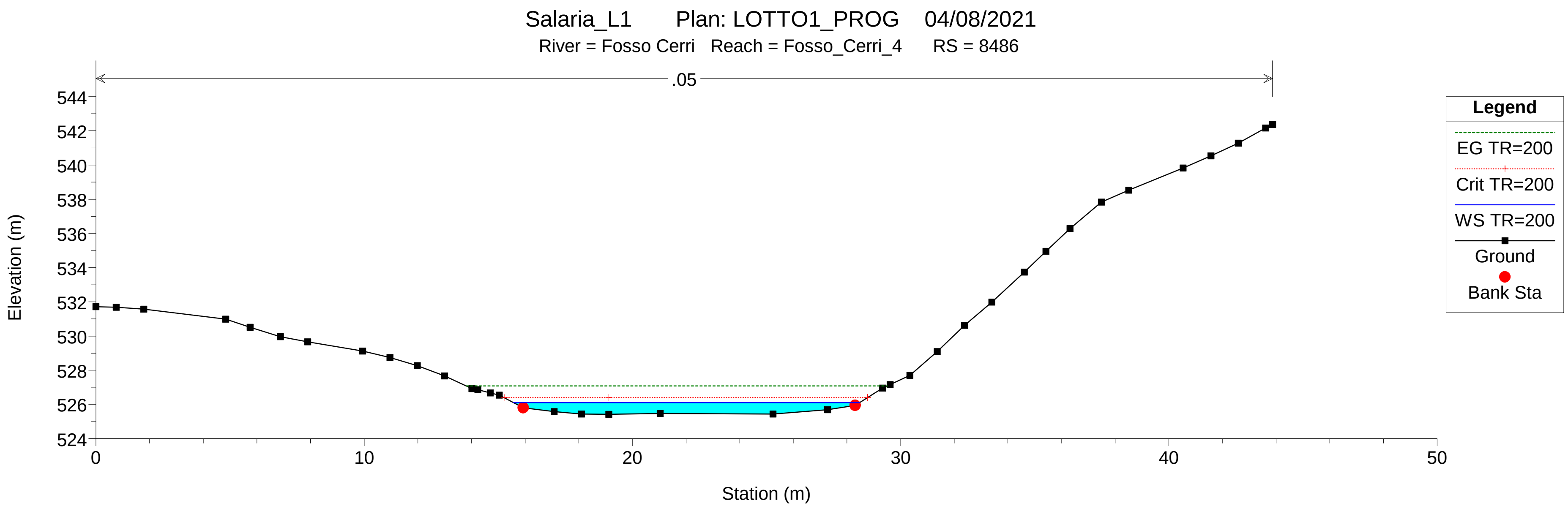

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8731
.05
Elevation (m)
544
542
540
538
536
534
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

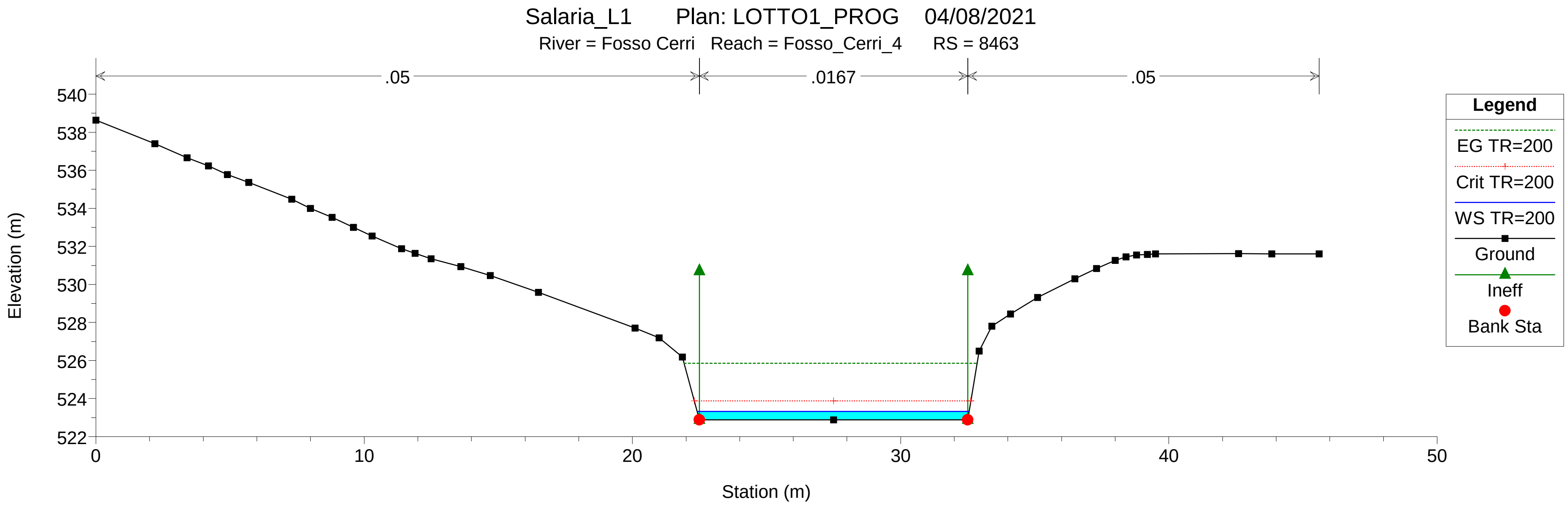

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8683
.05
Elevation (m)
546
544
542
540
538
536
534
532
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

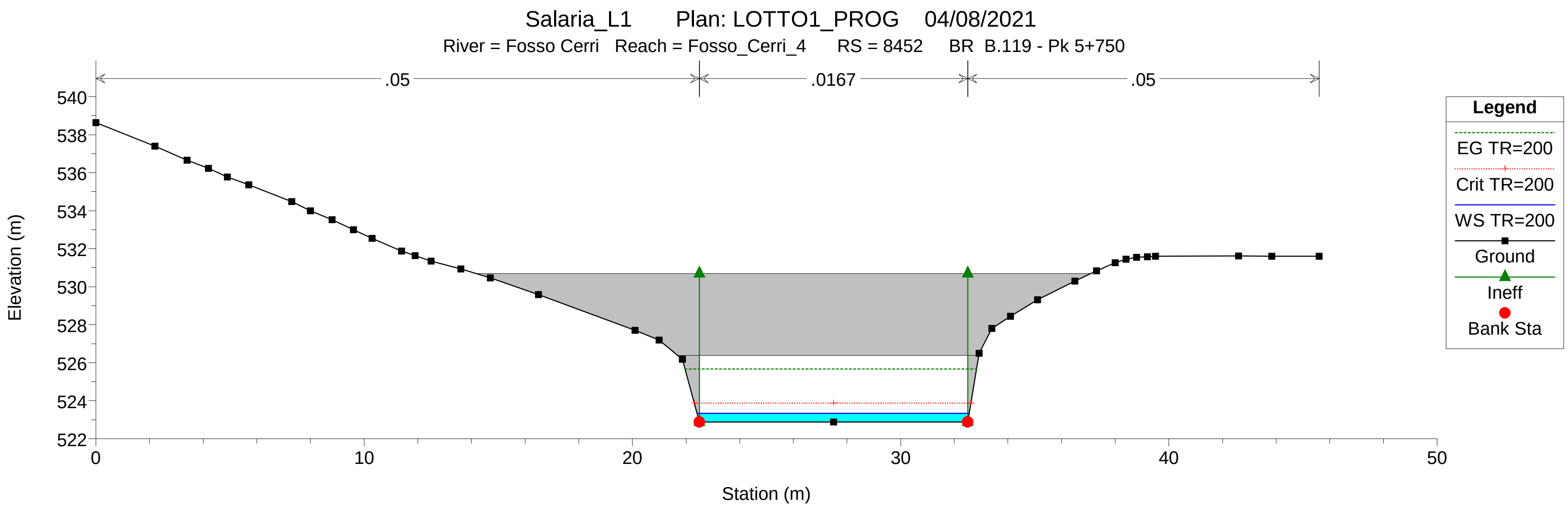

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8640
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

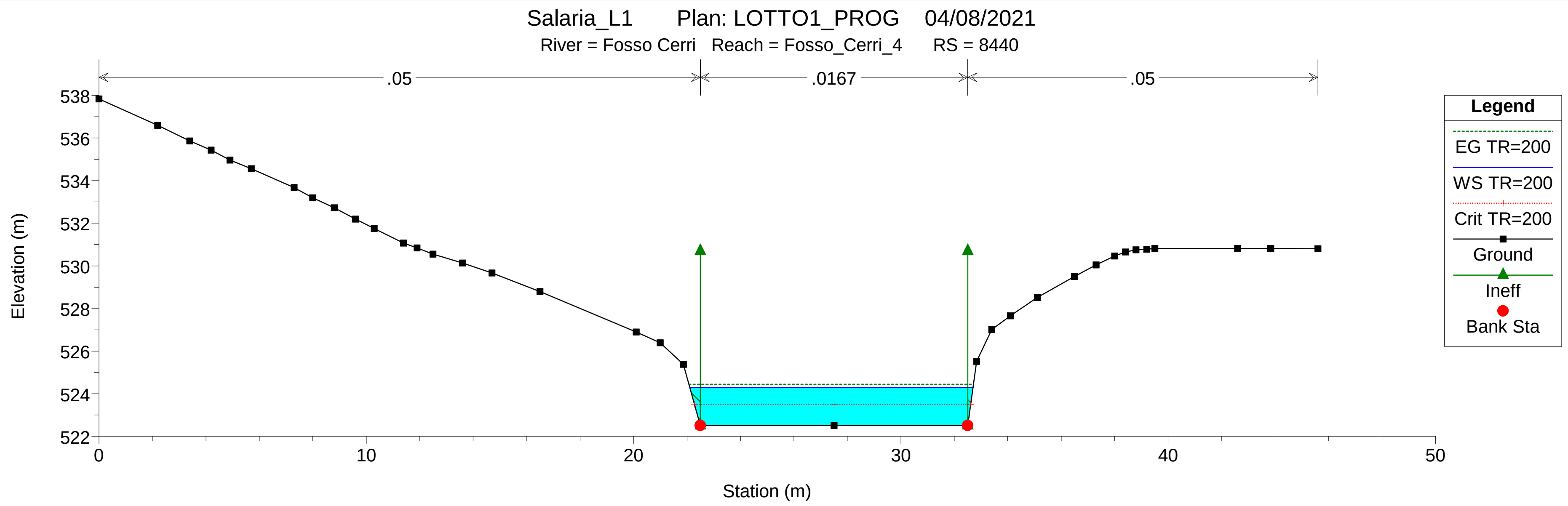

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8611
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8522
.05
Elevation (m)
542
540
538
536
534
532
530
528
526
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

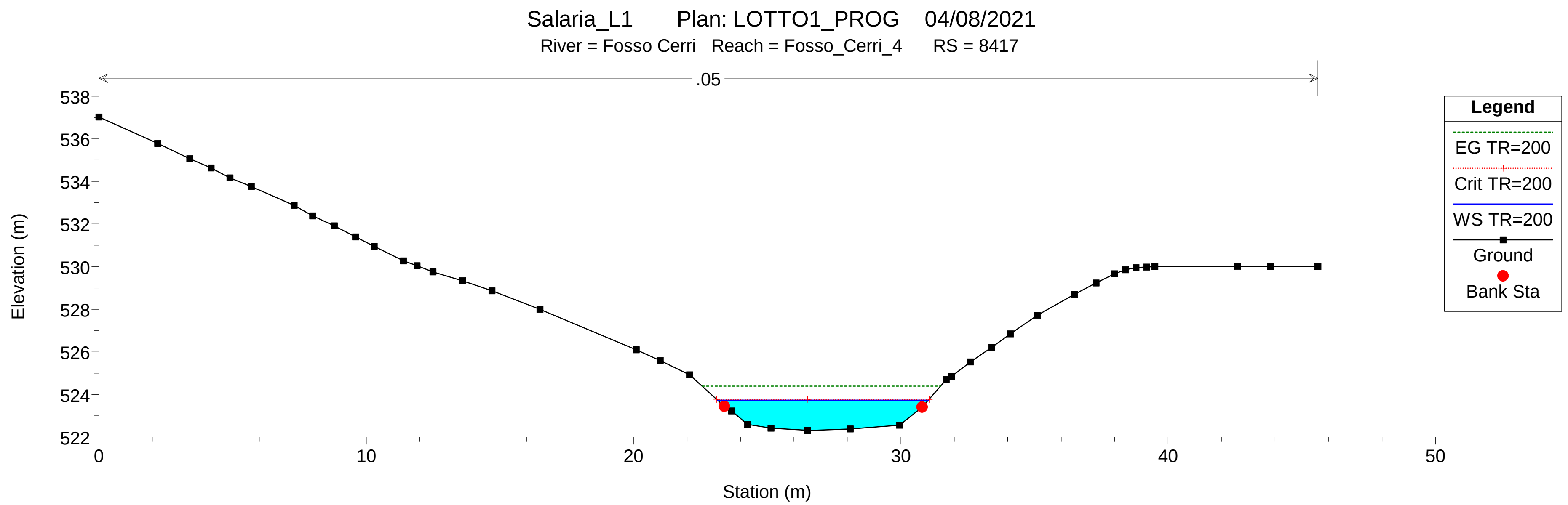

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8486
.05
Elevation (m)
544
542
540
538
536
534
532
530
528
526
524
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8463
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

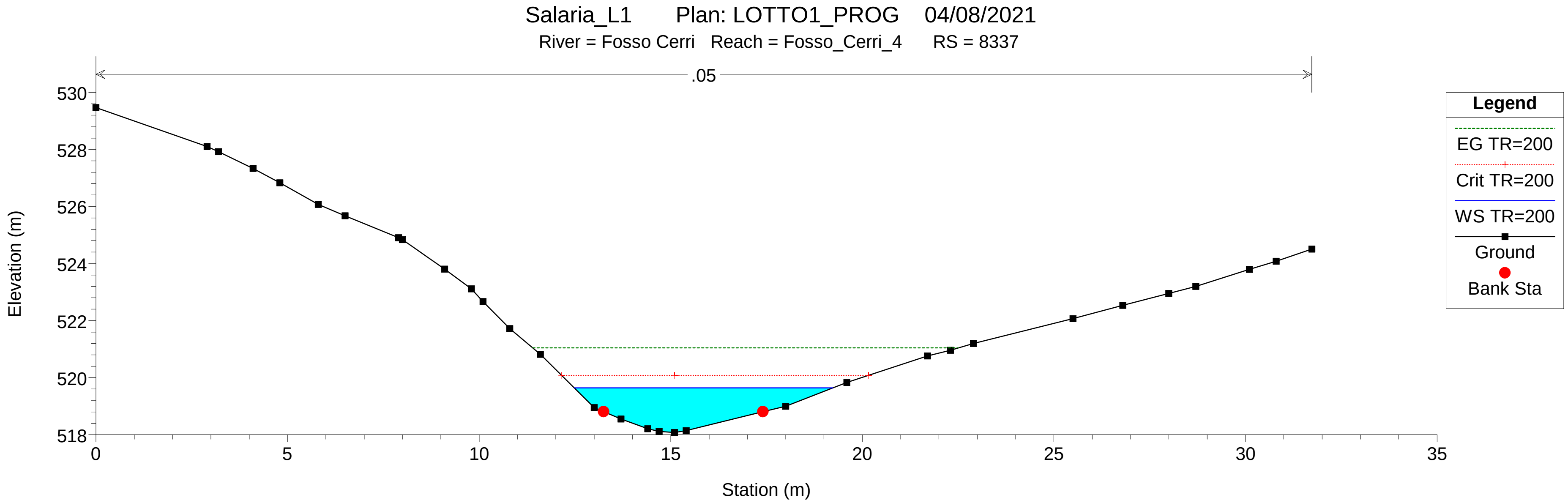

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8452 BR B.119 - Pk 5+750
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta



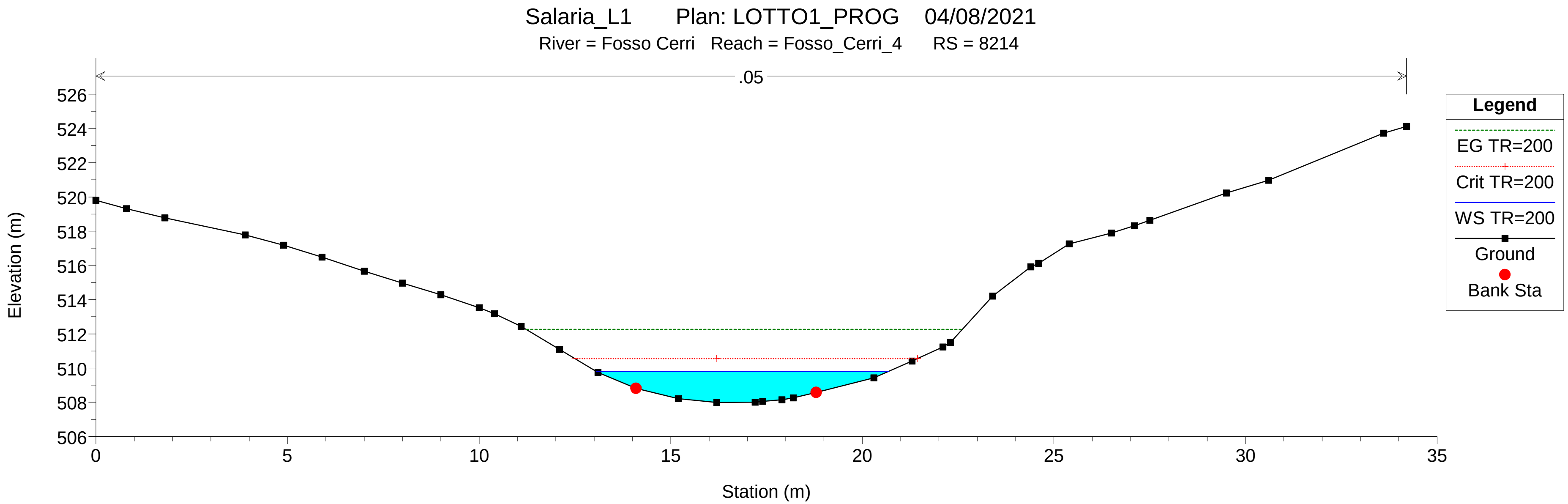
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8440
.05
.0167
.05
Elevation (m)
538
536
534
532
530
528
526
524
522
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



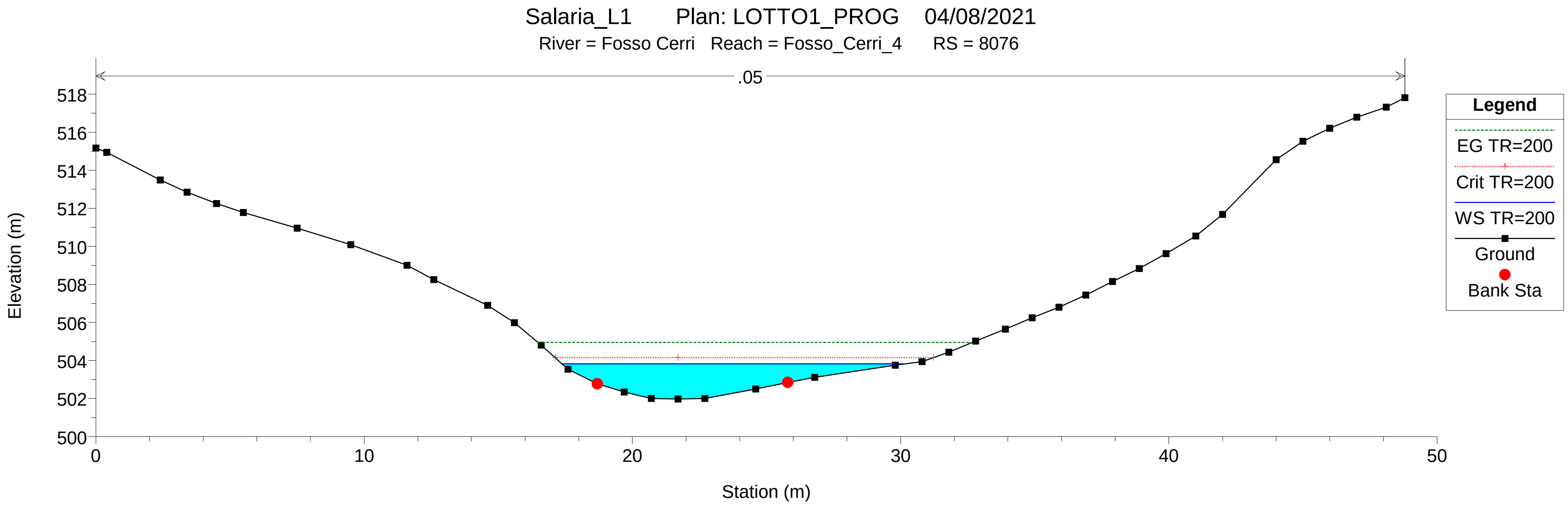
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8417
.05
Elevation (m)
538
536
534
532
530
528
526
524
522
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



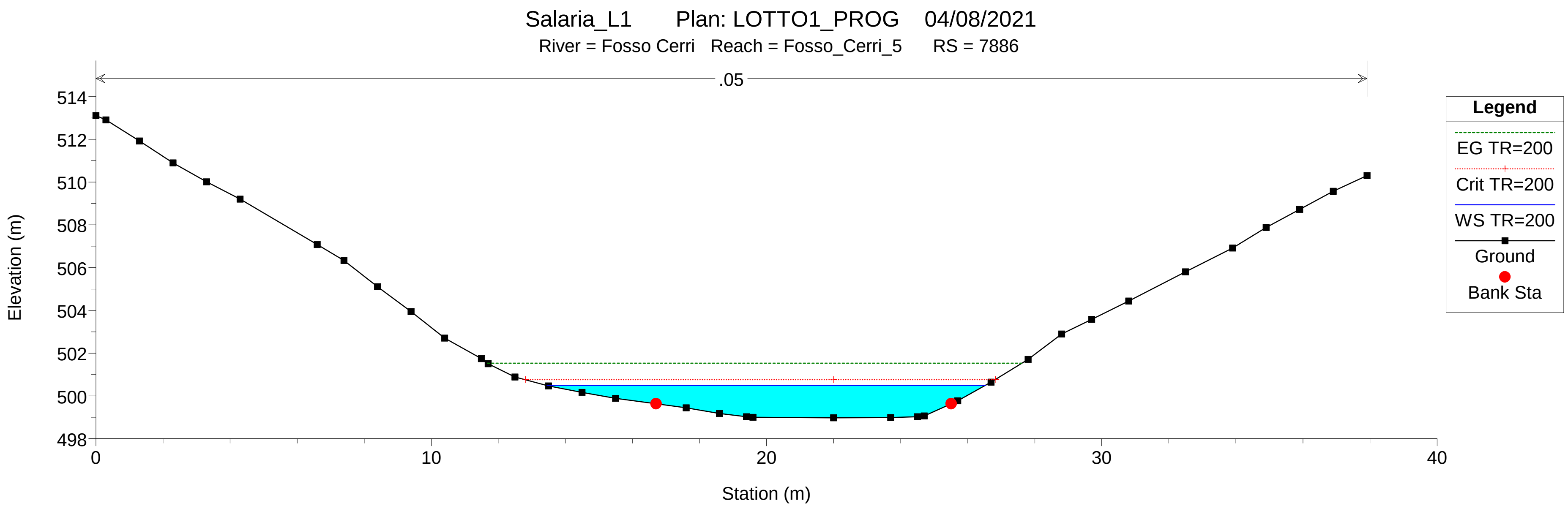
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8337
.05
Elevation (m)
530
528
526
524
522
520
518
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



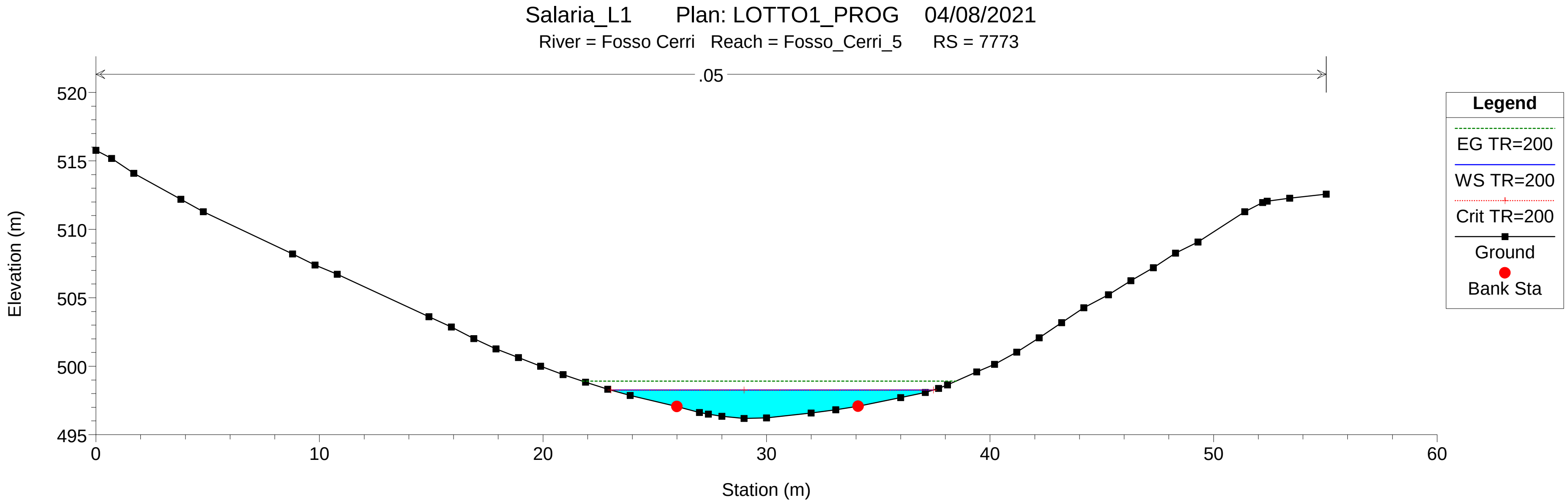
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8214
.05
Elevation (m)
526
524
522
520
518
516
514
512
510
508
506
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



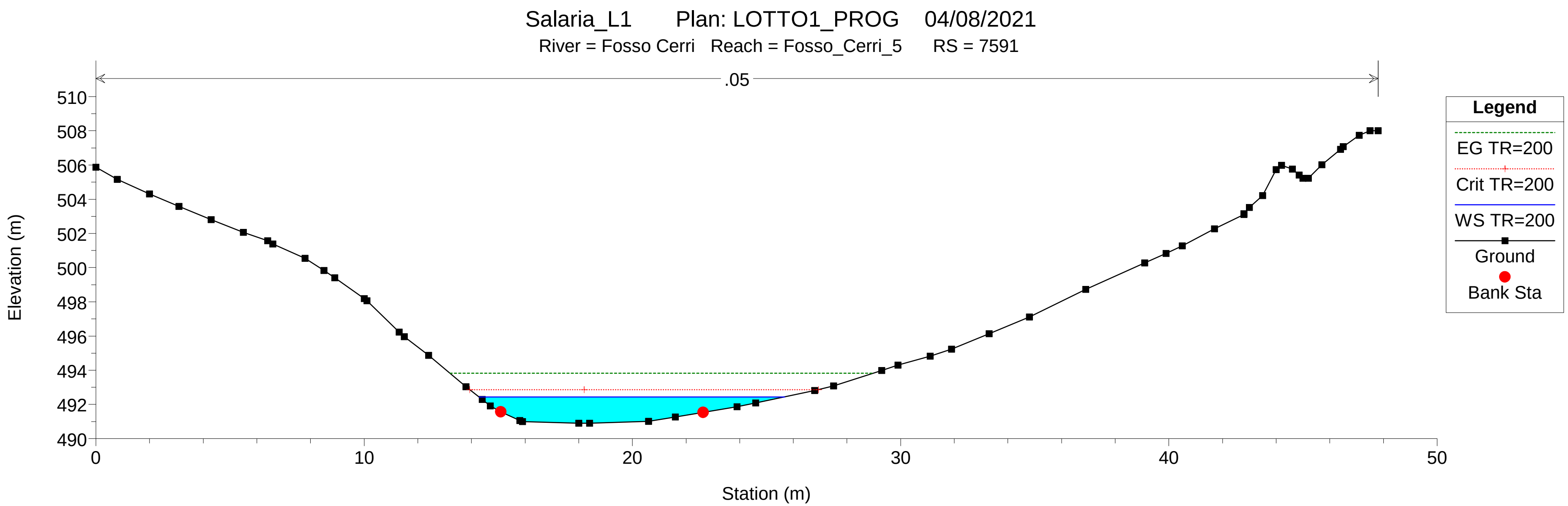
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_4 RS = 8076
.05
Elevation (m)
518
516
514
512
510
508
506
504
502
500
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



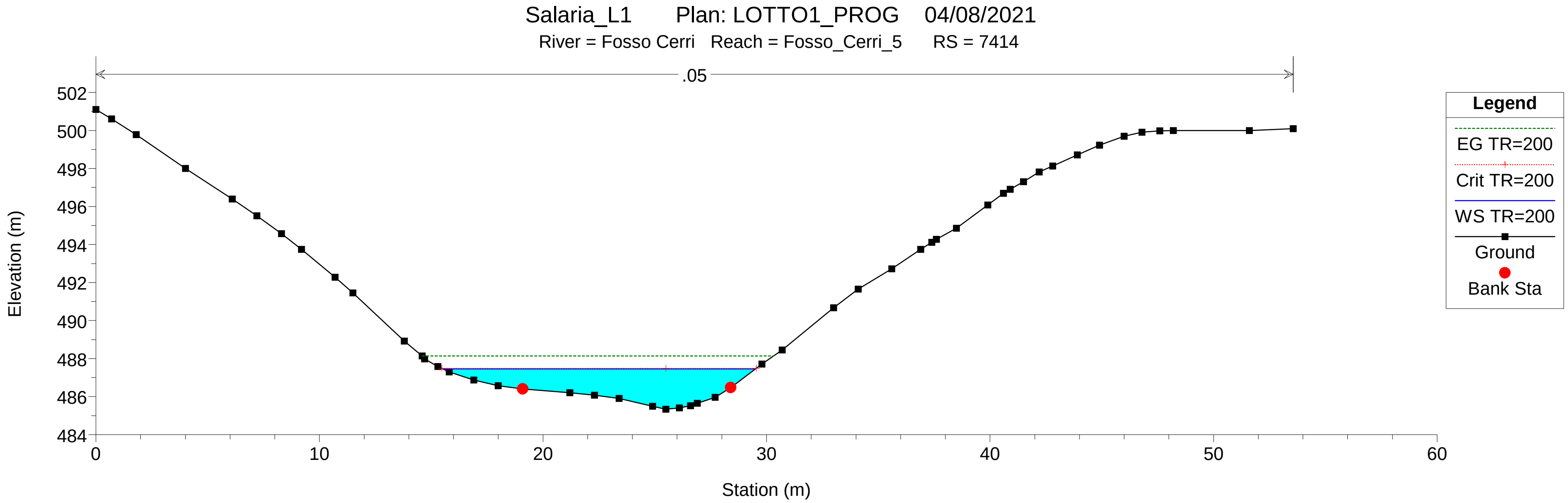
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_5 RS = 7886
.05
Elevation (m)
514
512
510
508
506
504
502
500
498
0
10
20
30
40
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

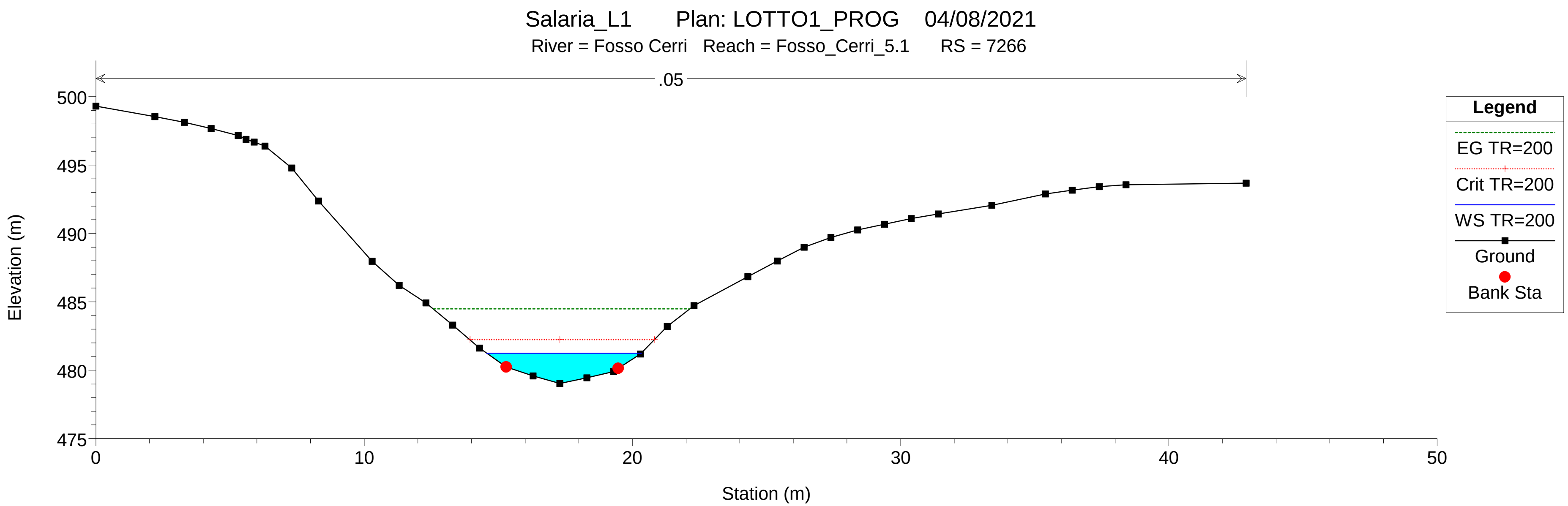


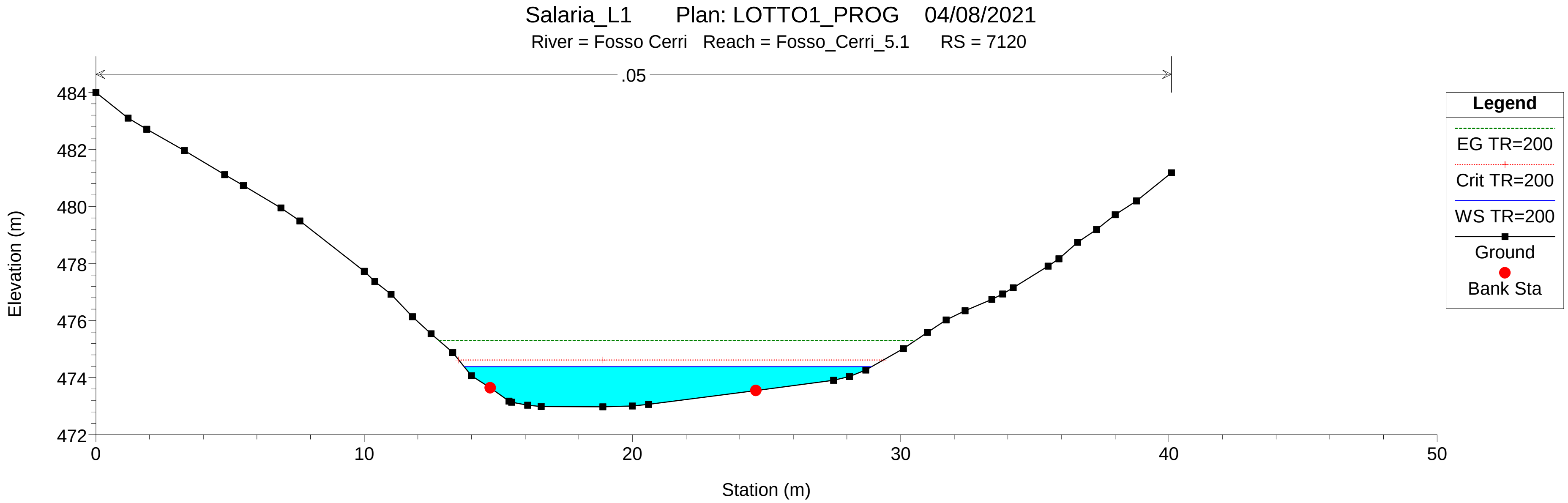
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_5 RS = 7773
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

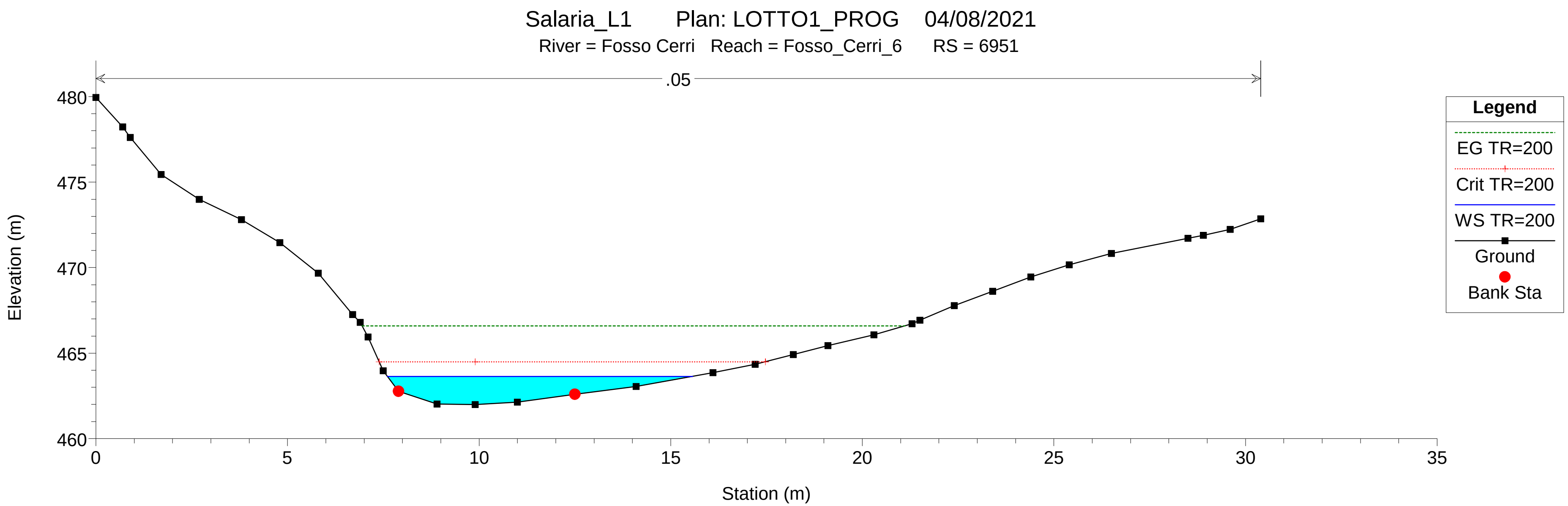


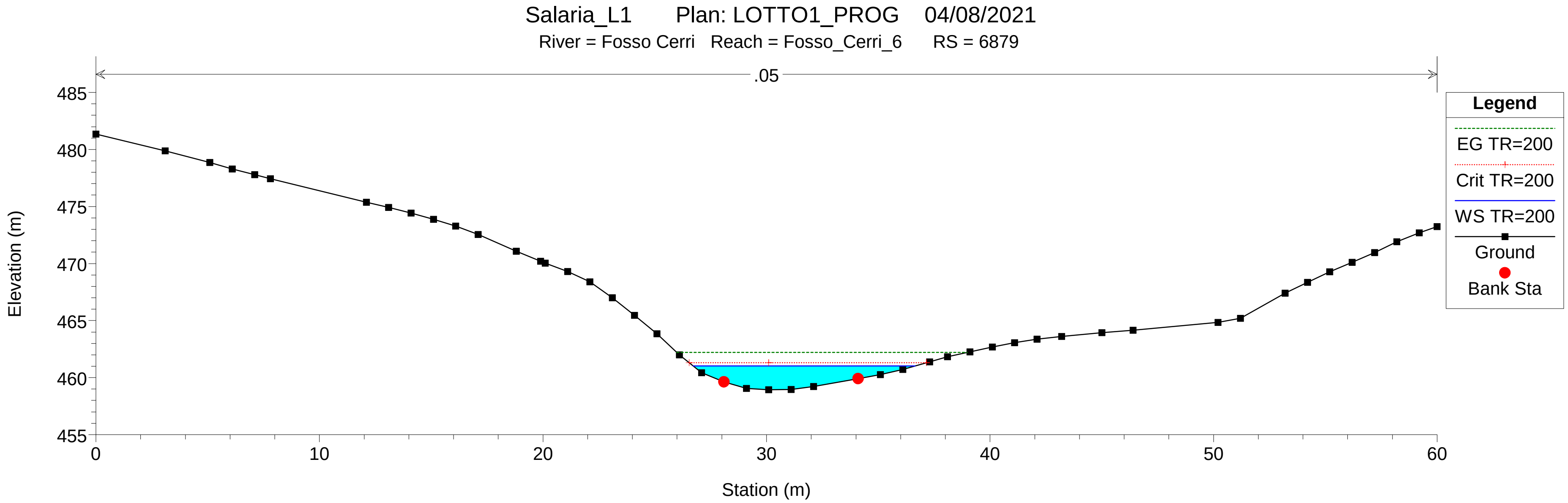
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_5 RS = 7591
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_5 RS = 7414
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

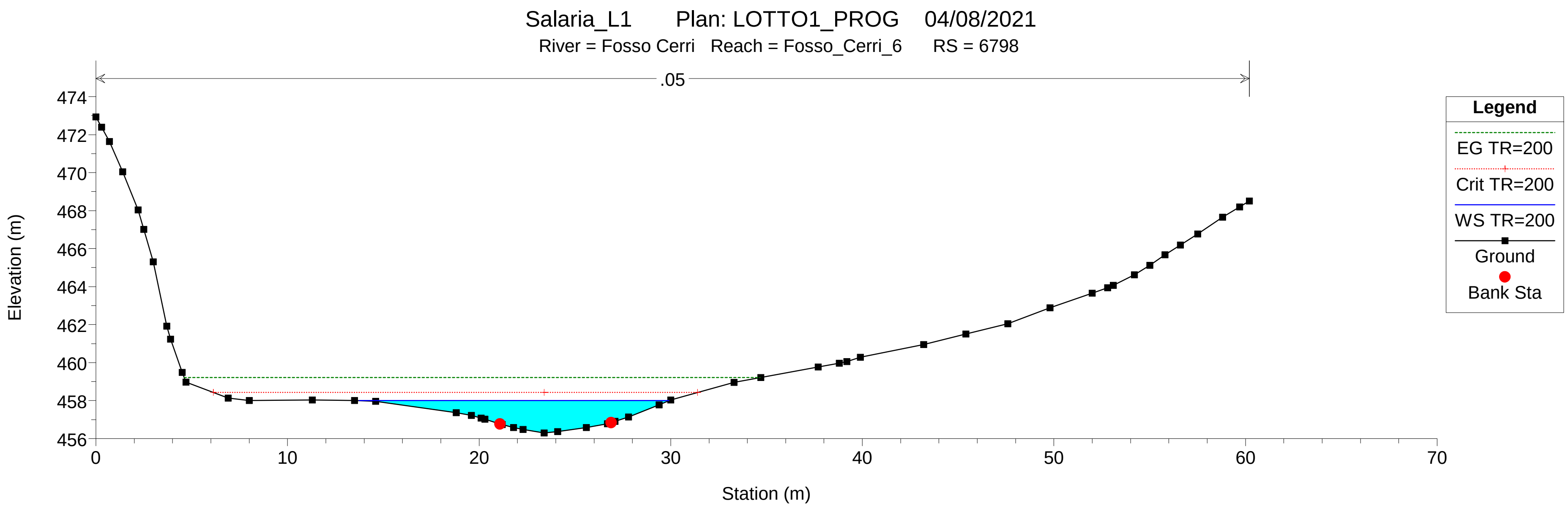

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_5.1 RS = 7266
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_5.1 RS = 7120
.05
Elevation (m)
484
482
480
478
476
474
472
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

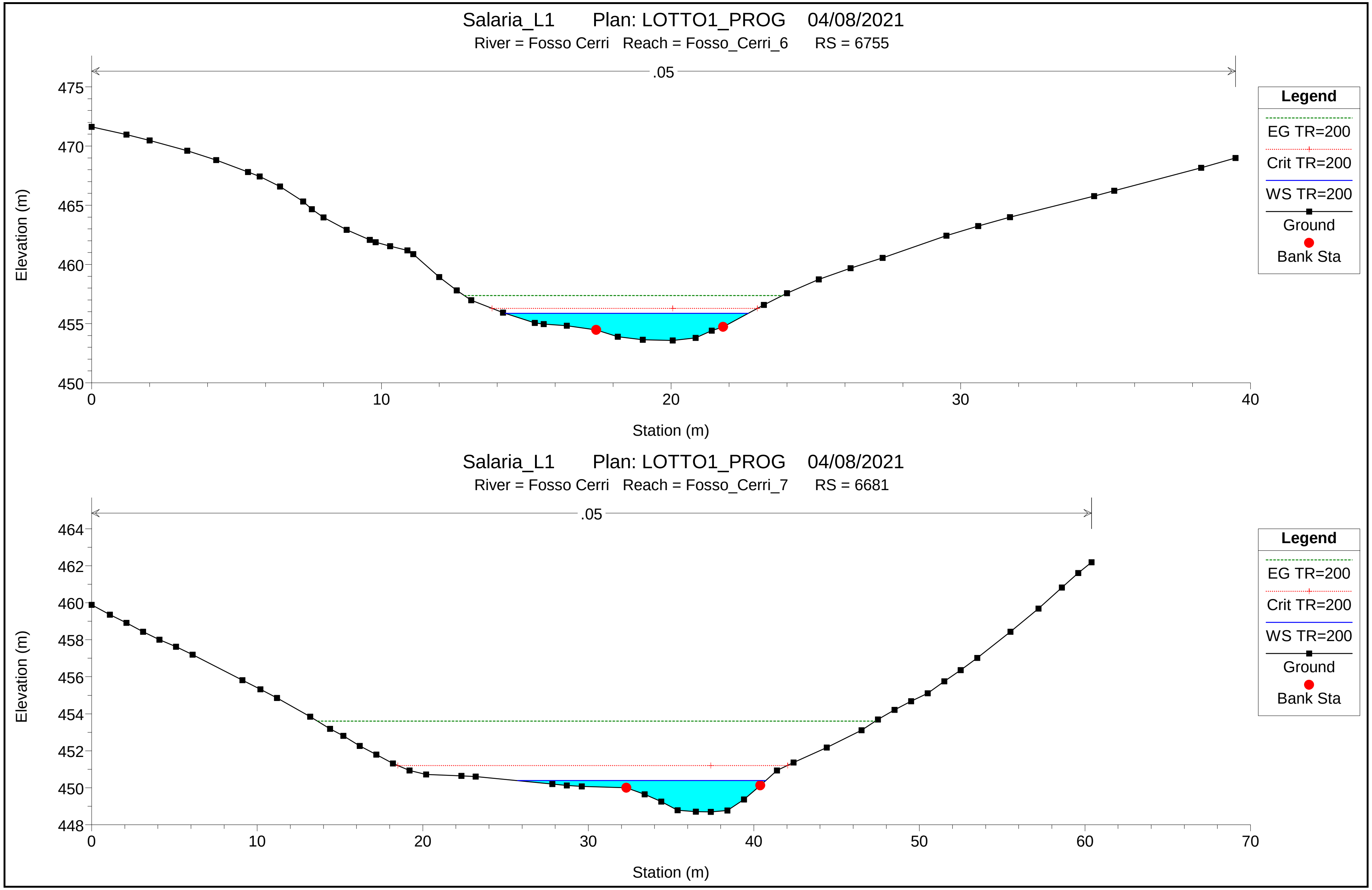

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_6 RS = 6951
.05
Elevation (m)
480
475
470
465
460
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



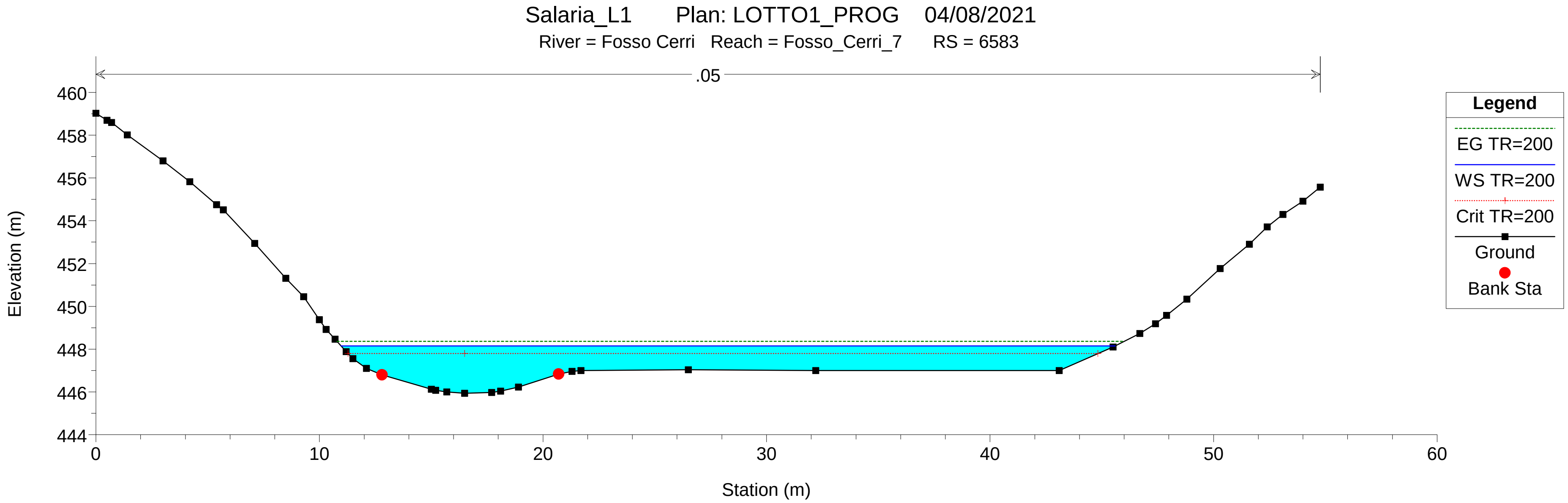
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_6 RS = 6879
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

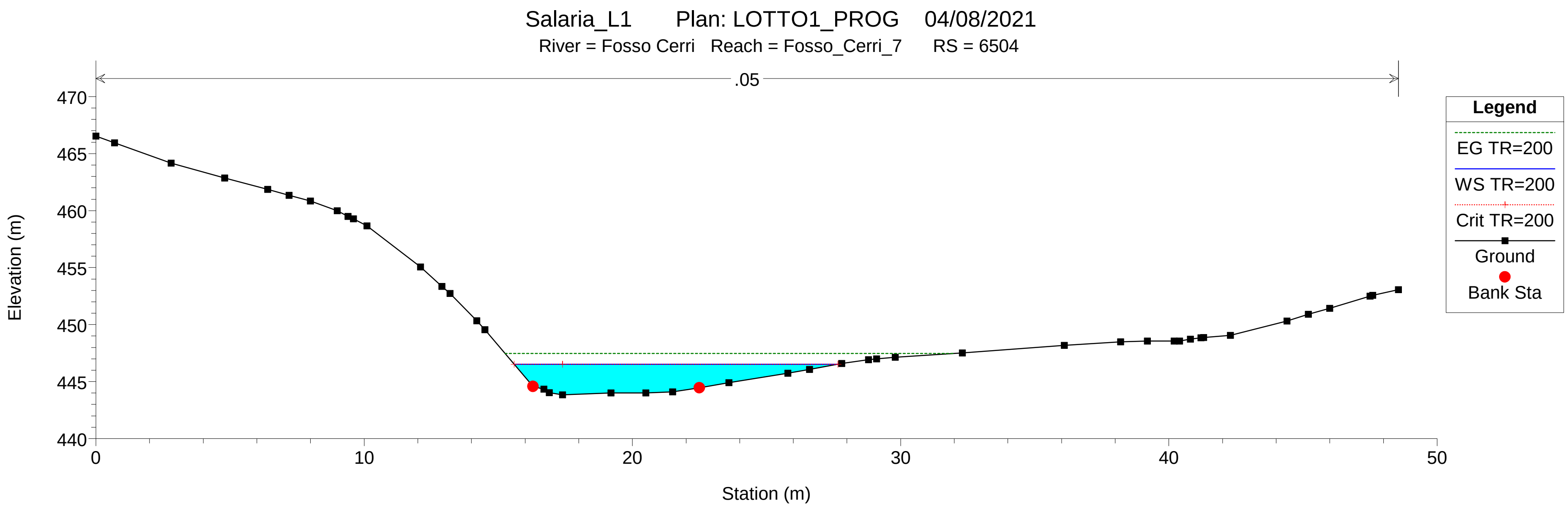


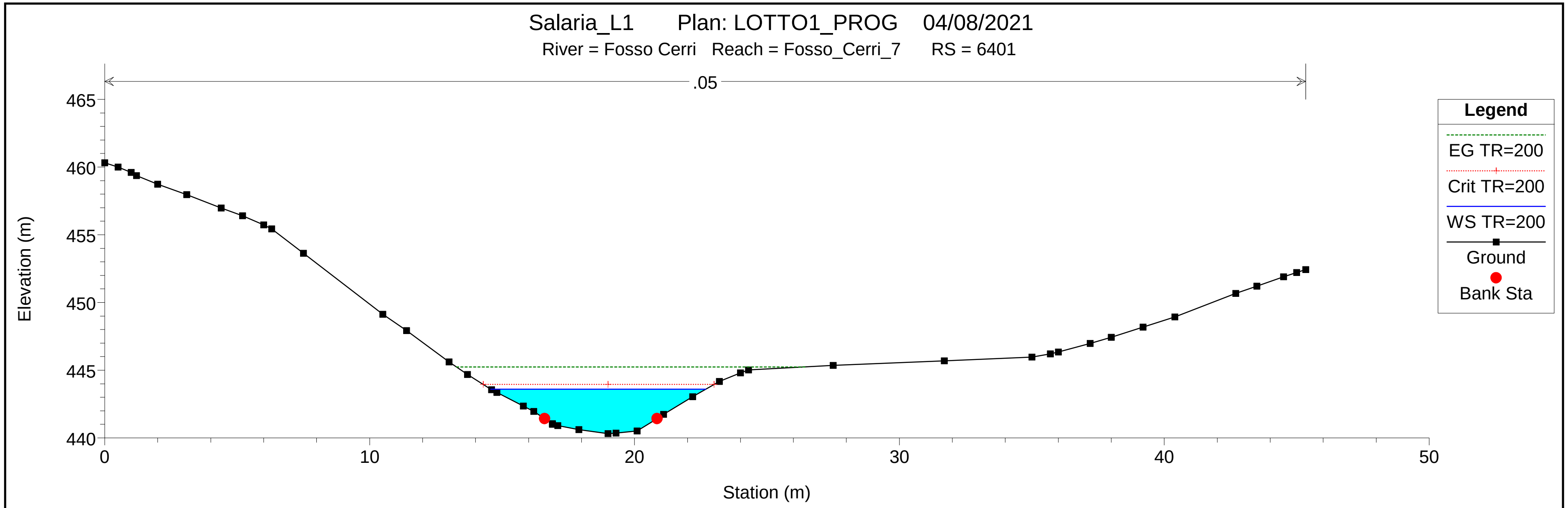
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_6 RS = 6798
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



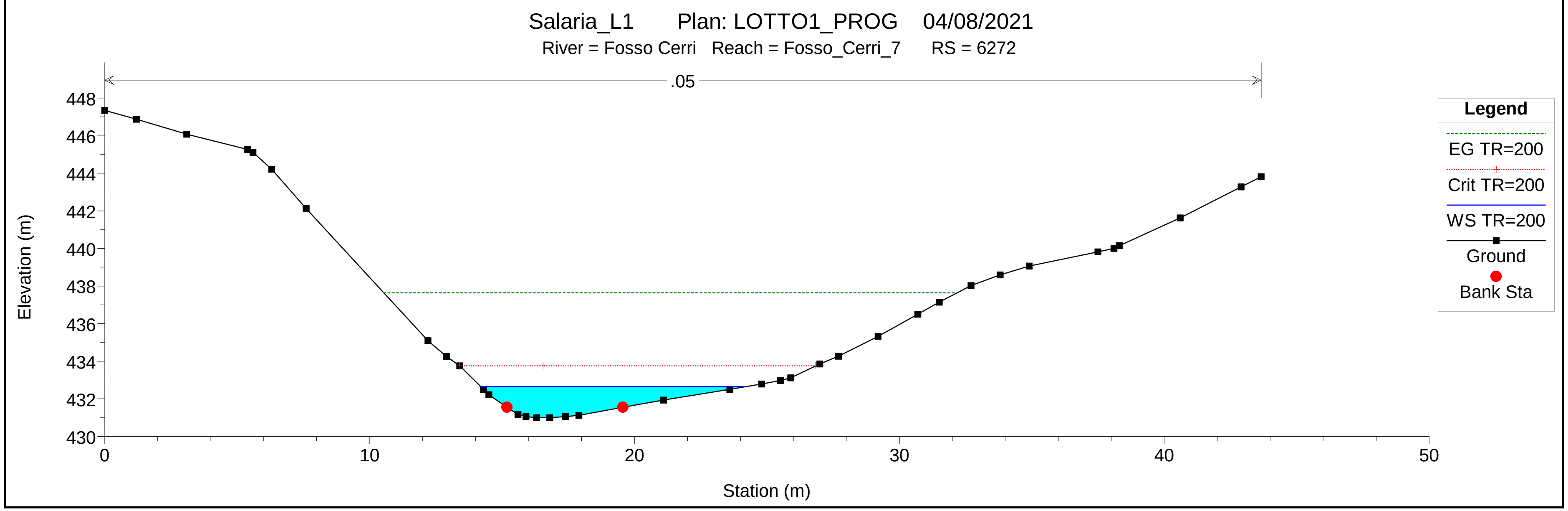
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_6 RS = 6755
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6681
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6583
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

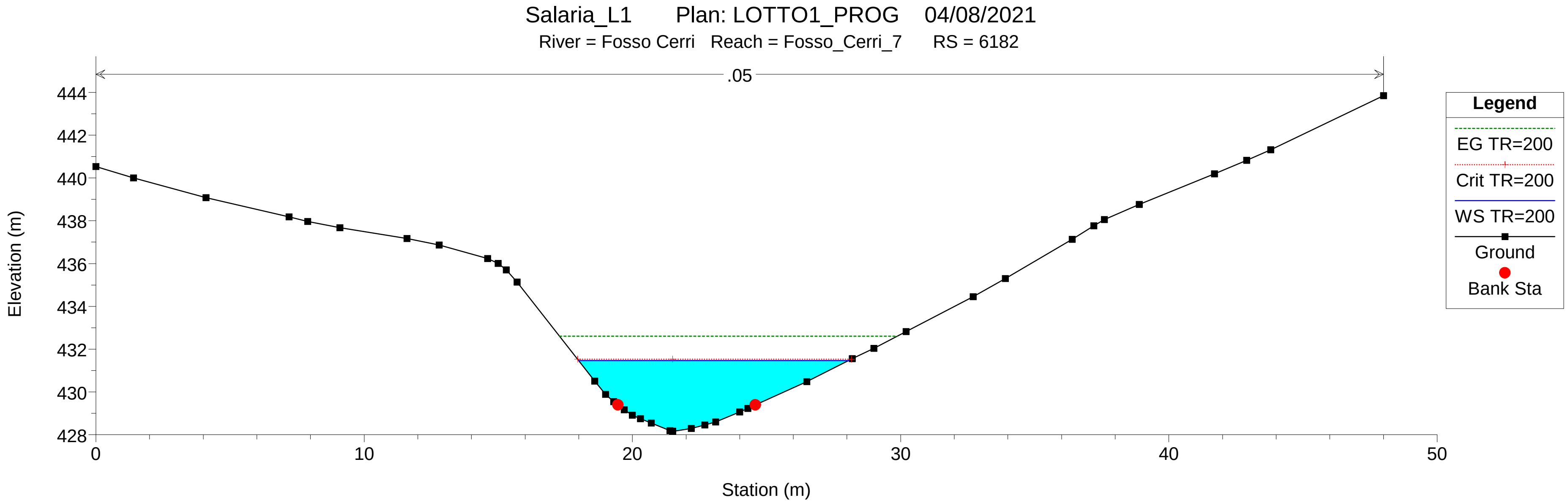

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6504
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

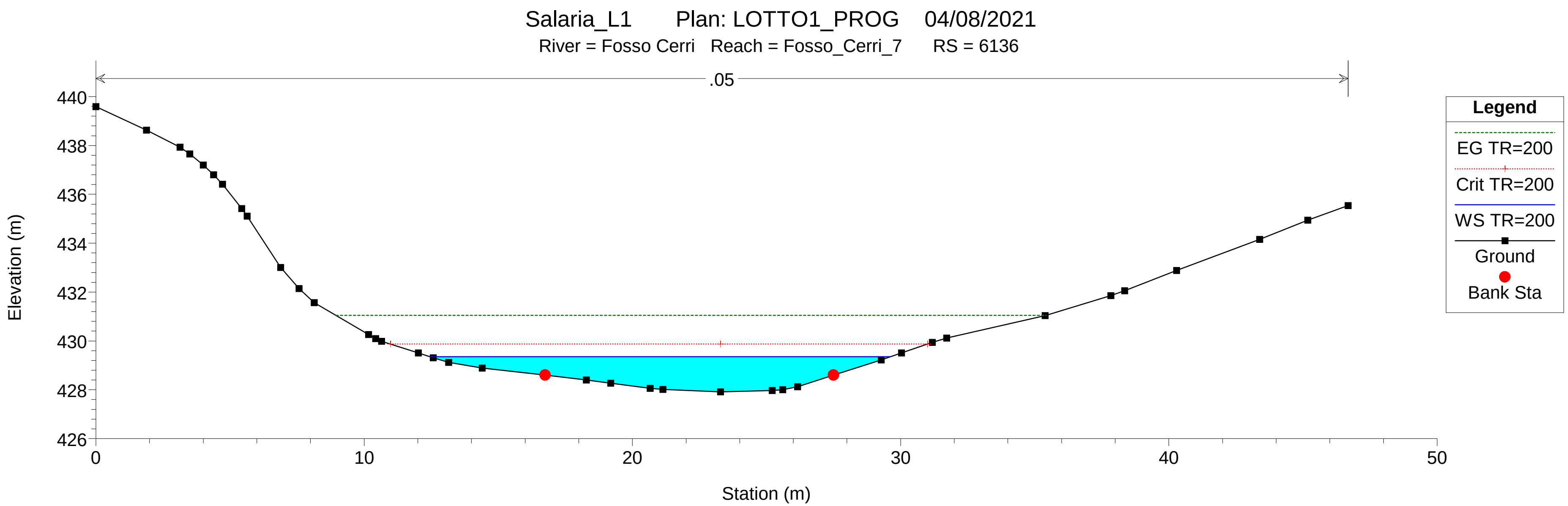


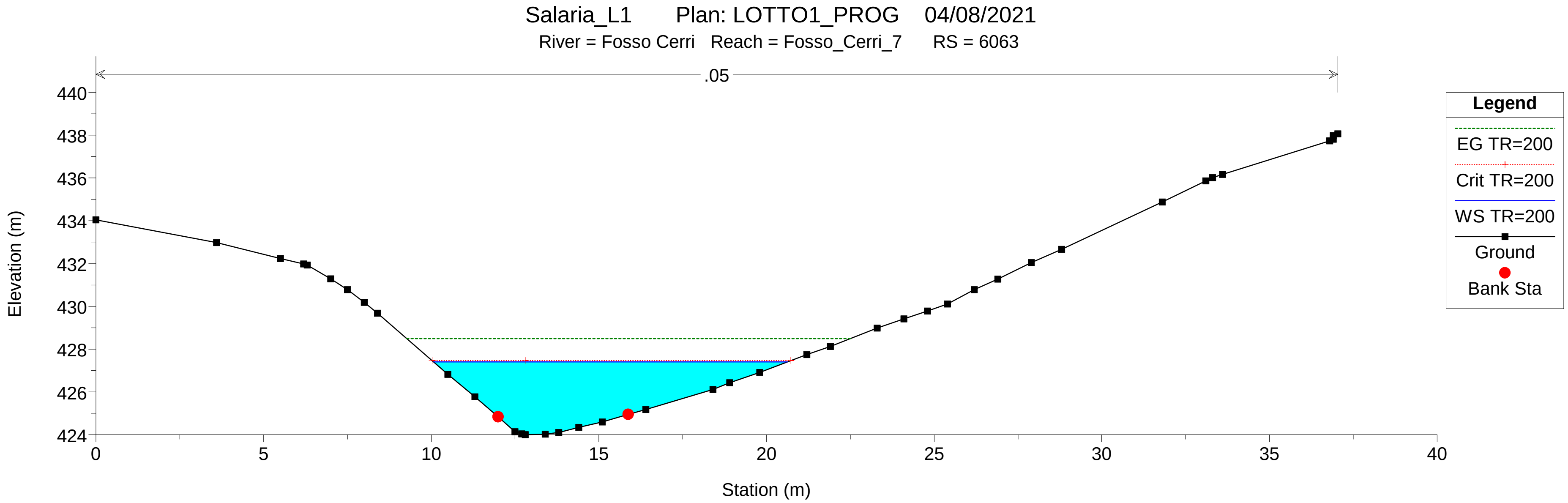
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6401
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

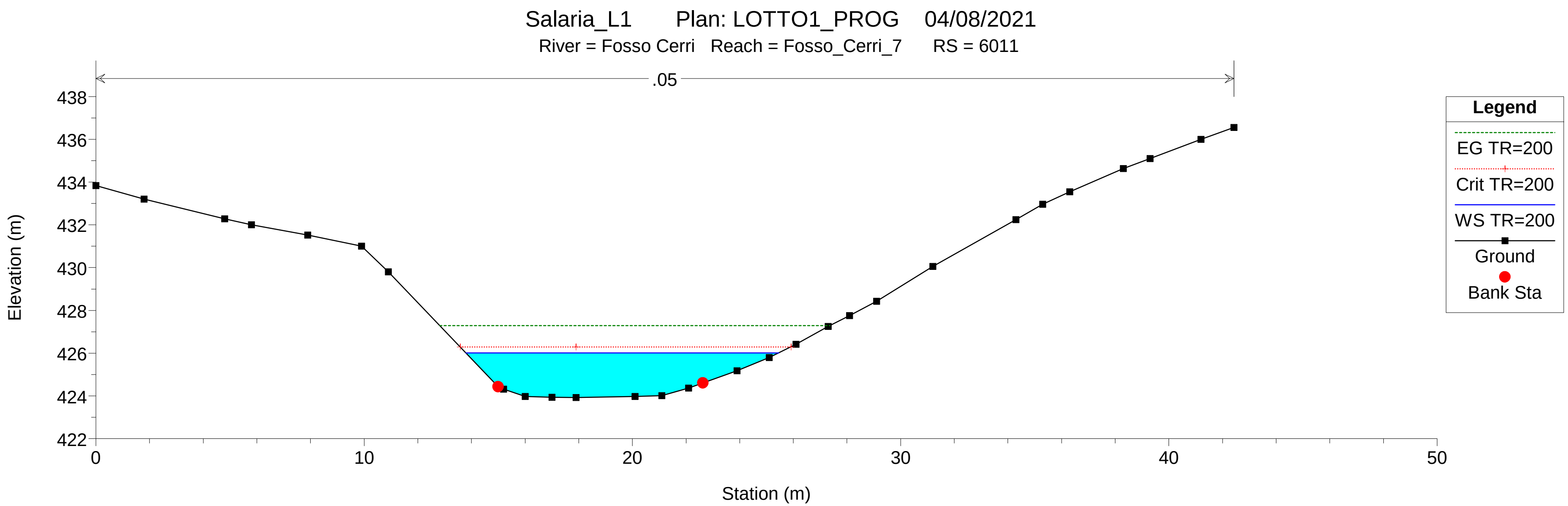


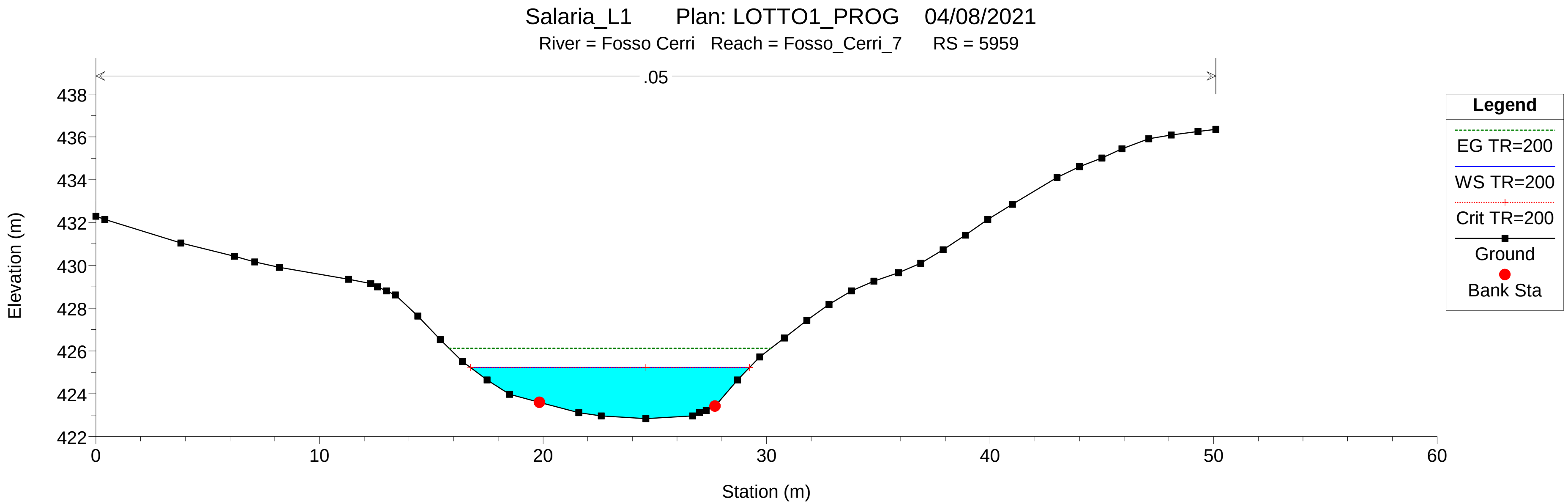
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6272
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

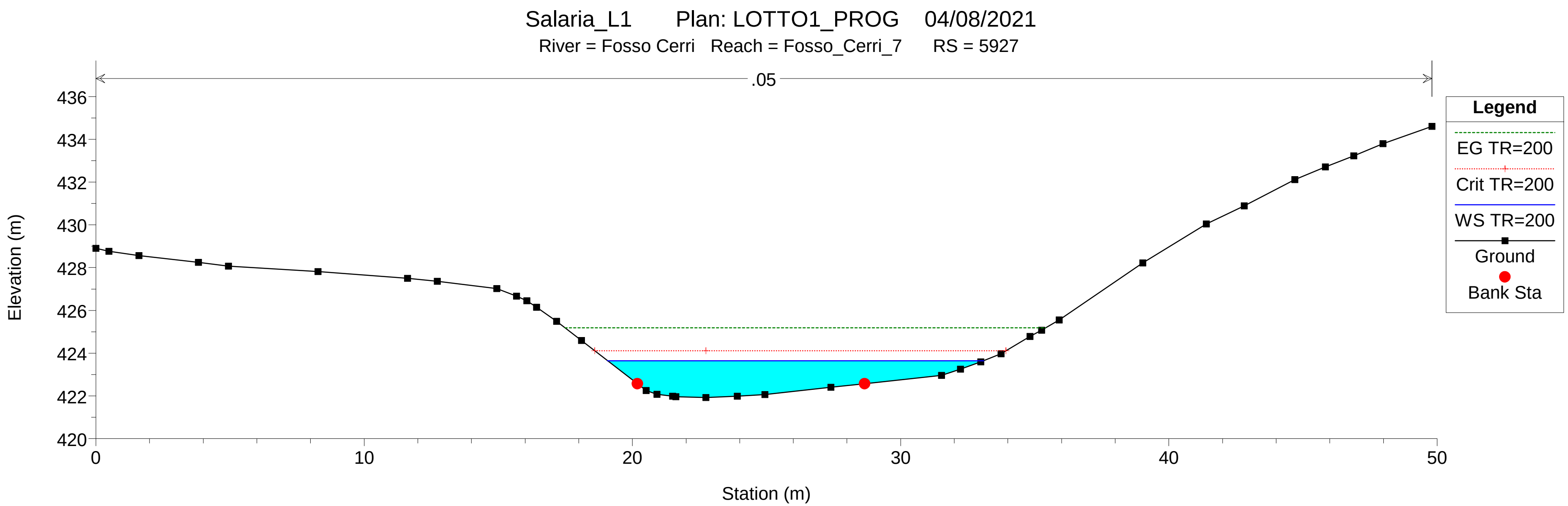

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6182
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

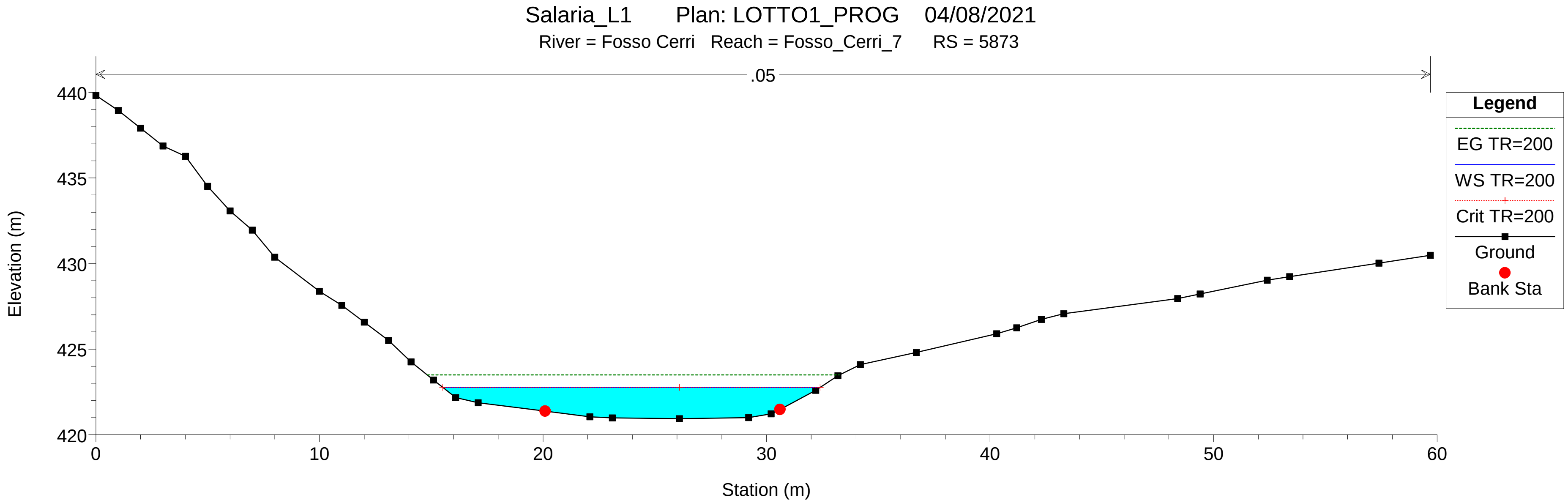

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6136
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

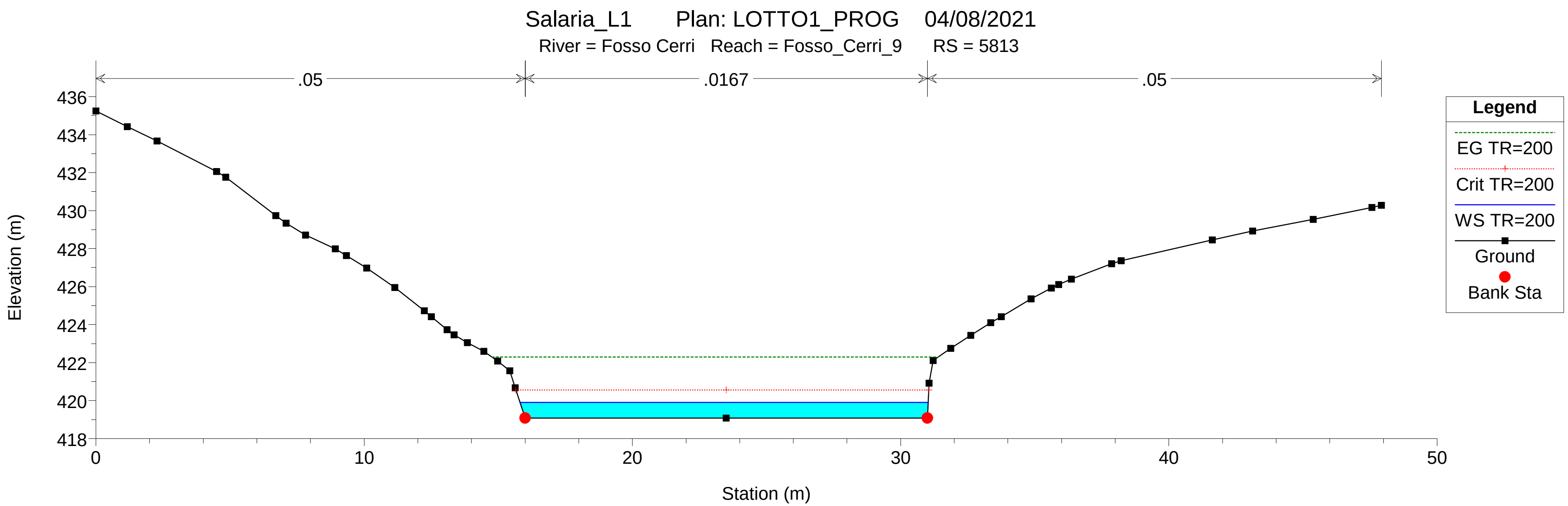

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6063
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

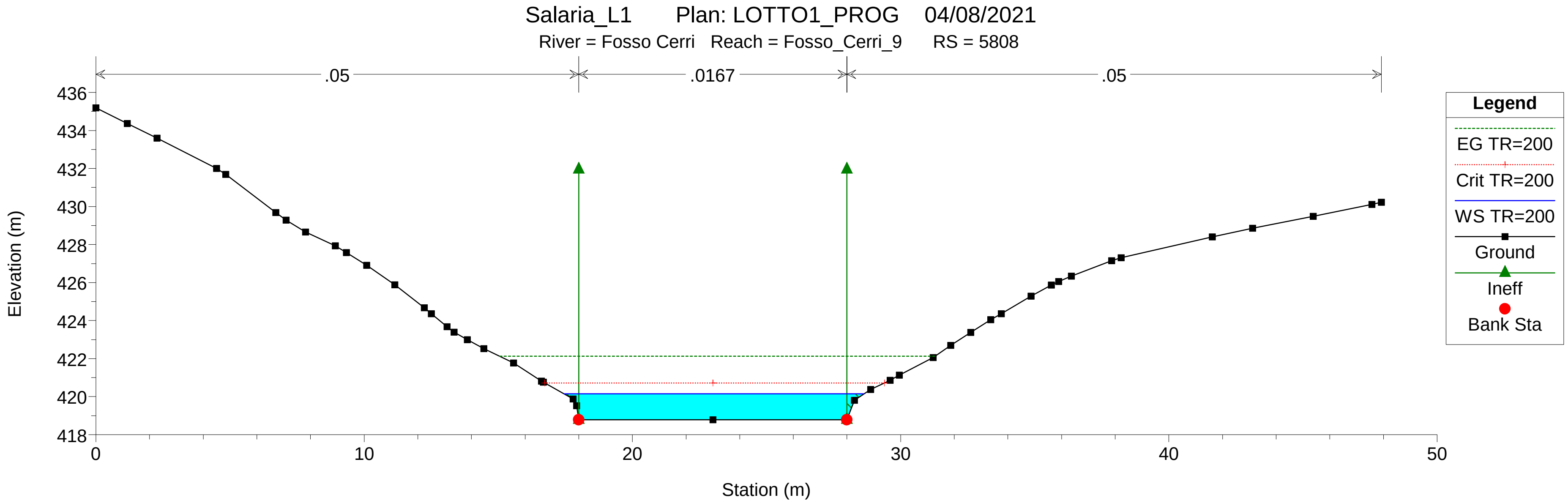

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 6011
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

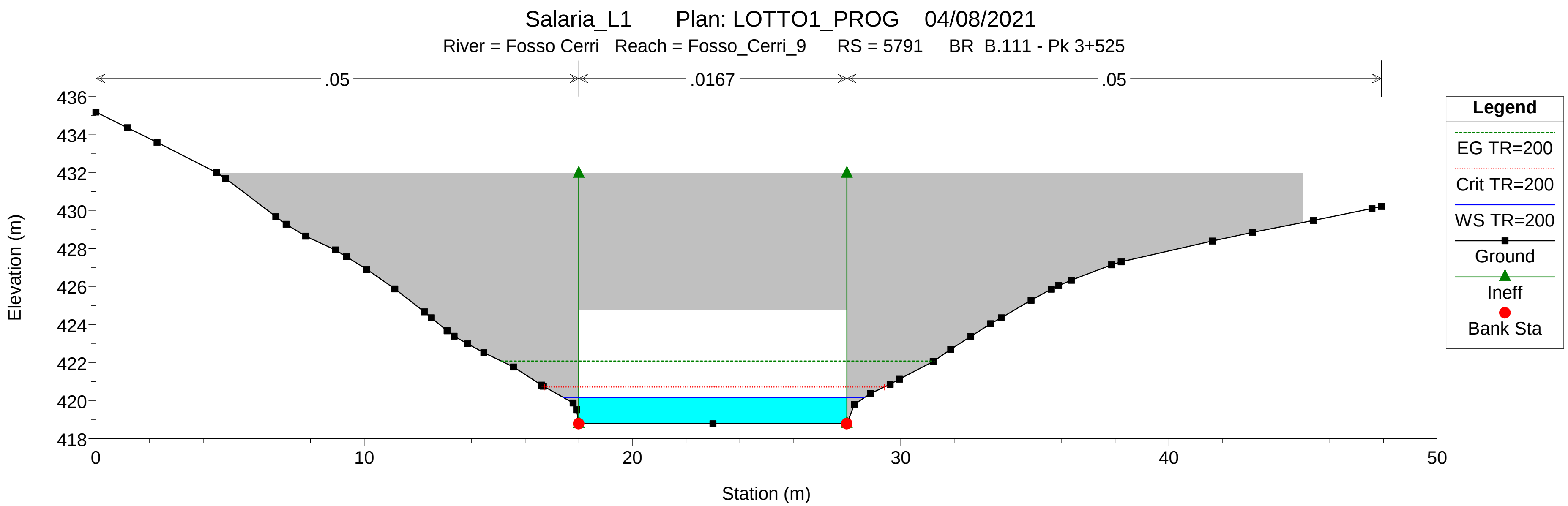

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 5959
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

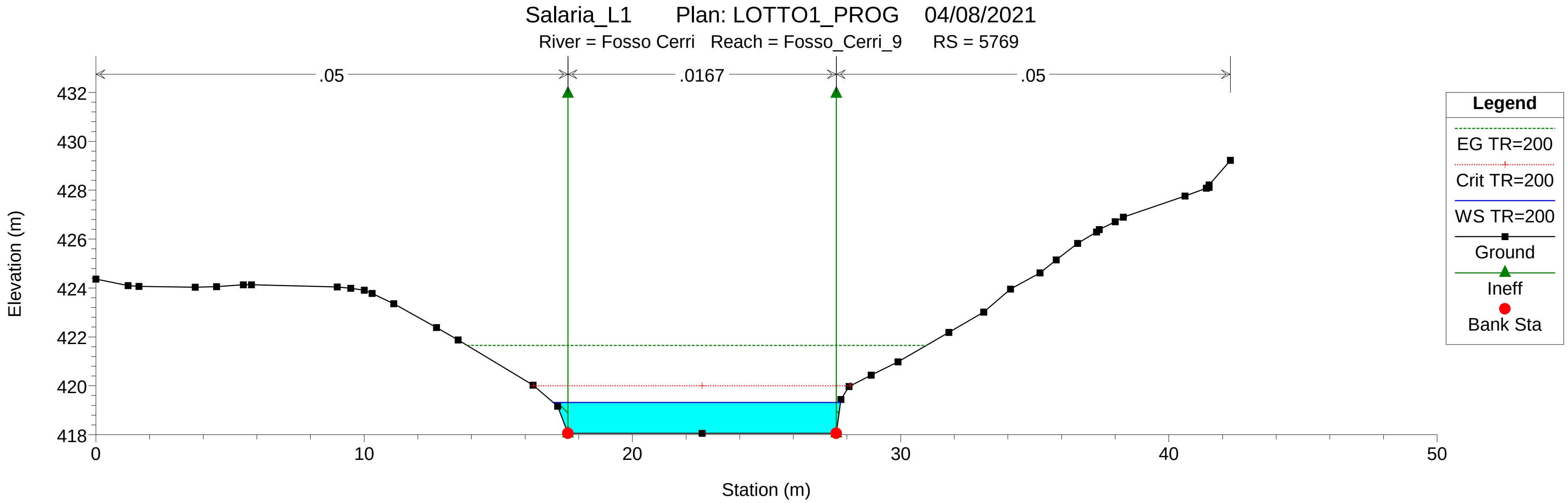

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 5927
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

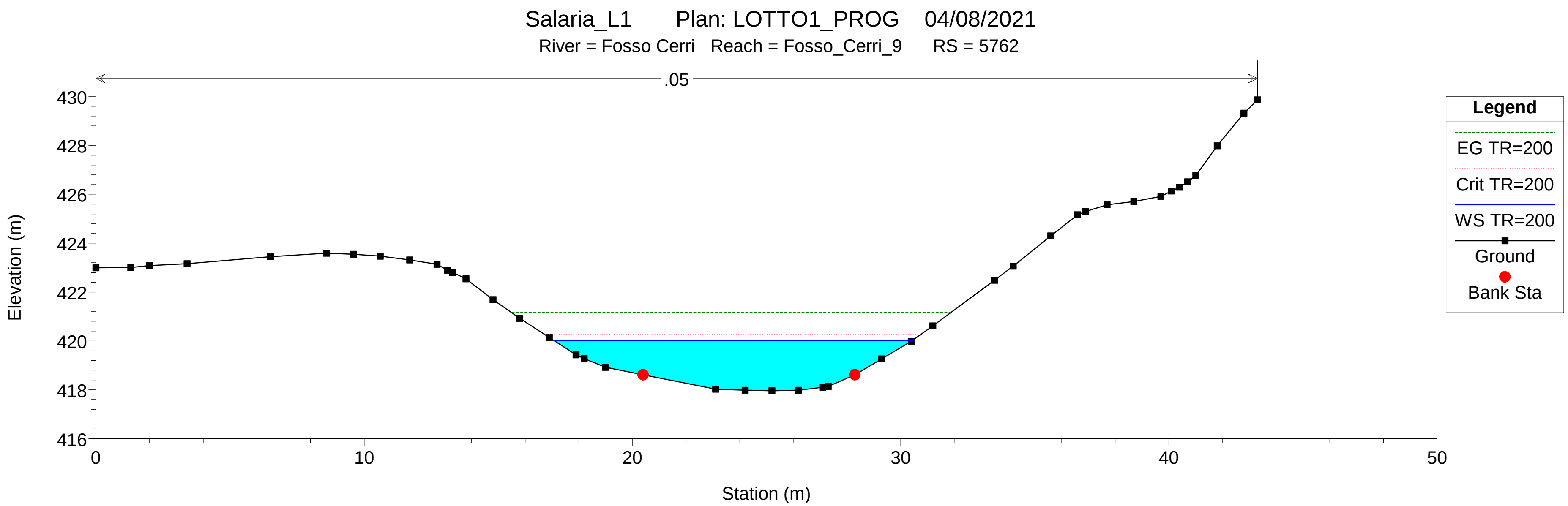

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_7 RS = 5873
.05
Elevation (m)
440
435
430
425
420
0
10
20
30
40
50
60
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

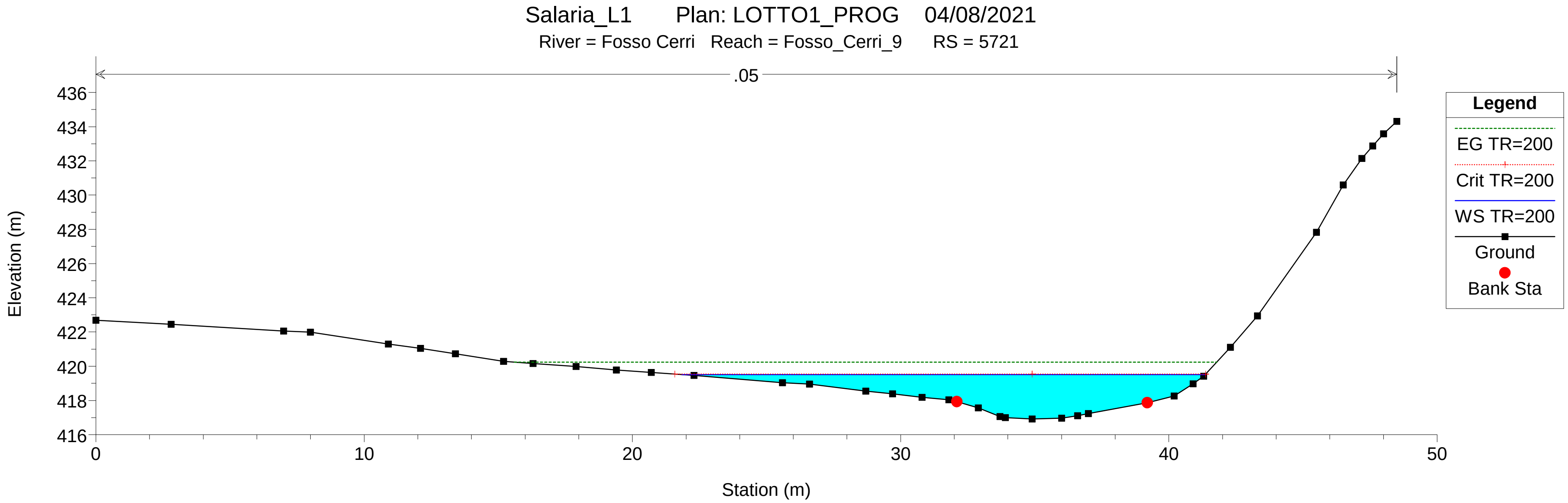

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5813
.05
.0167
.05
Elevation (m)
436
434
432
430
428
426
424
422
420
418
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

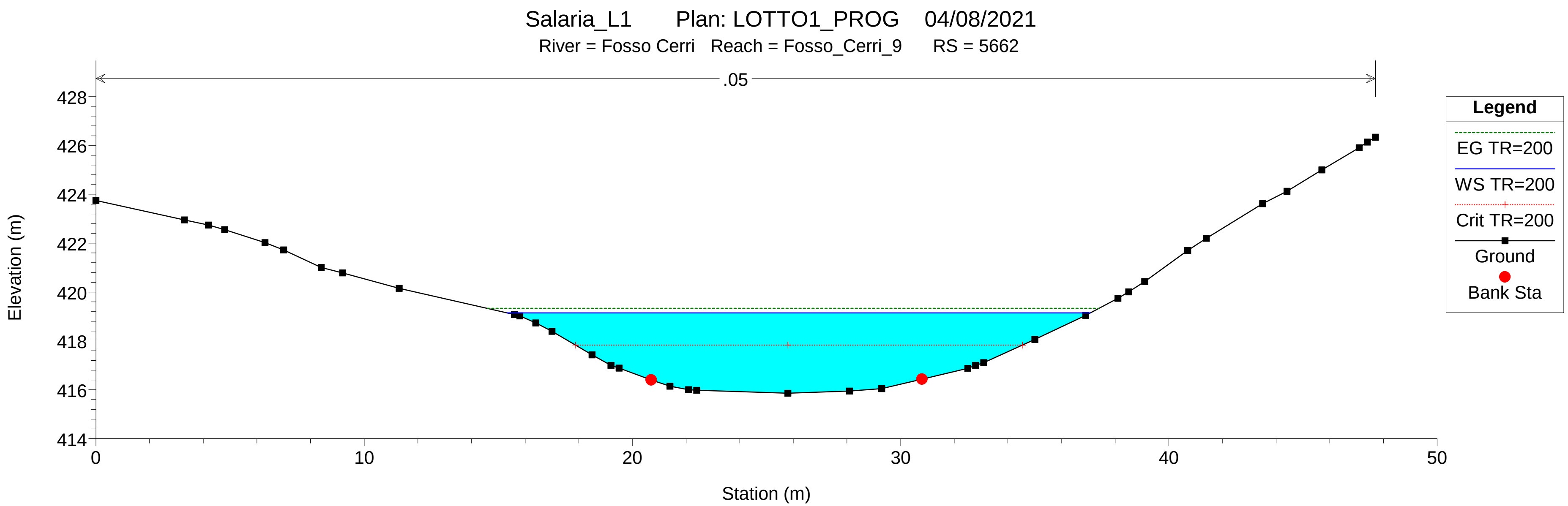

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5808
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

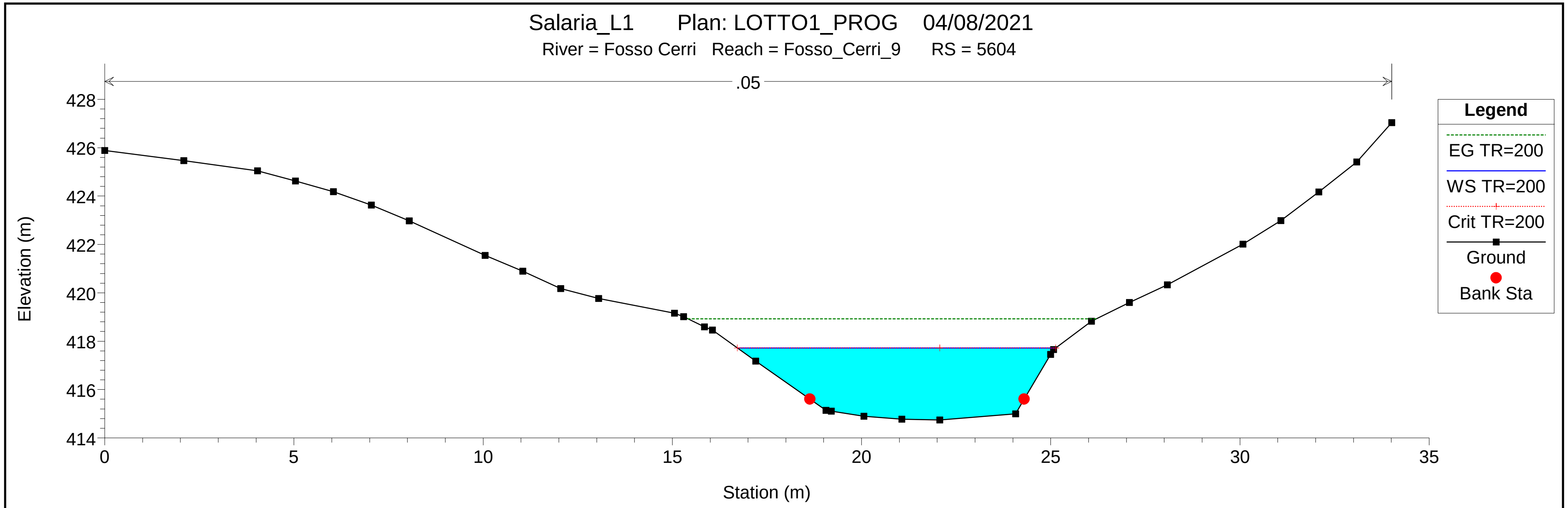

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5791 BR B.111 - Pk 3+525
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

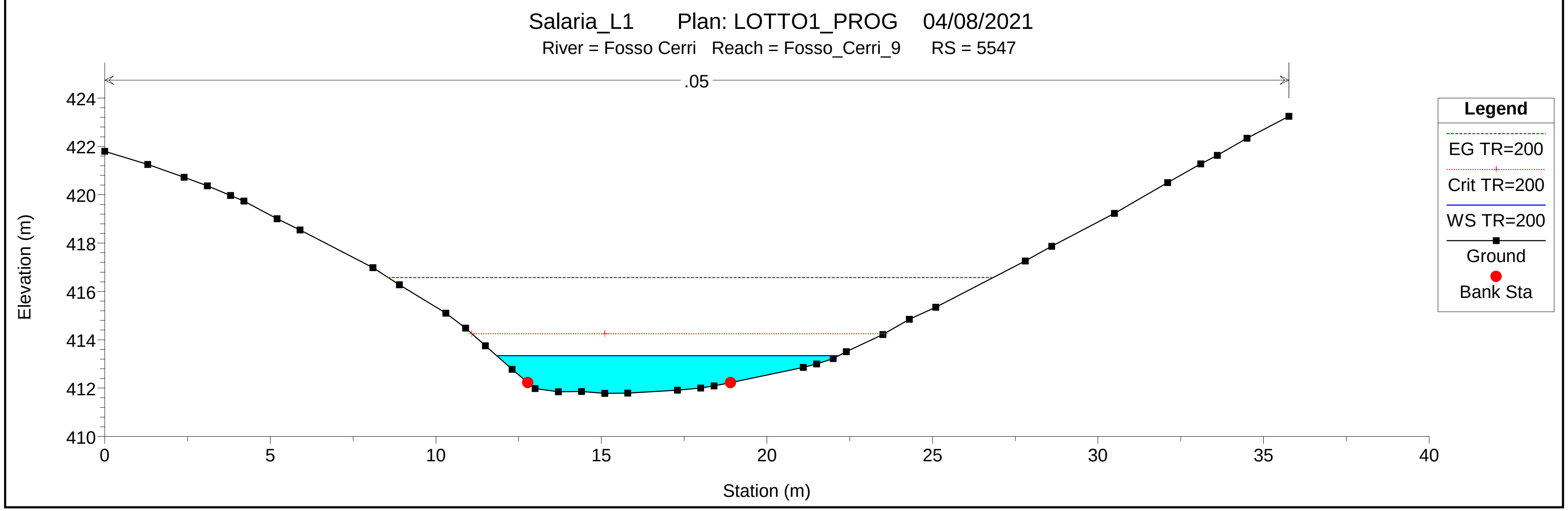

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5769
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

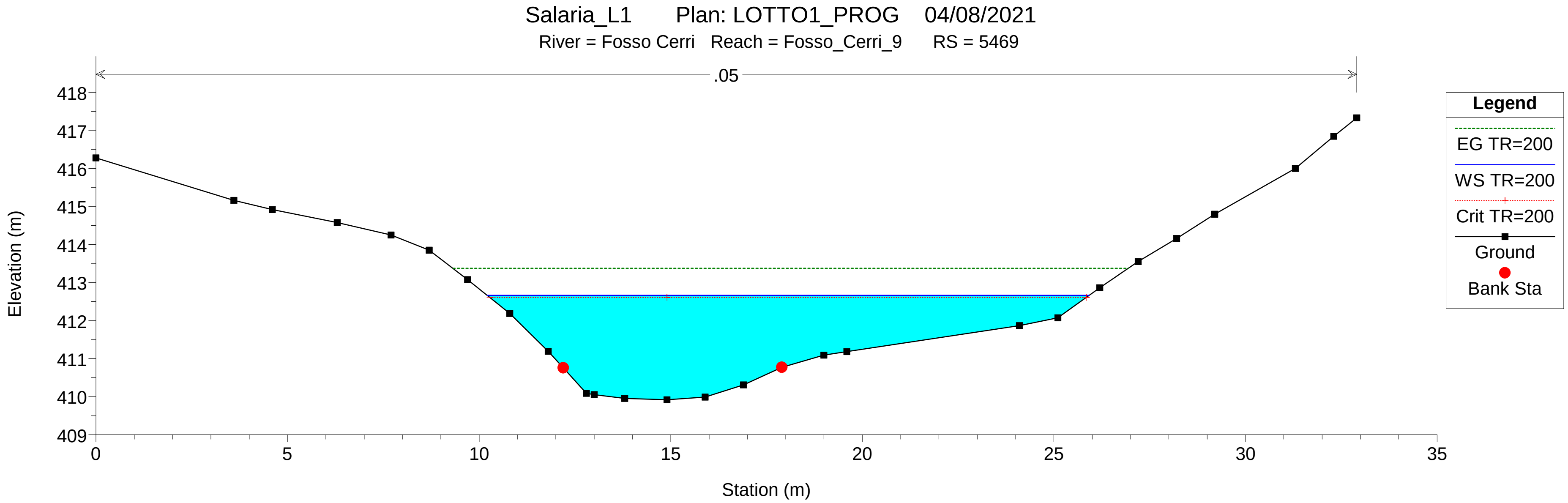

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5762
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

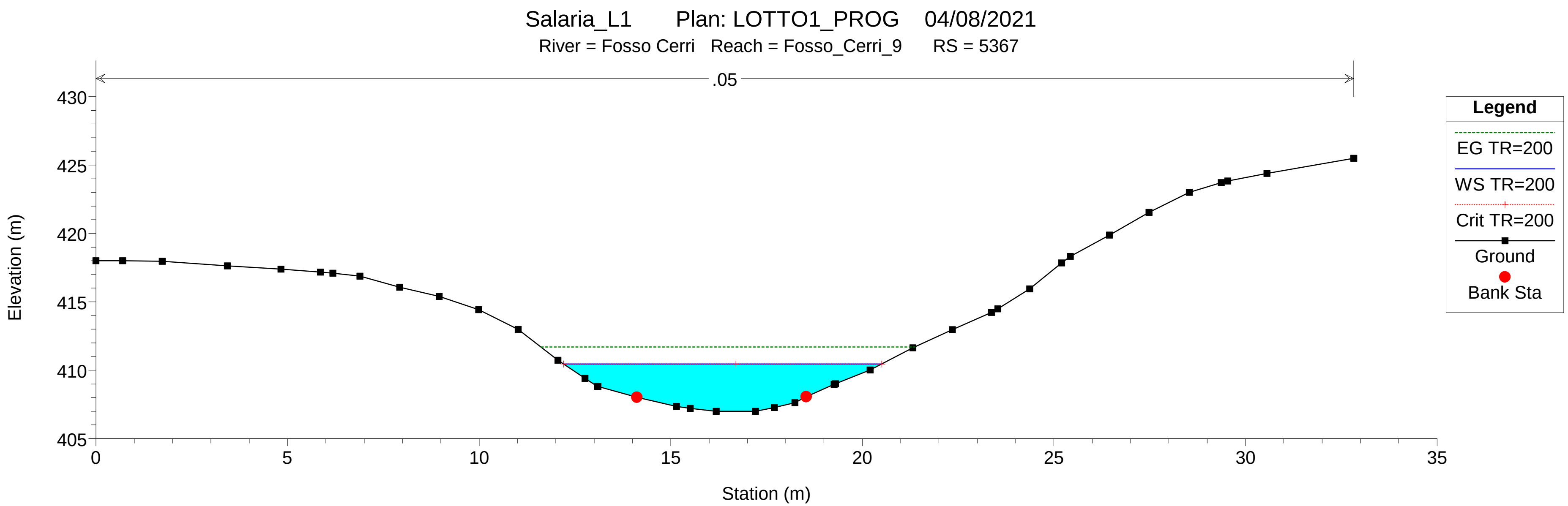

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5721
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

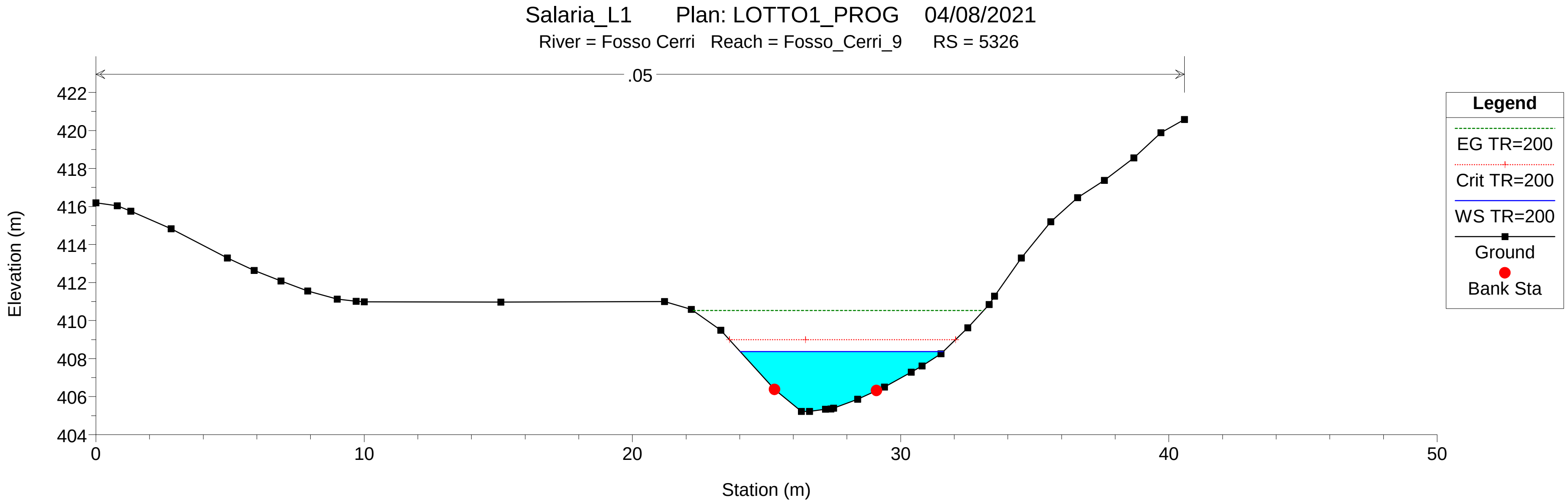

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5662
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

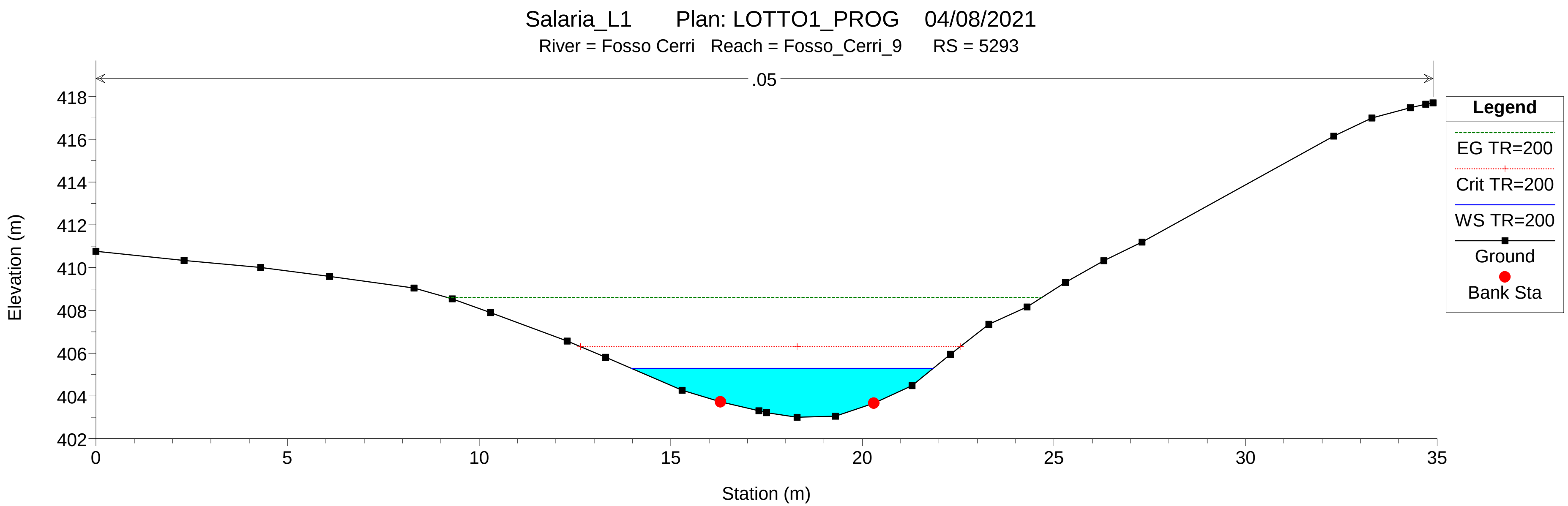

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5604
.05
Elevation (m)
428
426
424
422
420
418
416
414
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

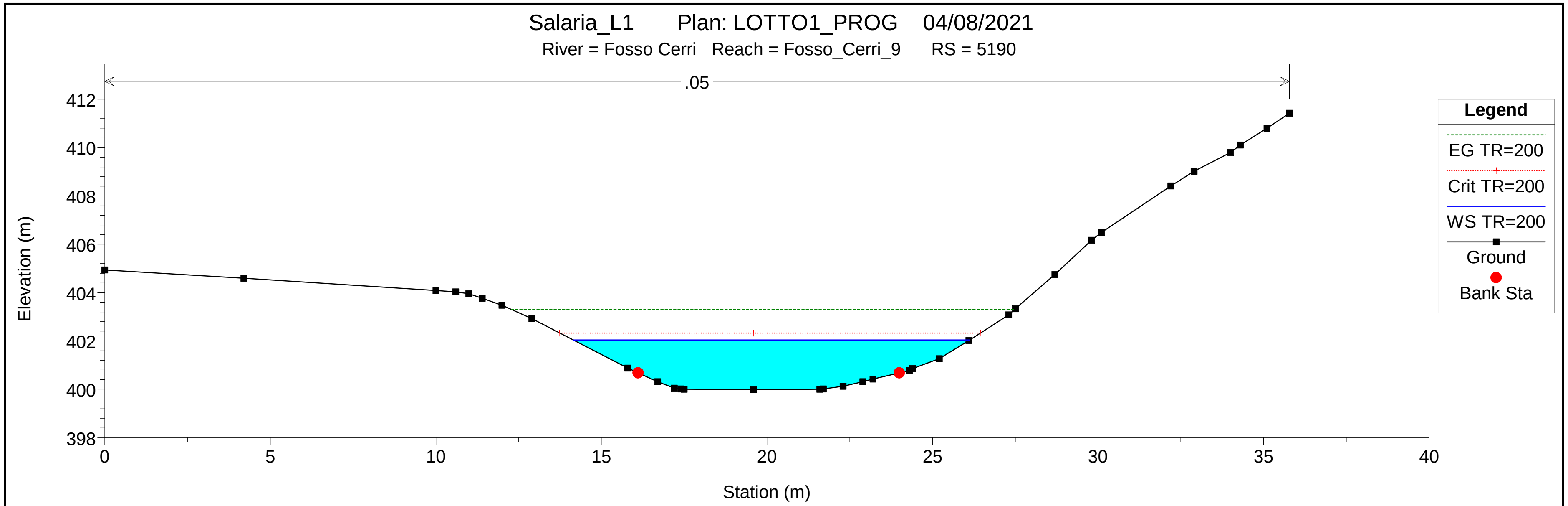

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5547
.05
Elevation (m)
424
422
420
418
416
414
412
410
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5469
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

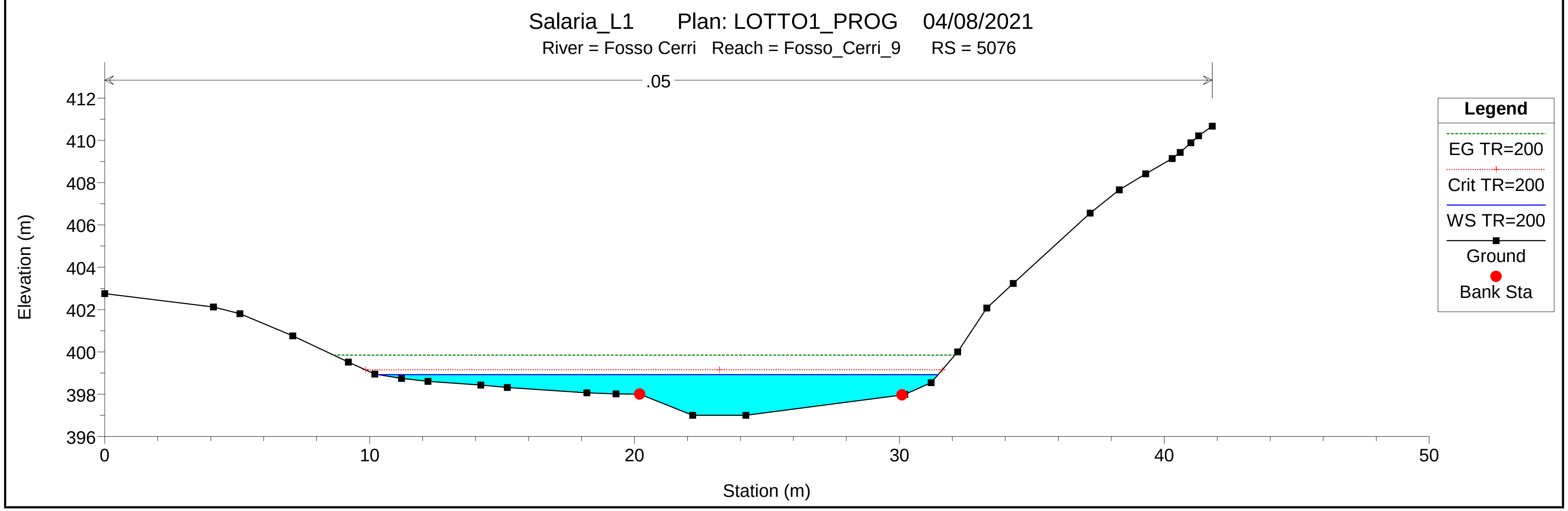

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5367
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5326
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

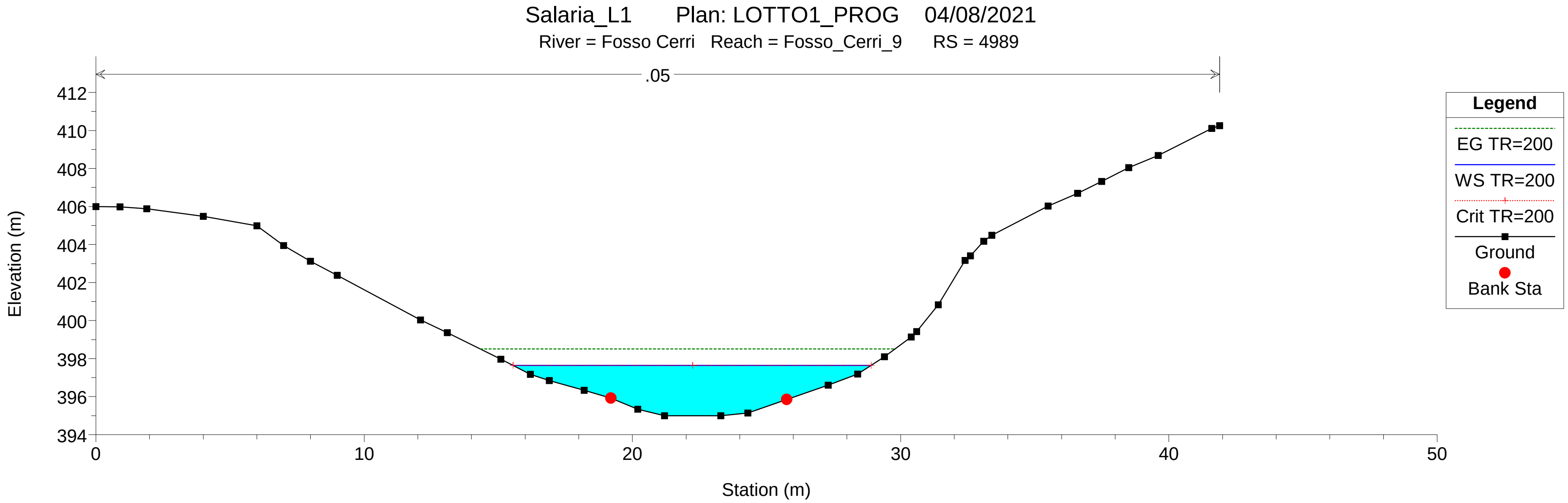

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5293
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



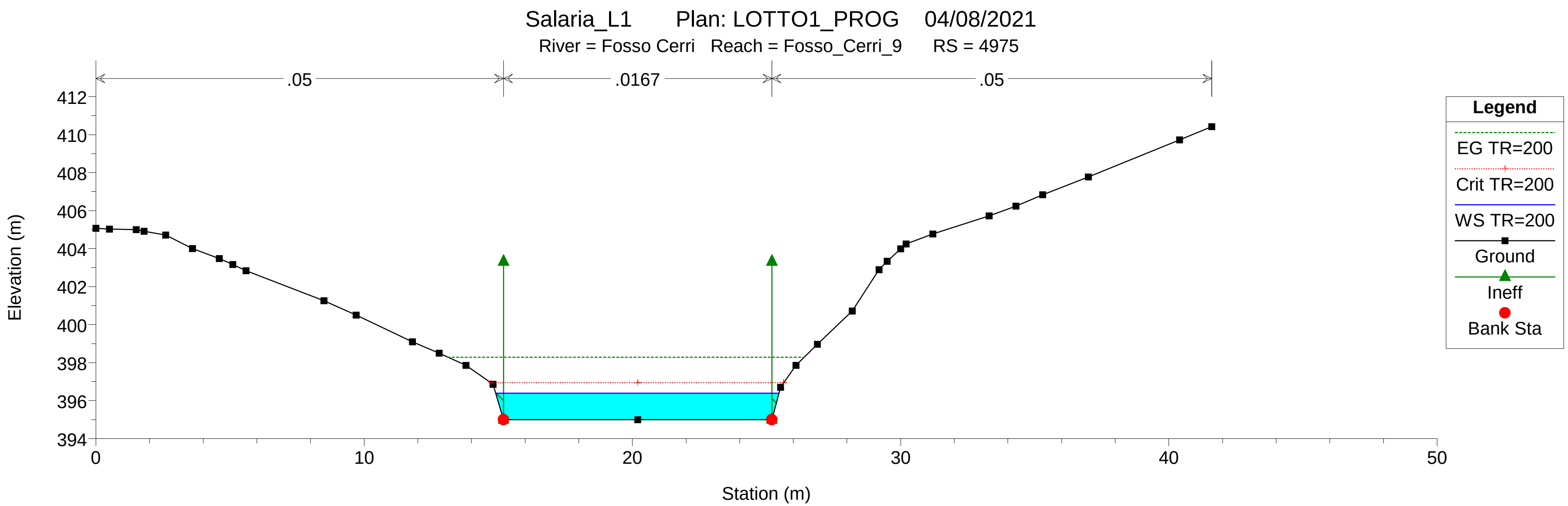
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5190
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



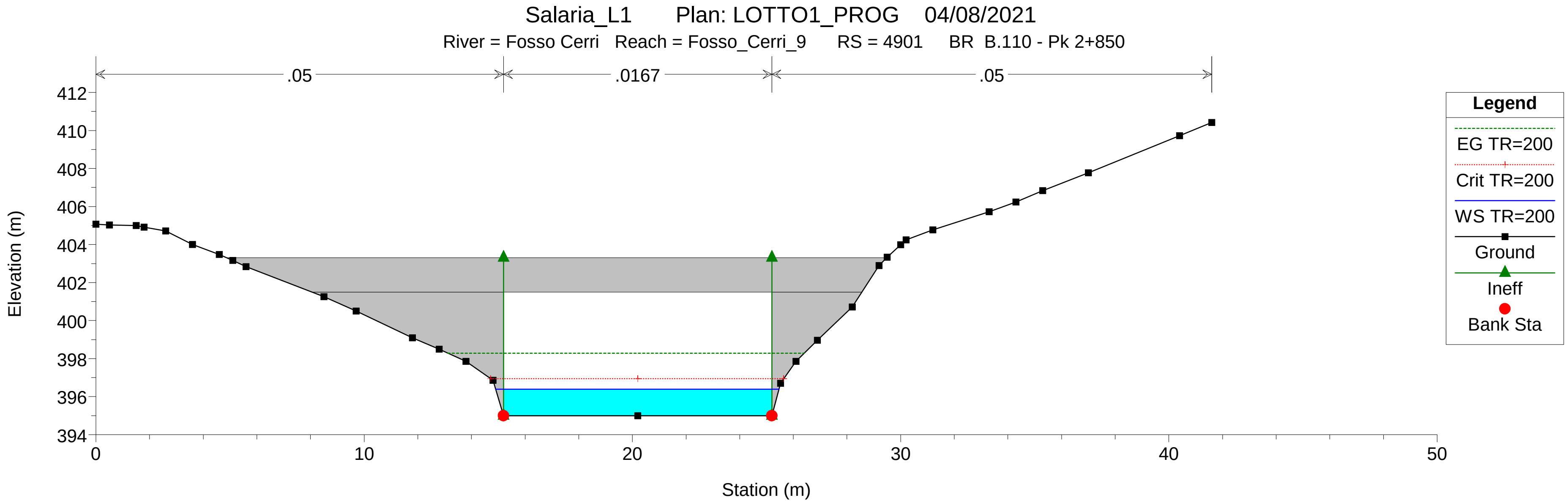
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 5076
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

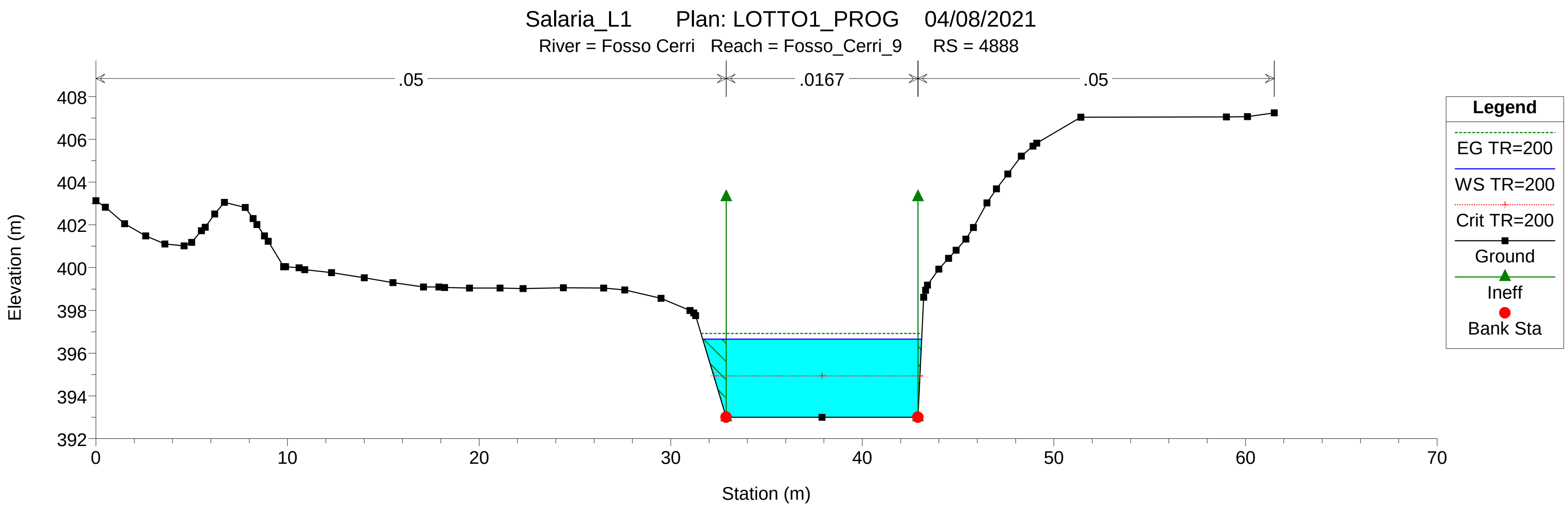


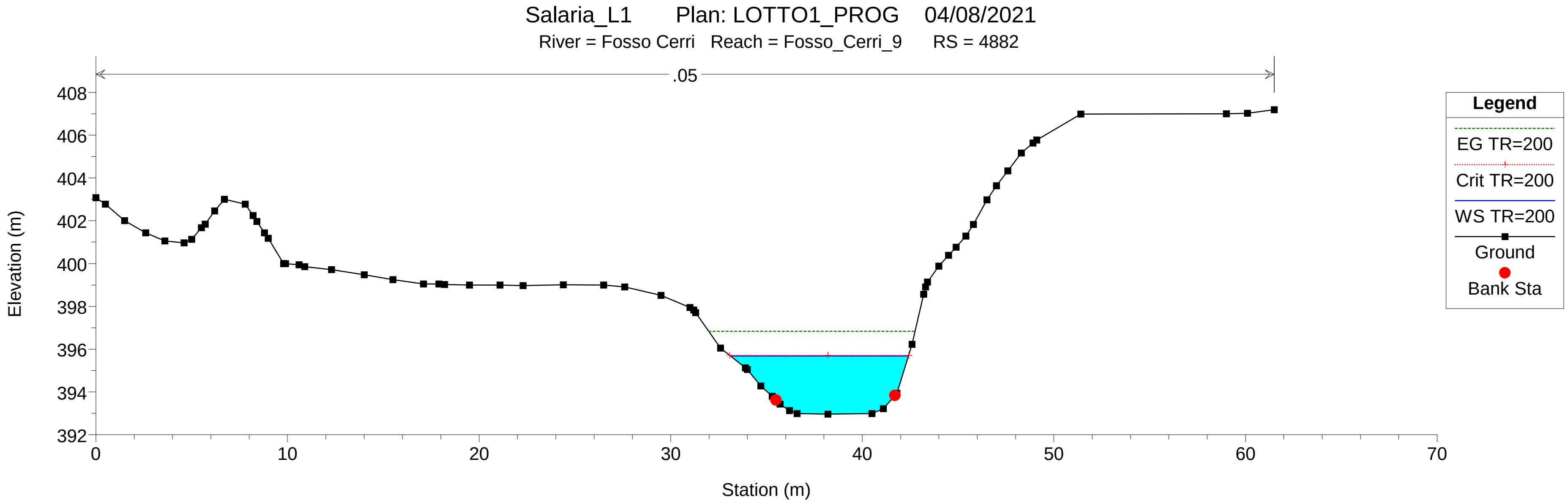
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4989
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

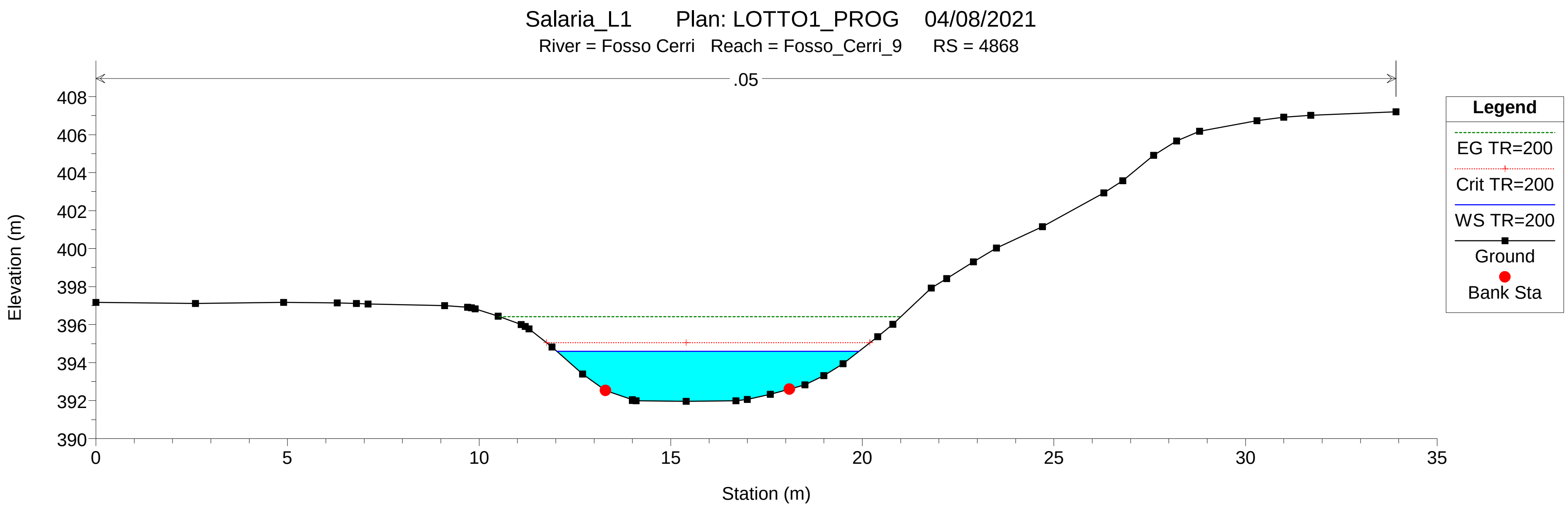


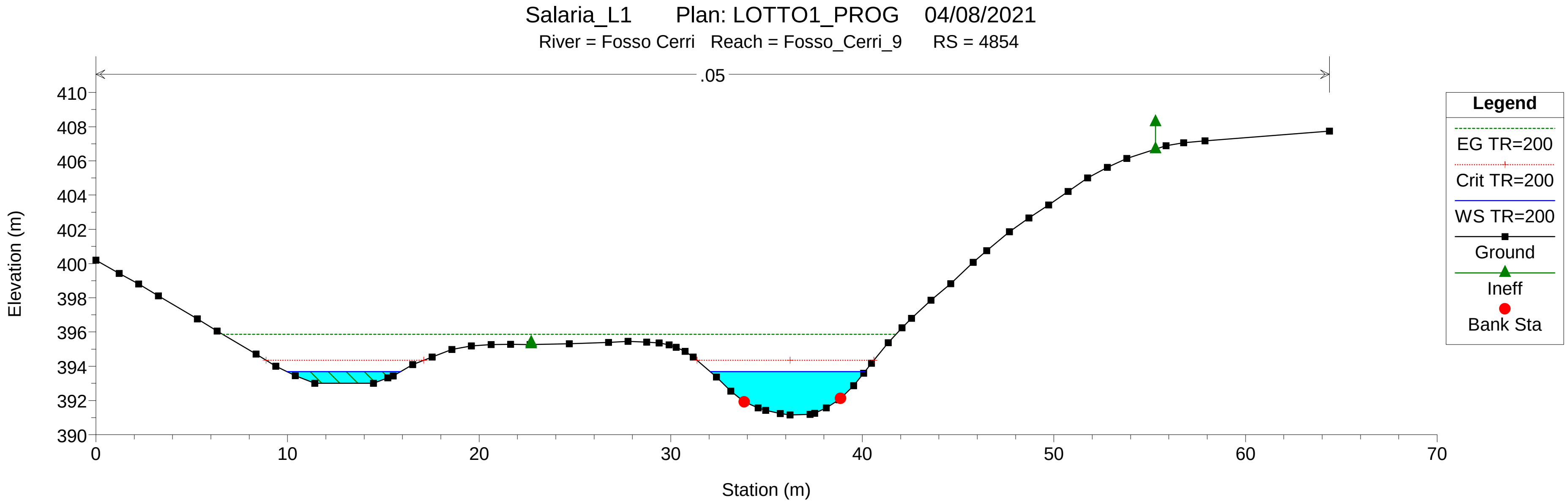
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4975
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

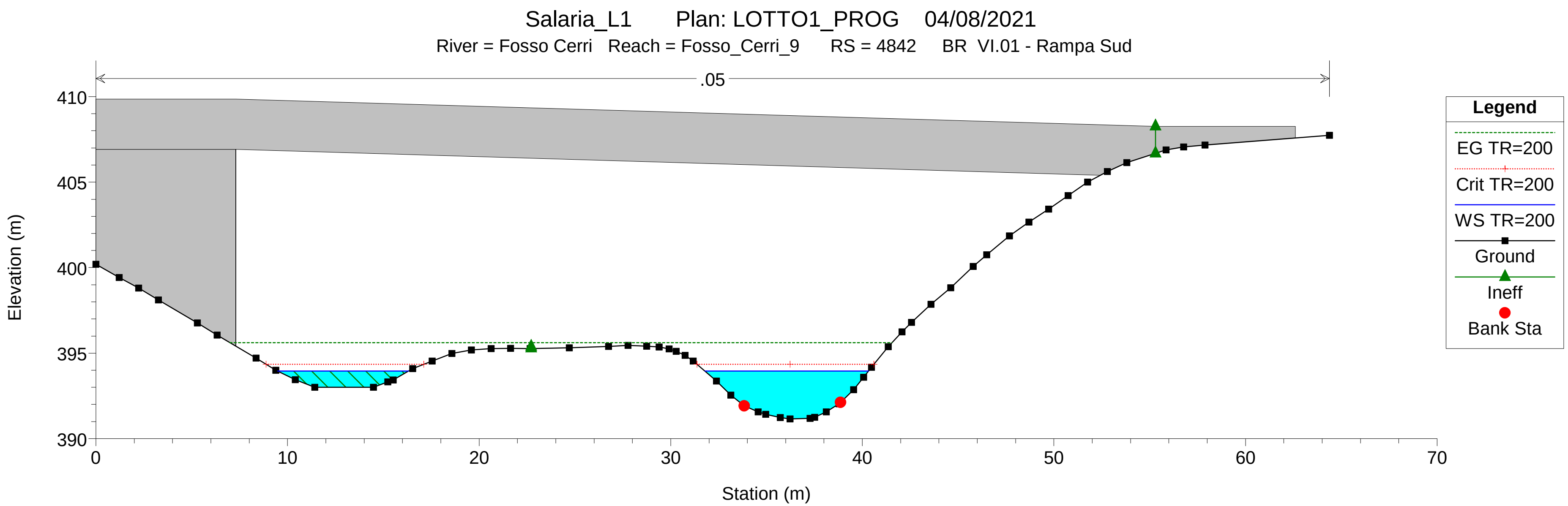

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4901 BR B.110 - Pk 2+850
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

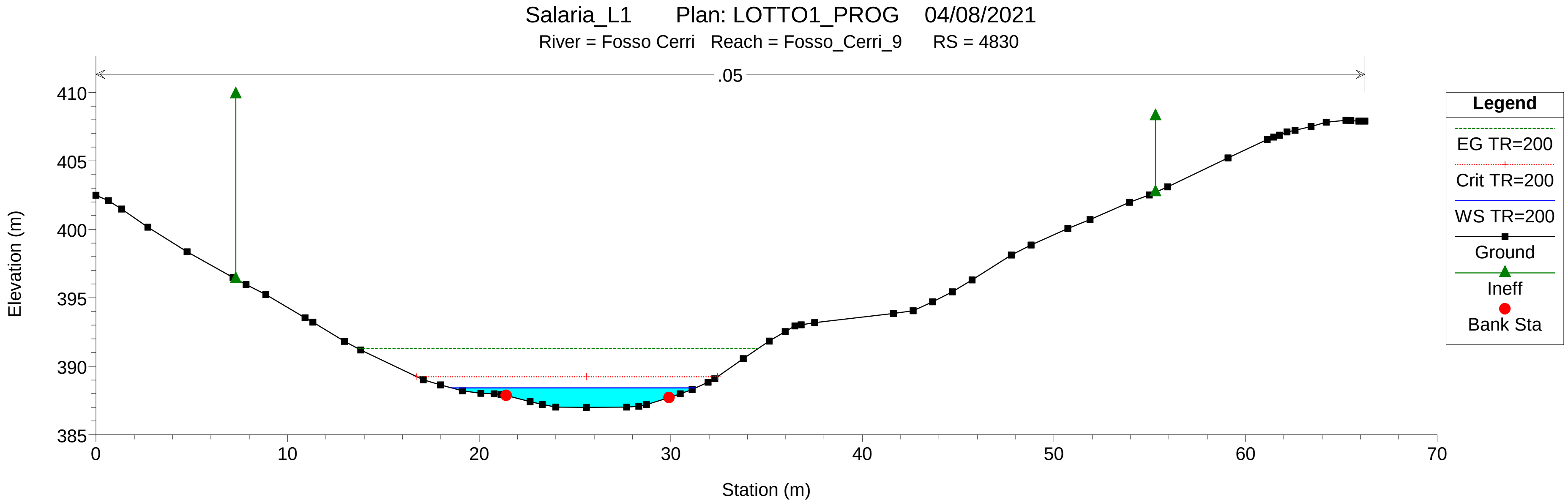

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4888
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

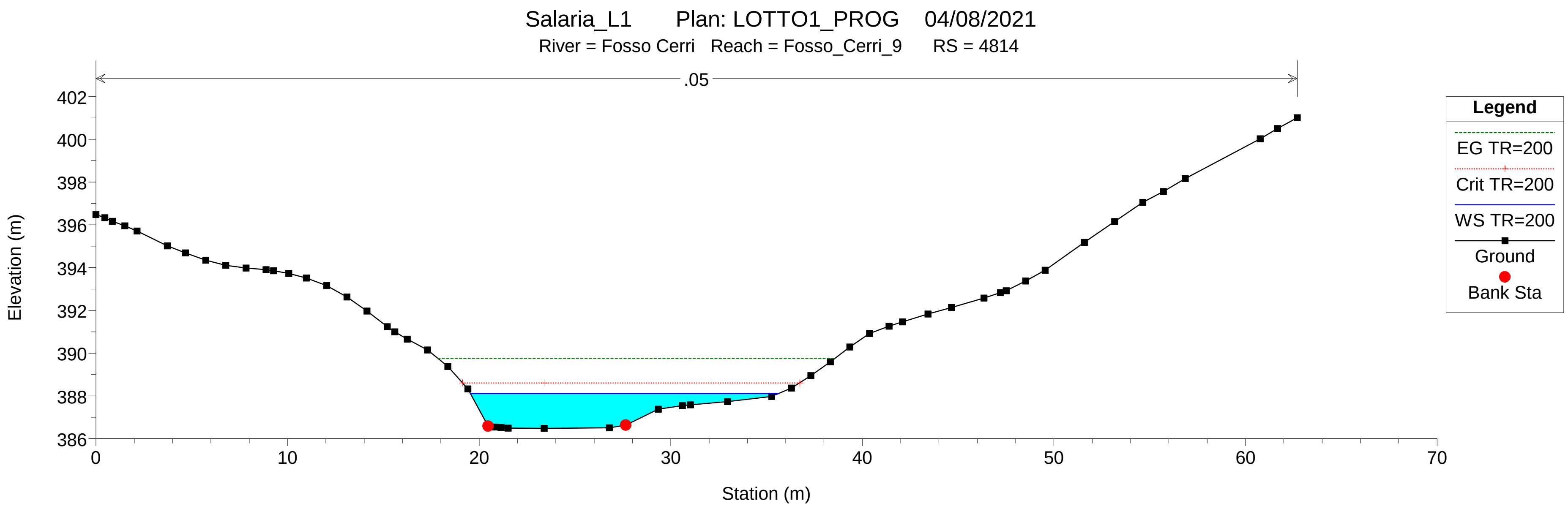

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4882
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

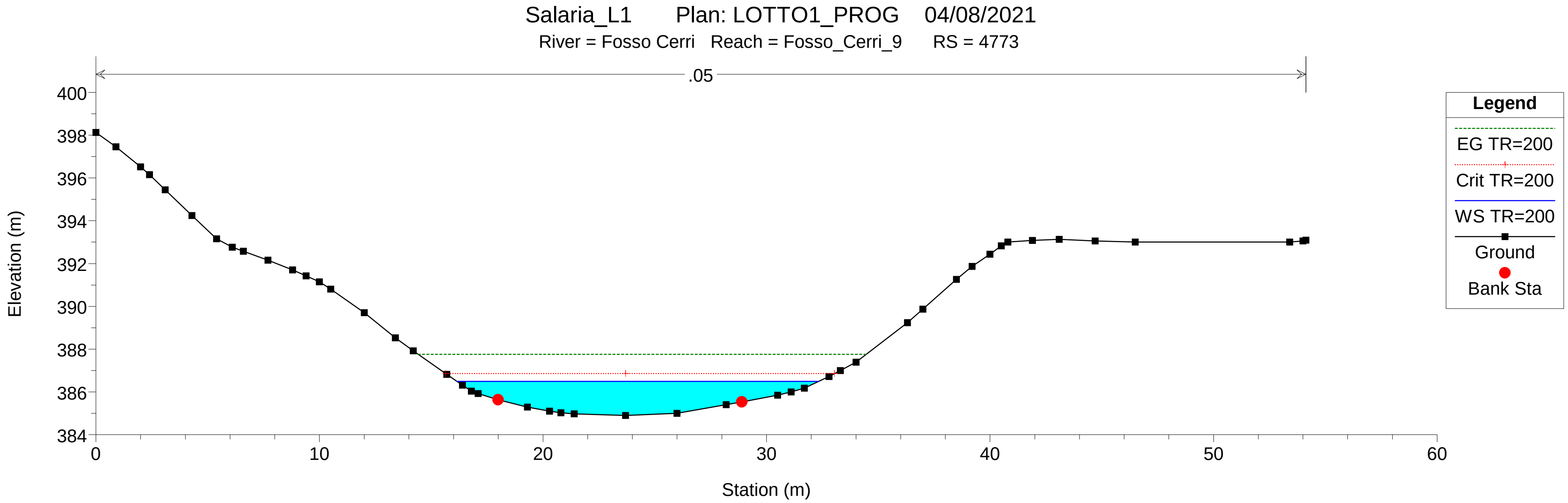

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4868
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

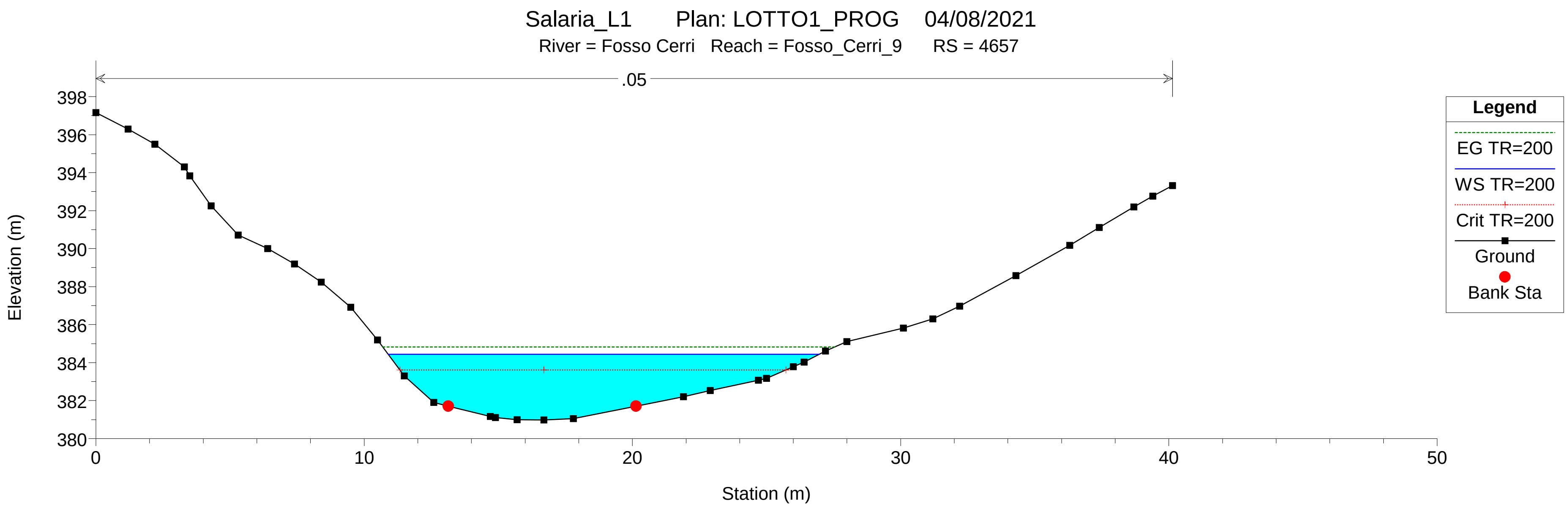

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4854
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

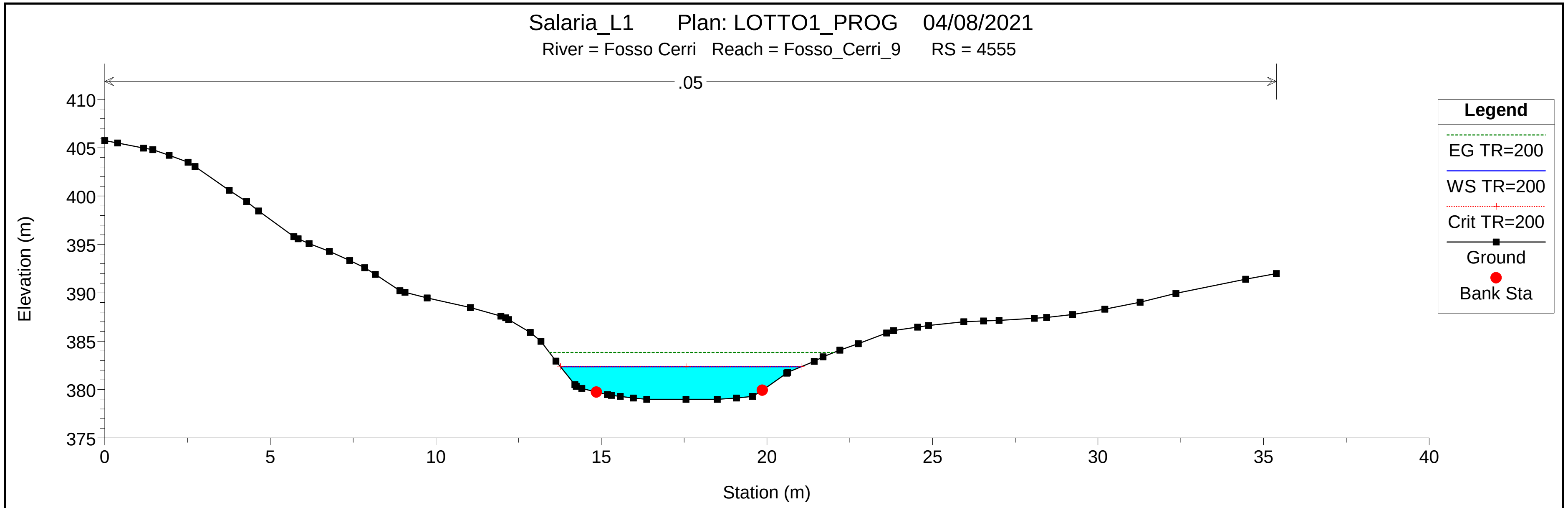

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4842 BR VI.01 - Rampa Sud
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

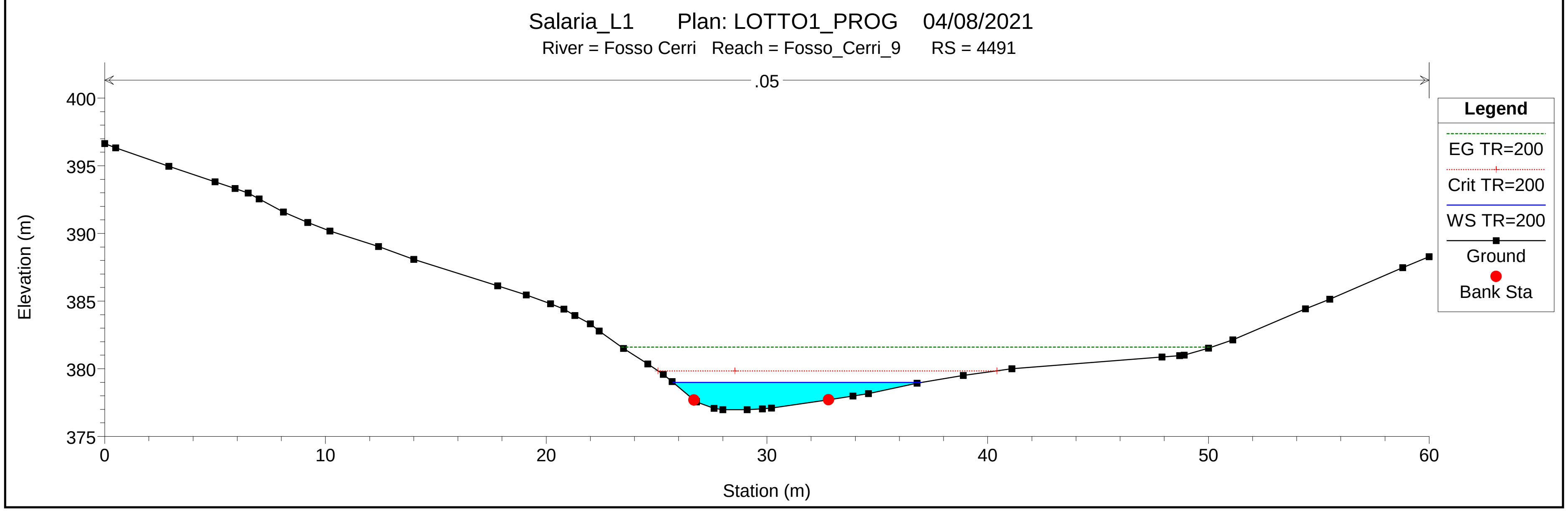

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4830
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

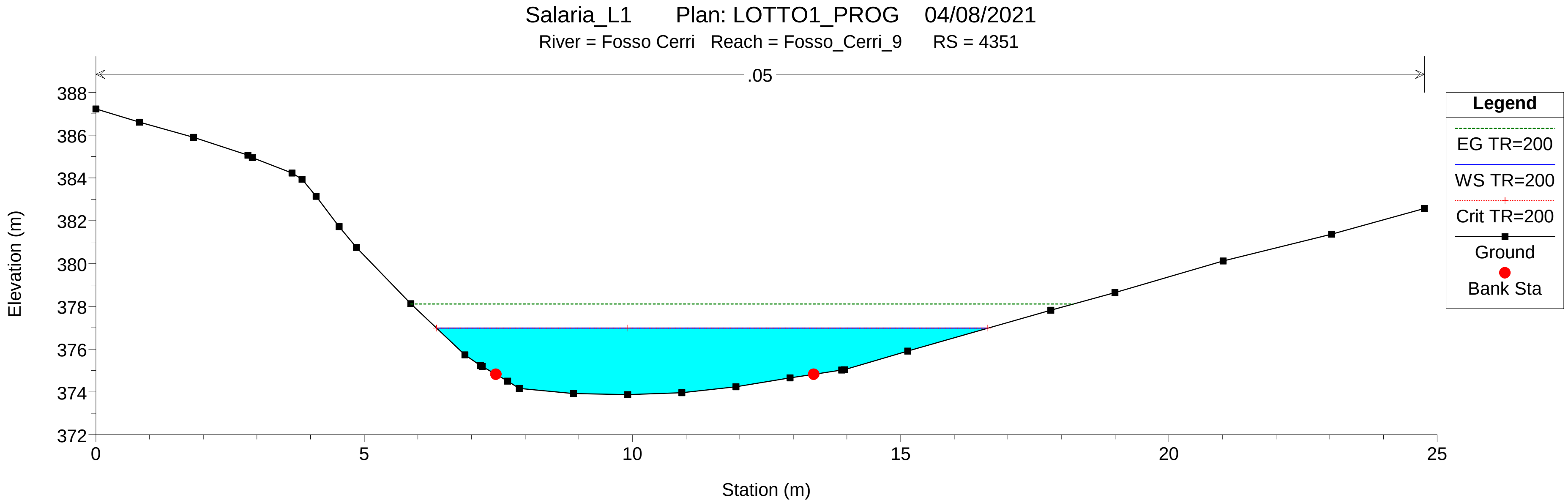

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4814
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

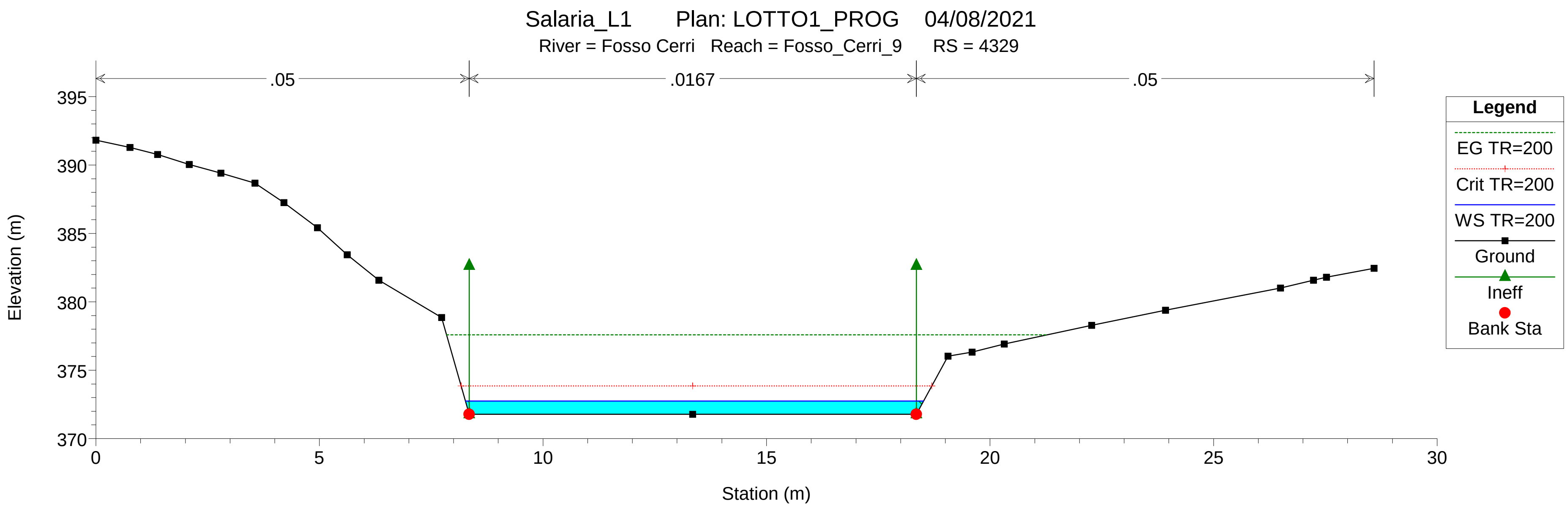

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4773
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

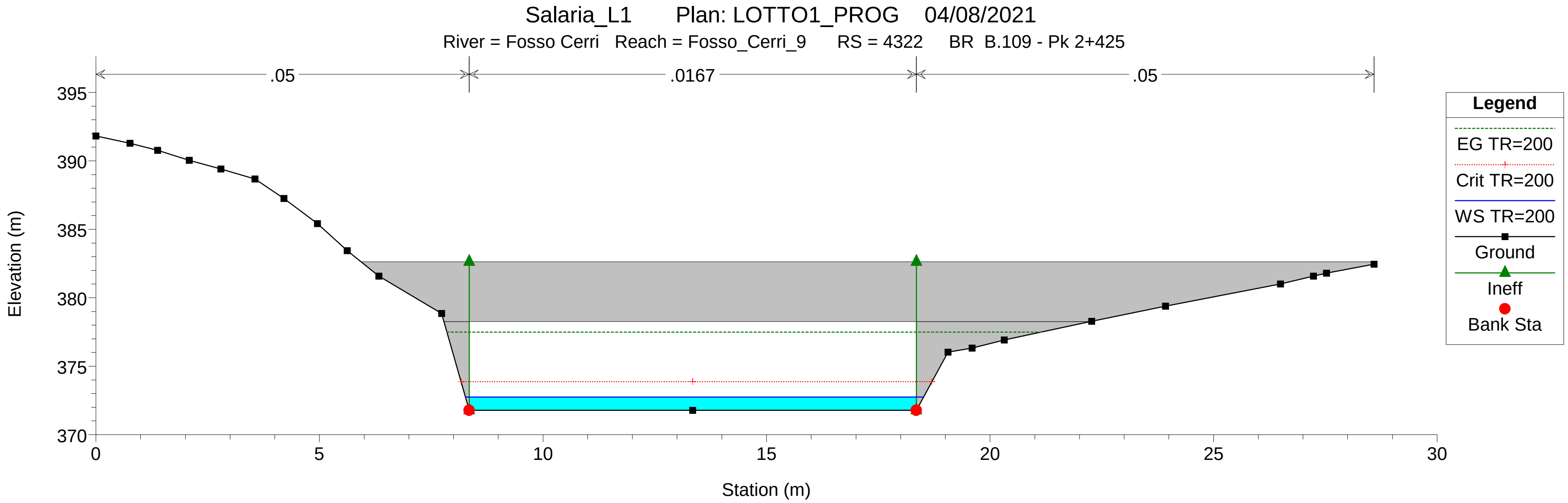

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4657
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4555
.05
Elevation (m)
410
405
400
395
390
385
380
375
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

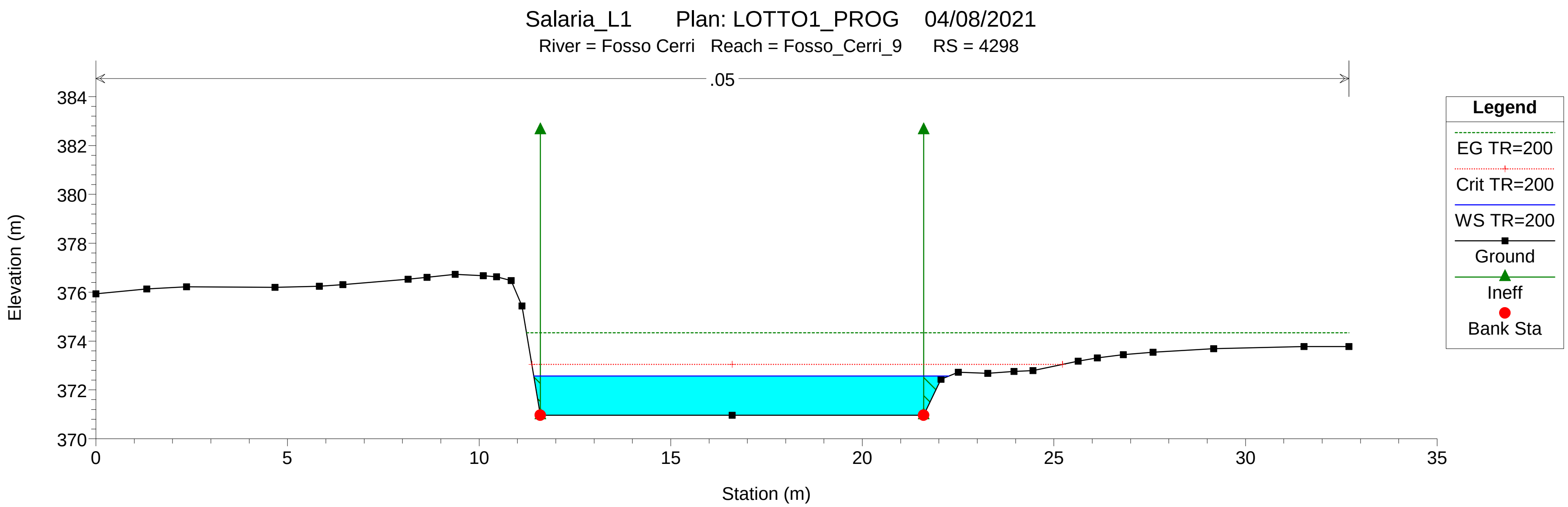

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4491
.05
Elevation (m)
400
395
390
385
380
375
0
10
20
30
40
50
60
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4351
.05
Elevation (m)
388
386
384
382
380
378
376
374
372
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

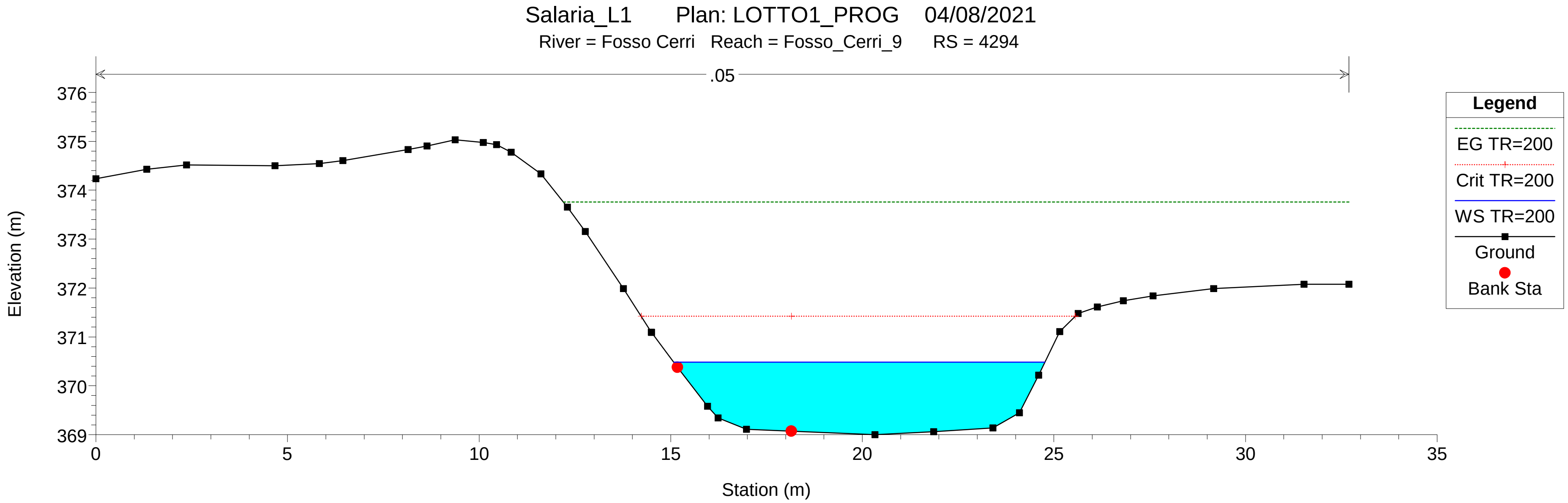

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4329
.05
.0167
.05
Elevation (m)
395
390
385
380
375
370
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta



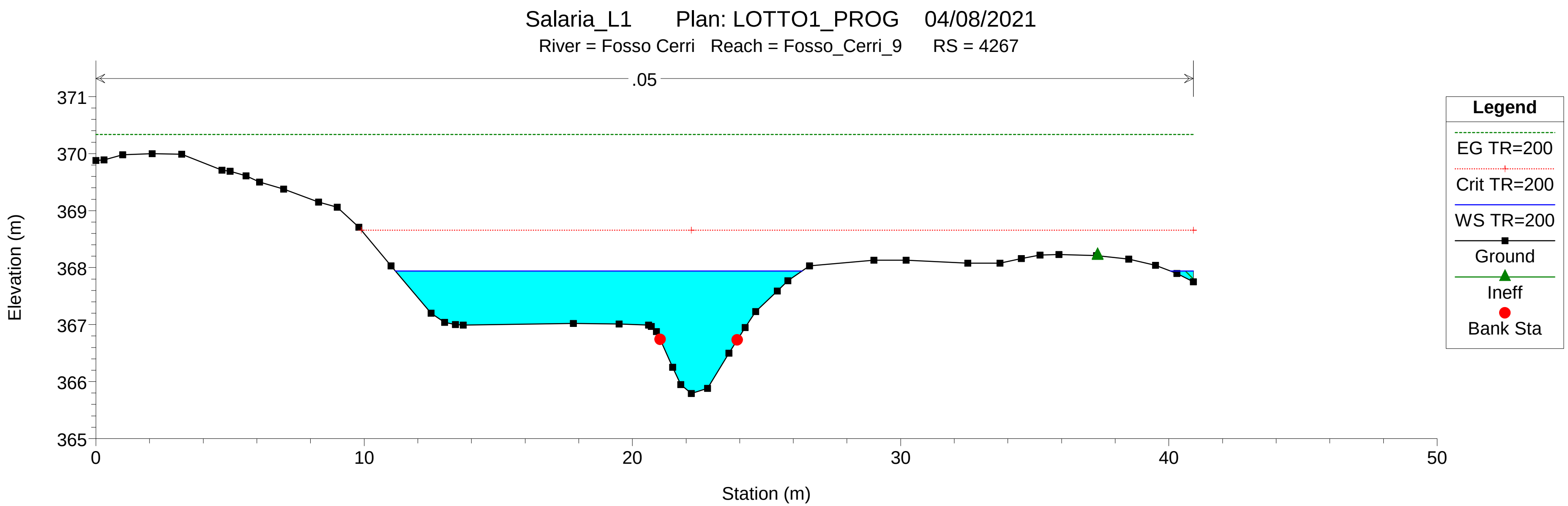
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4322 BR B.109 - Pk 2+425
.05
.0167
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
395
390
385
380
375
370
0
5
10
15
20
25
30



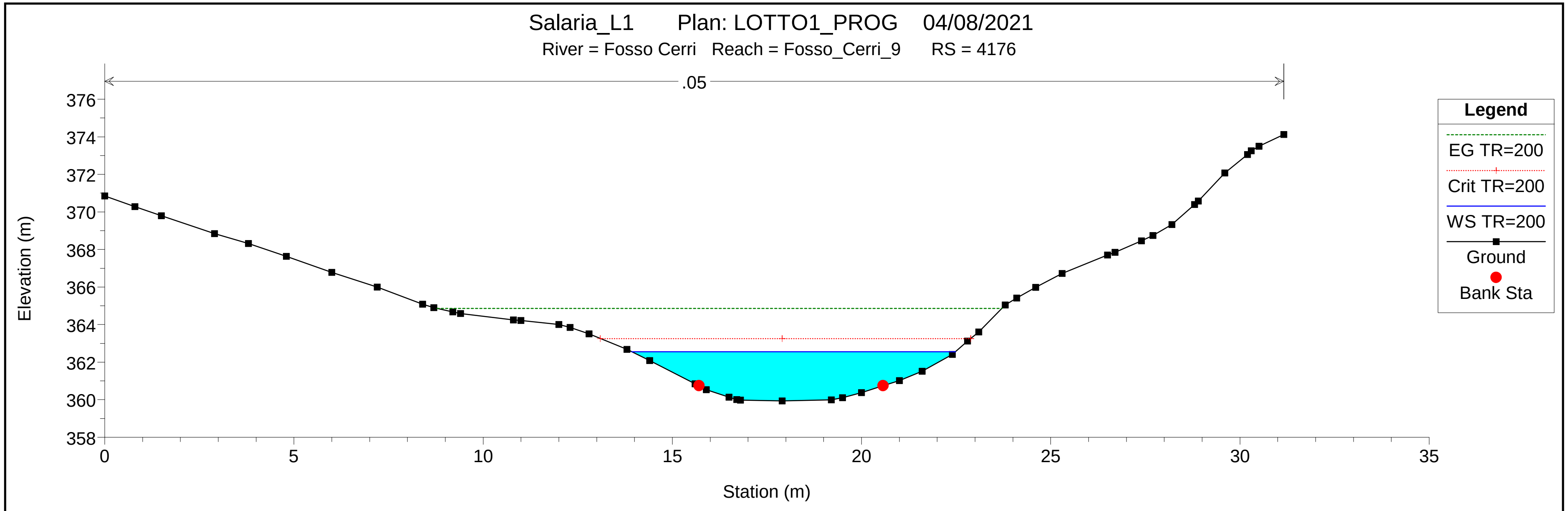
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4298
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
384
382
380
378
376
374
372
370
0
5
10
15
20
25
30
35

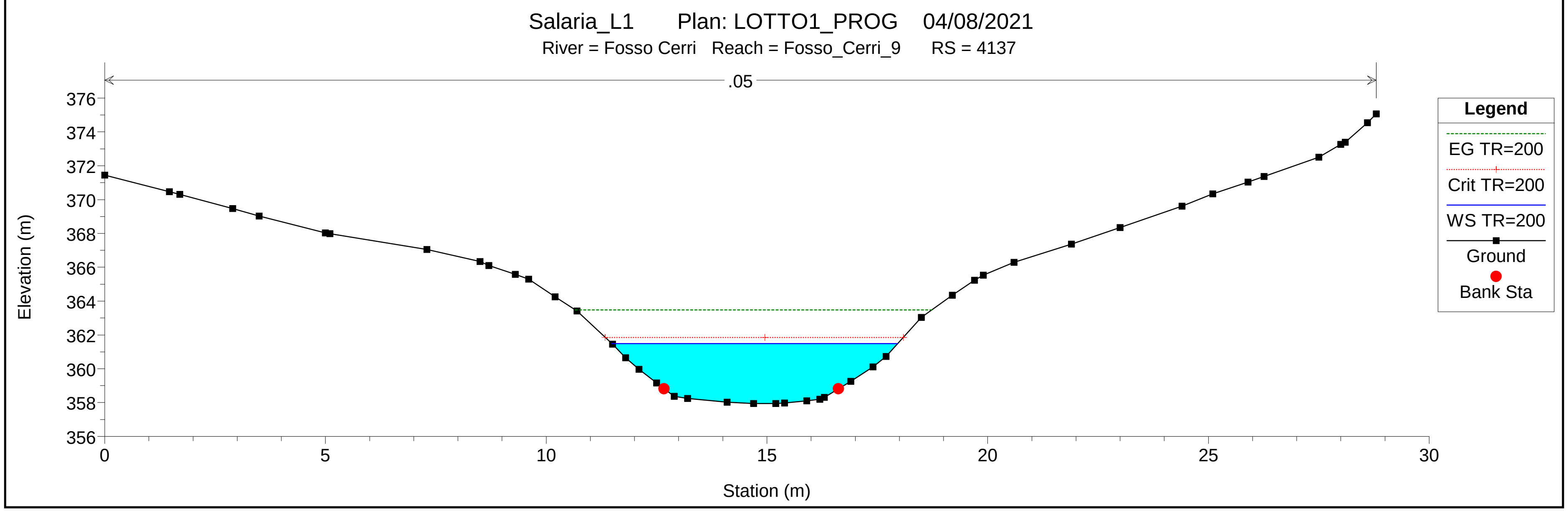


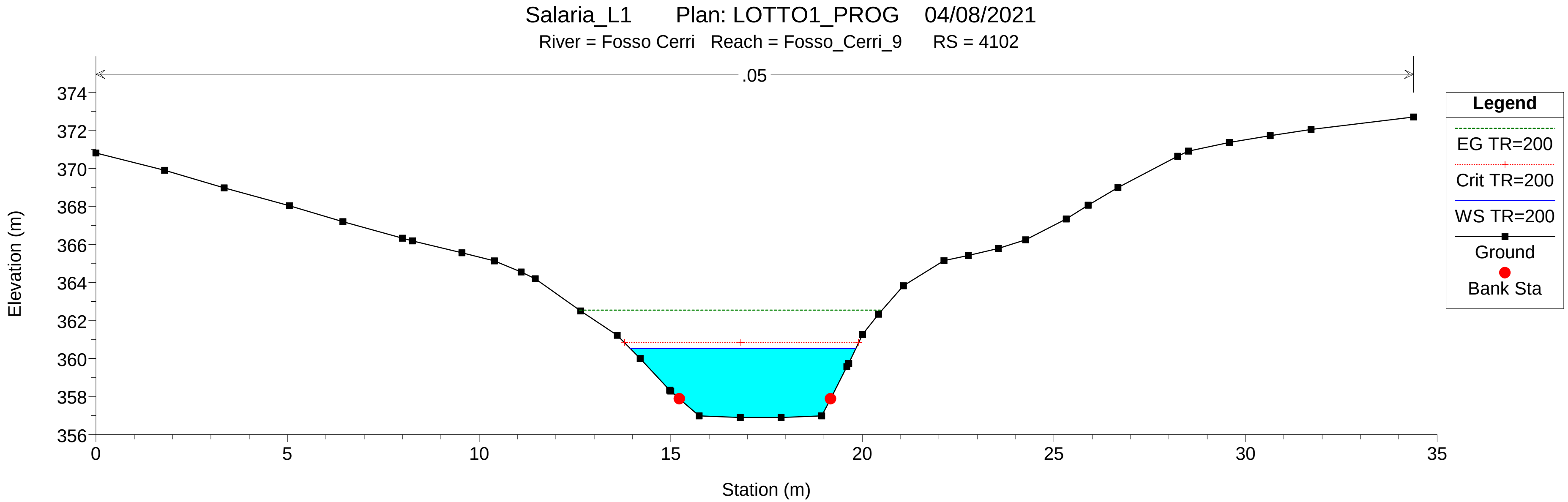
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4294
.05
Elevation (m)
376
375
374
373
372
371
370
369
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



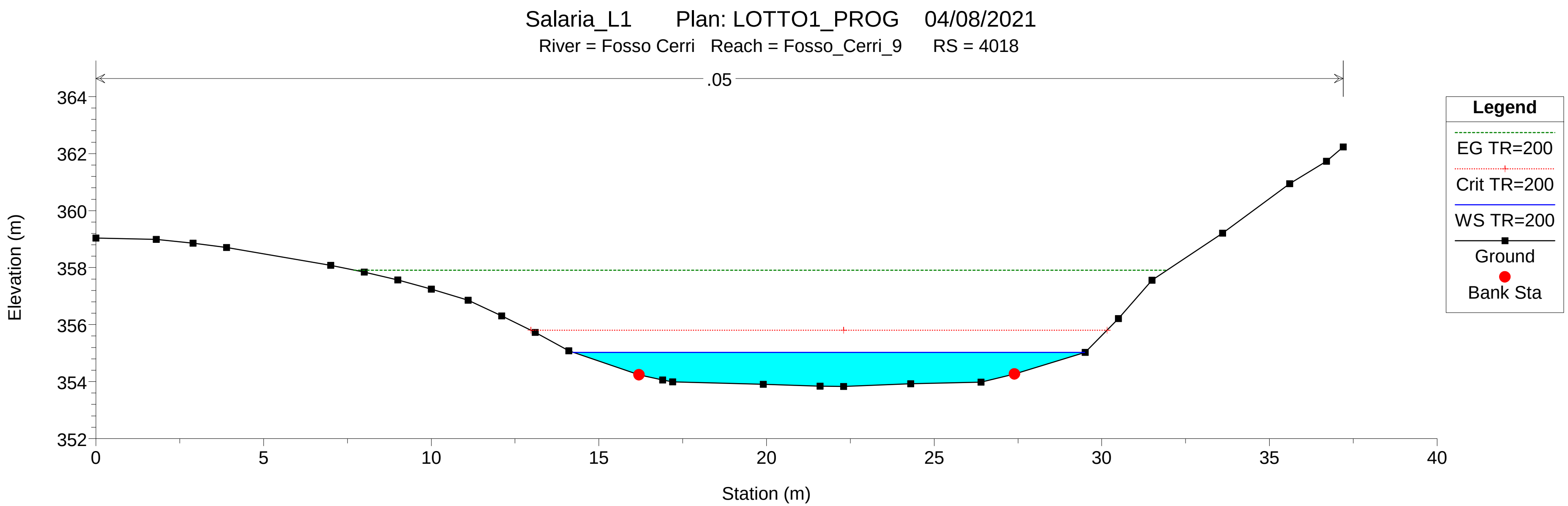
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4267
.05
Elevation (m)
371
370
369
368
367
366
365
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4176
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

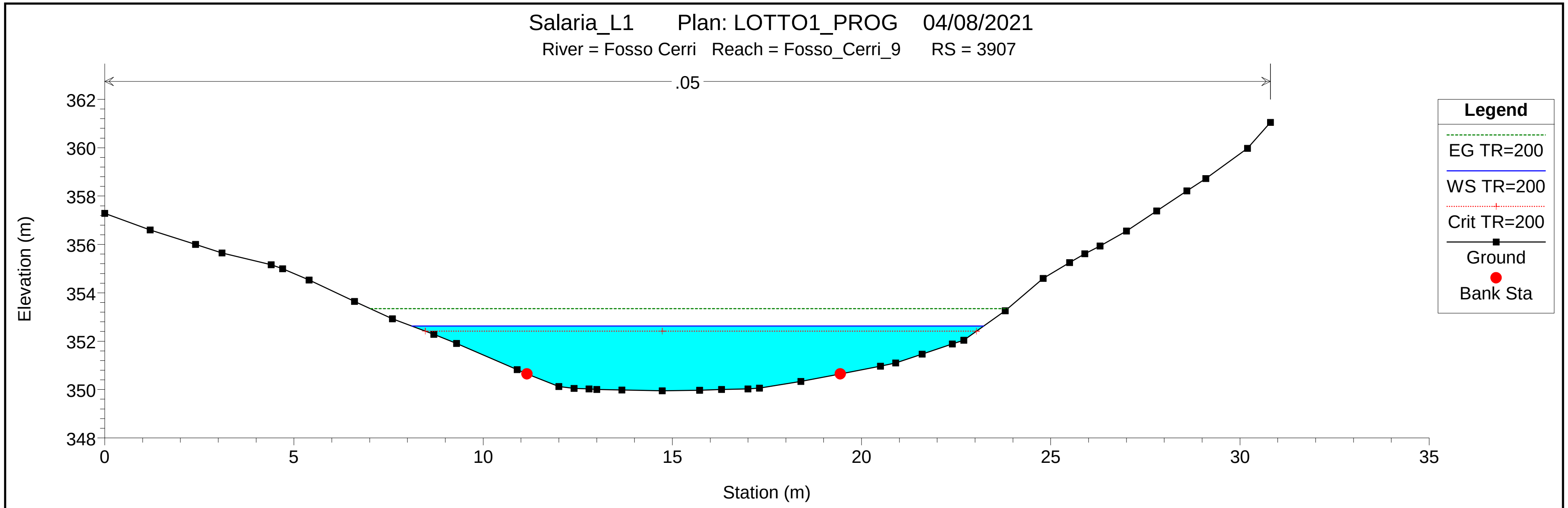

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4137
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

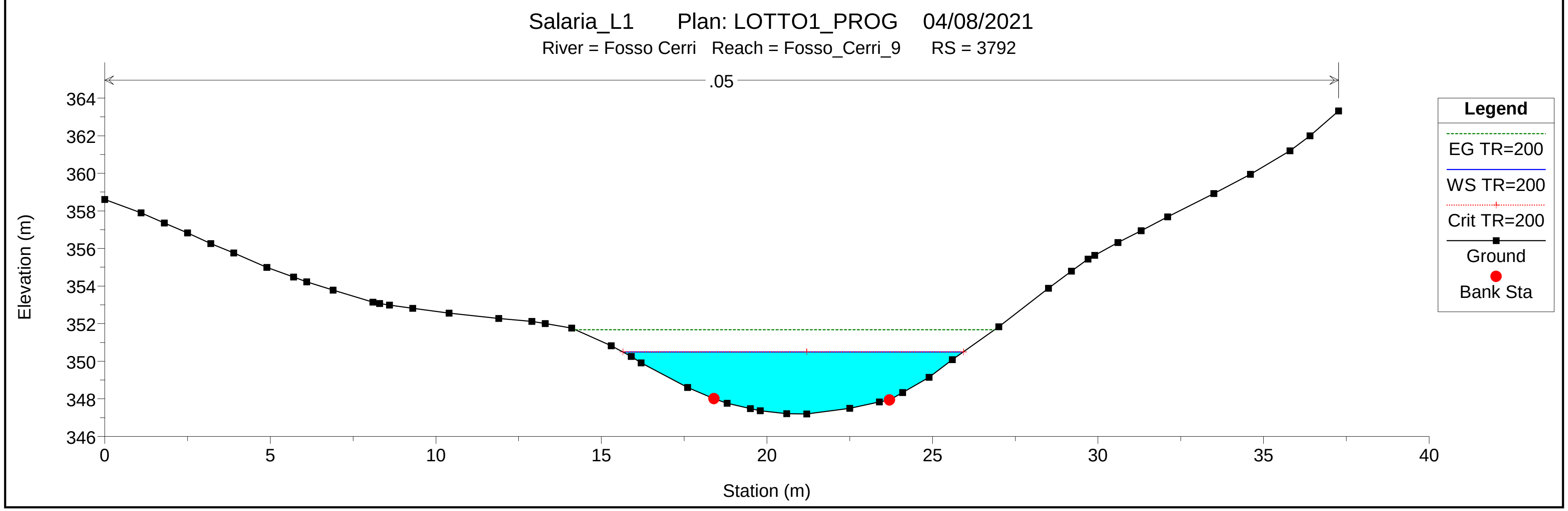


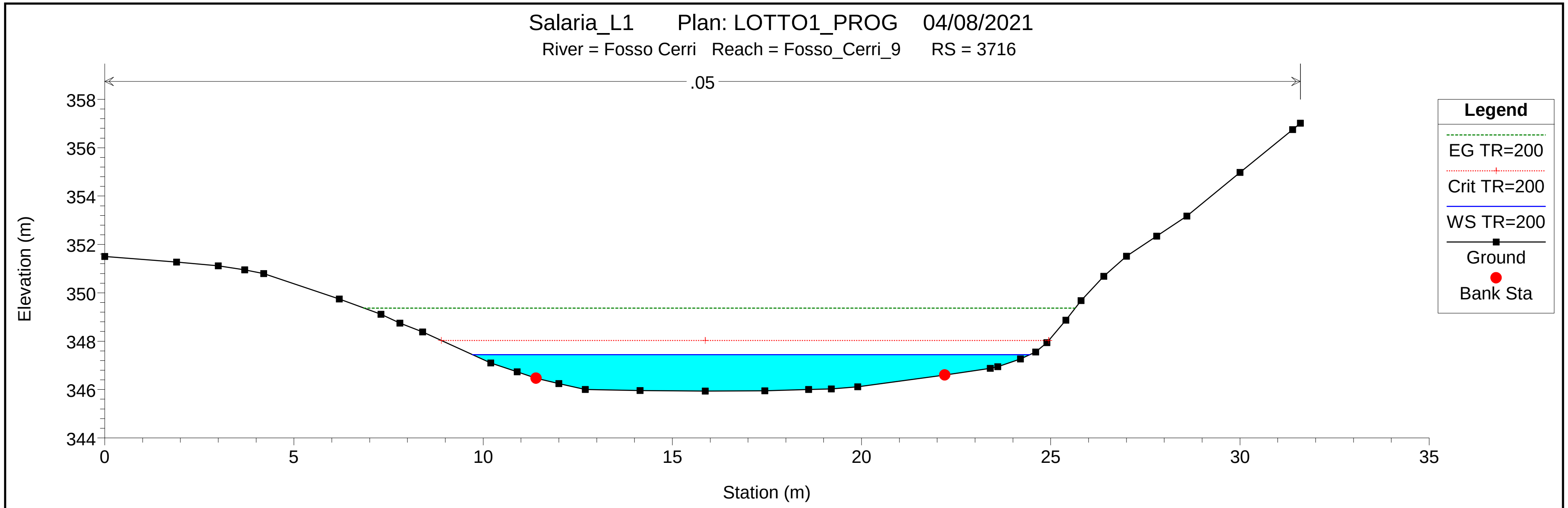
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4102
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

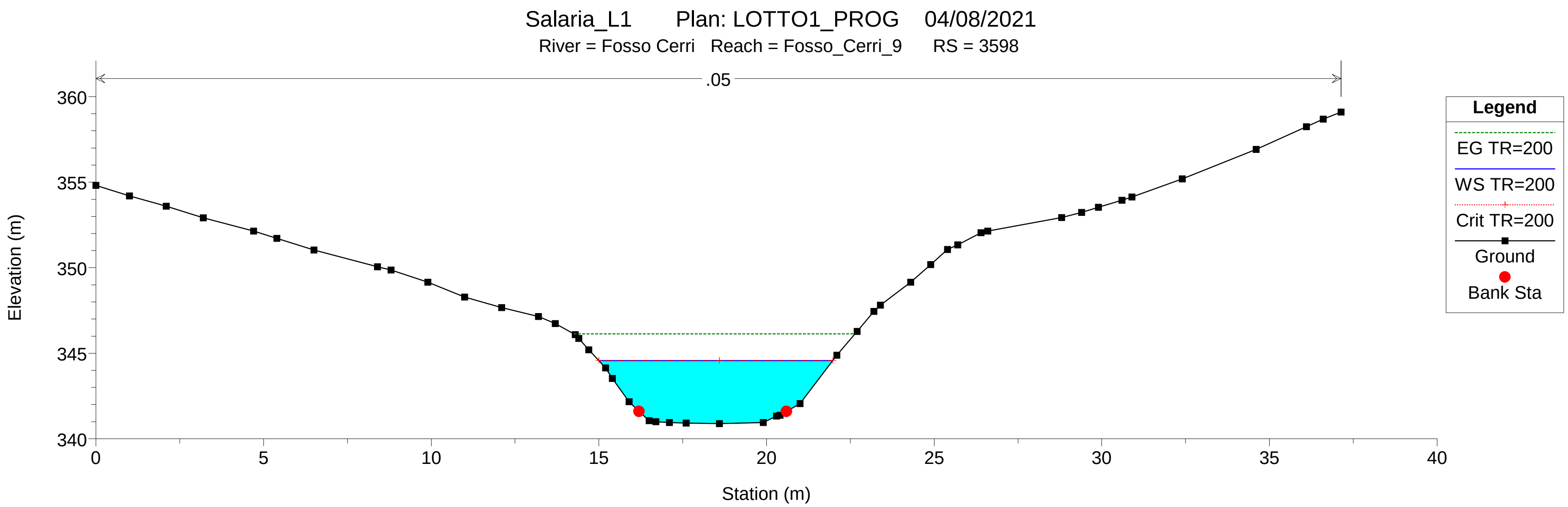


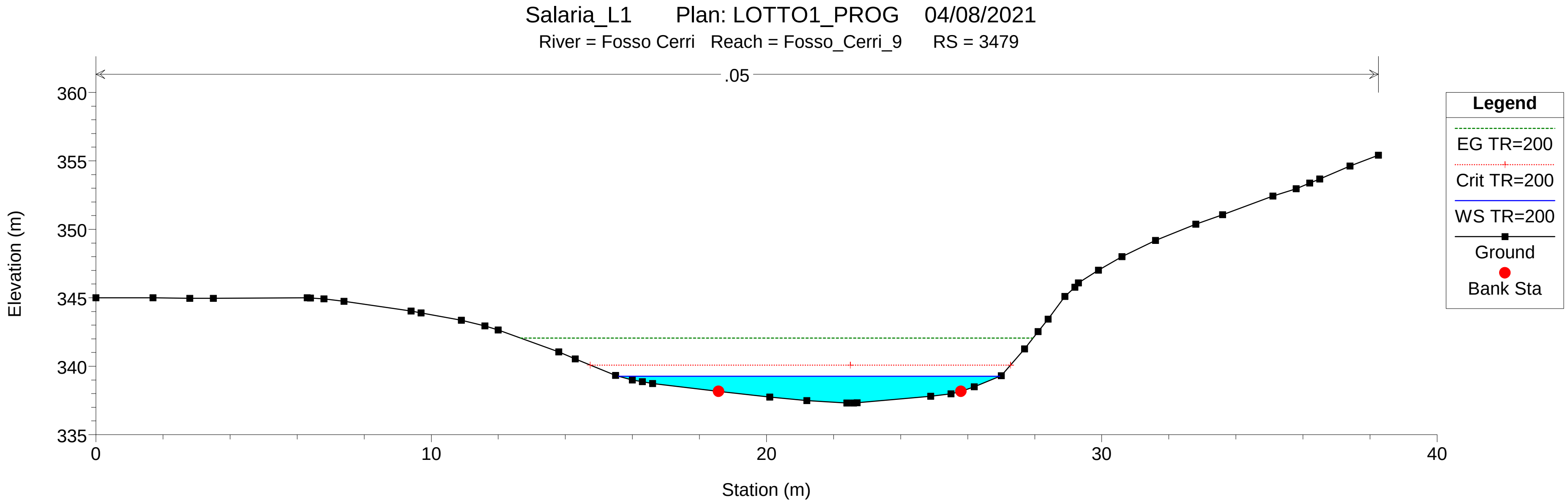
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 4018
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

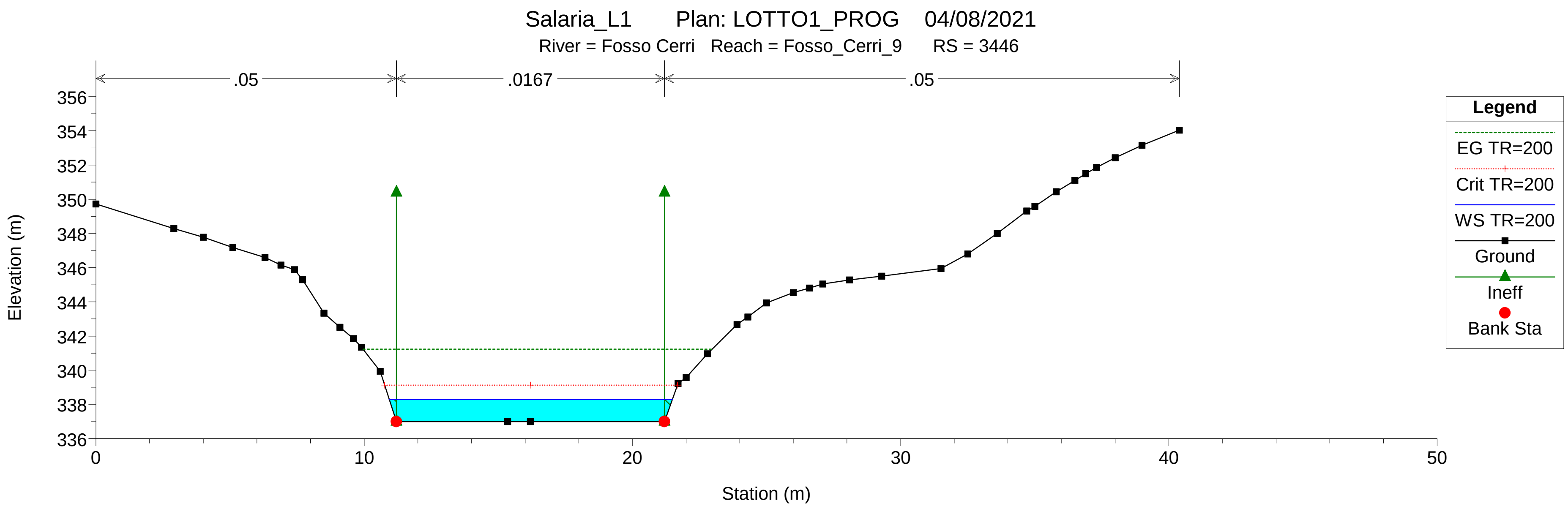

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3907
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

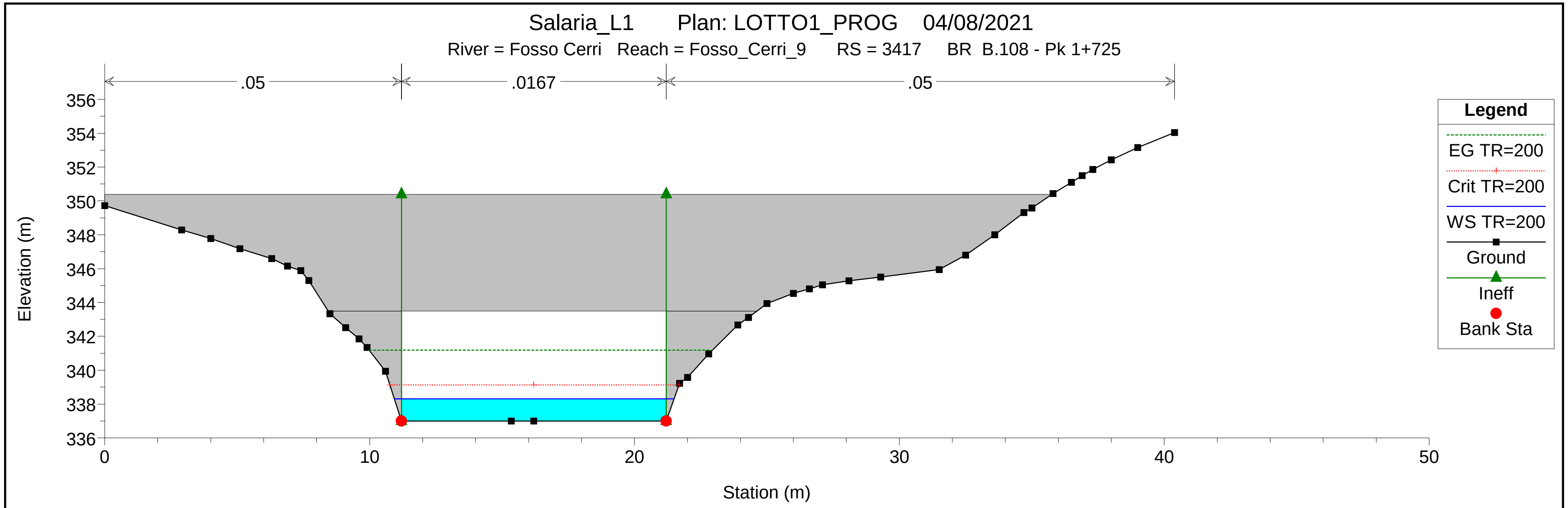

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3792
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

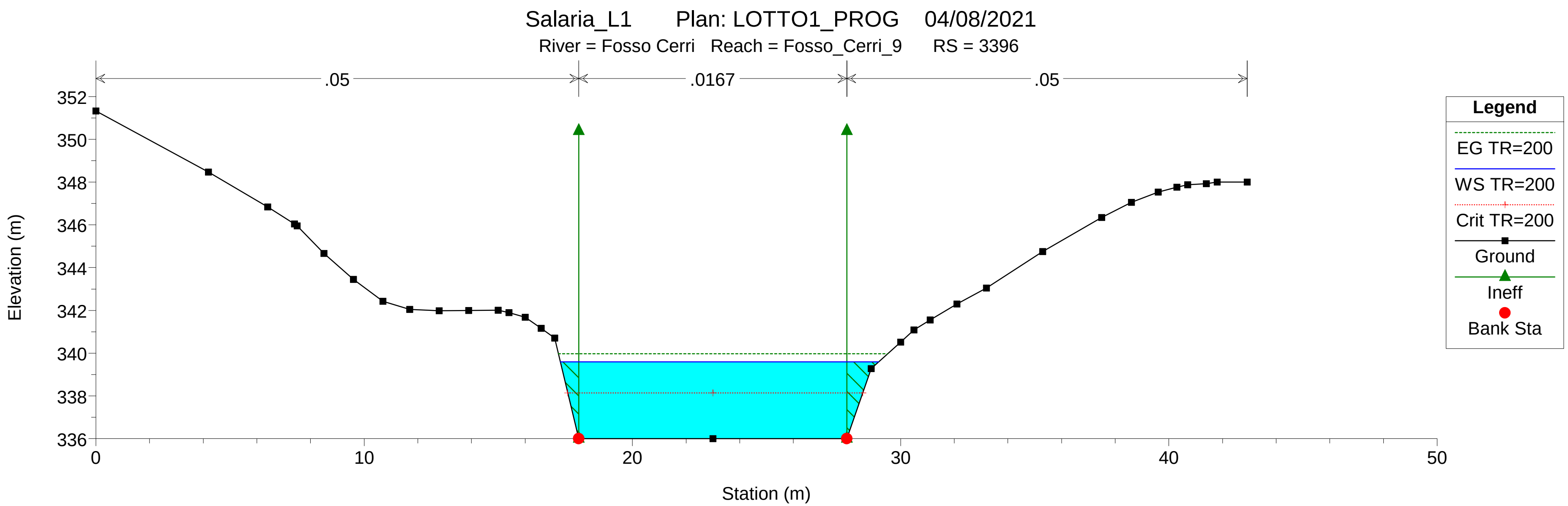

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3716
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

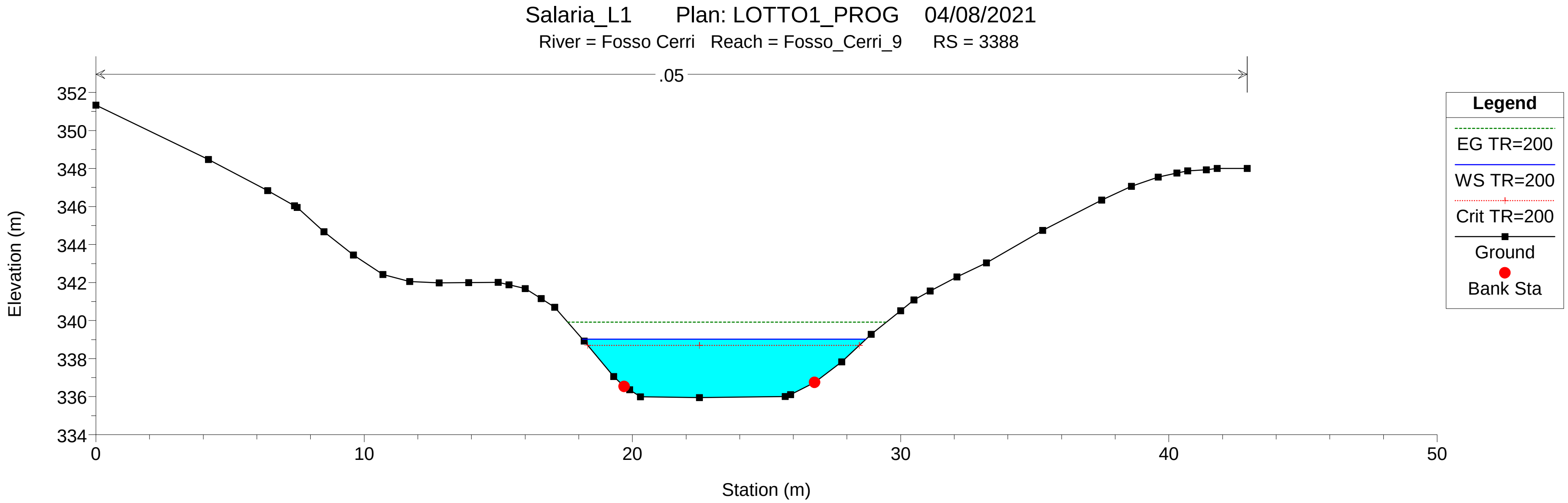

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3598
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3479
.05
Elevation (m)
360
355
350
345
340
335
0
10
20
30
40
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

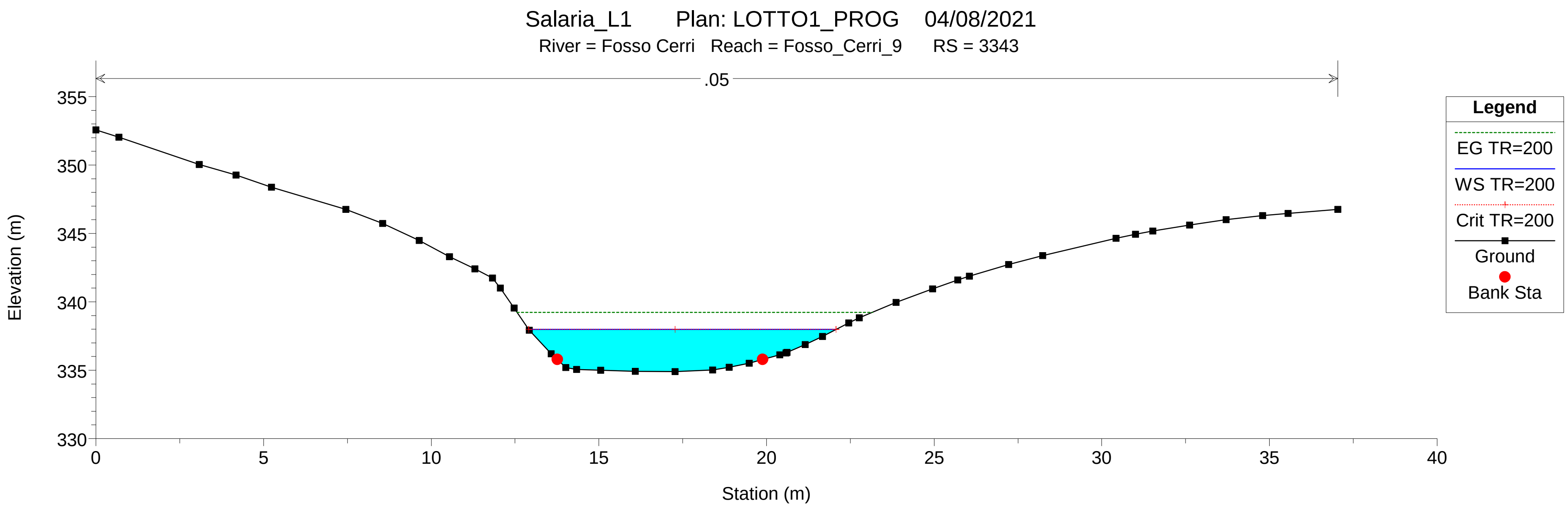

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3446
.05
.0167
.05
Elevation (m)
356
354
352
350
348
346
344
342
340
338
336
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3417 BR B.108 - Pk 1+725
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

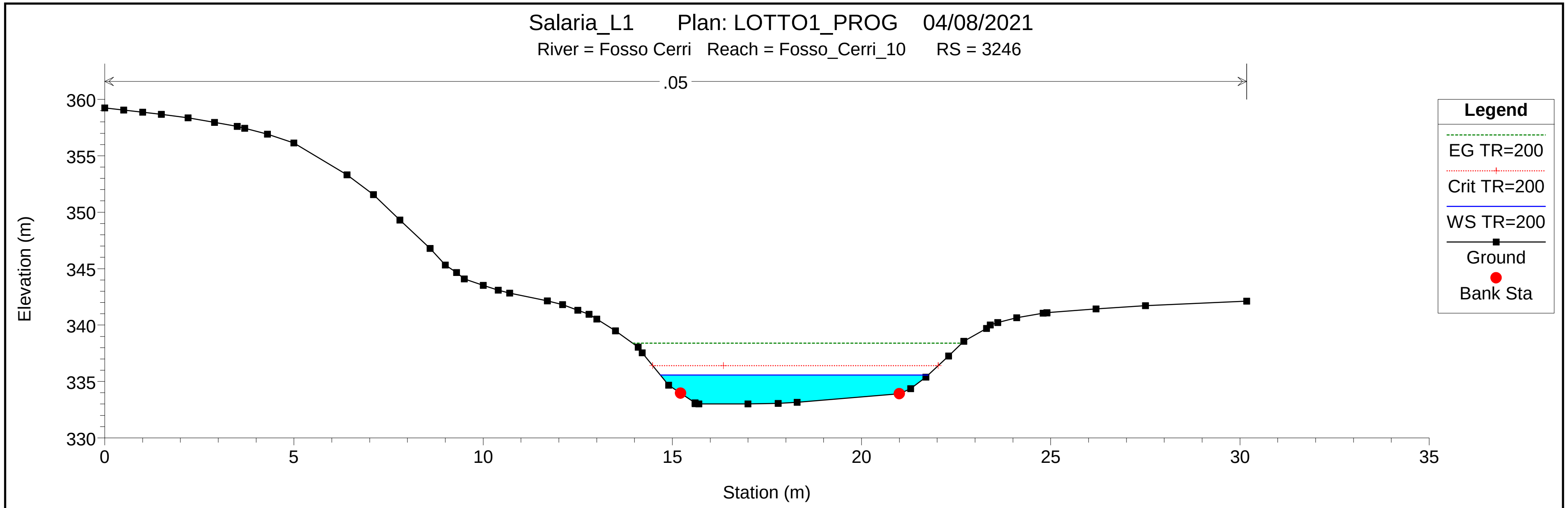

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3396
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

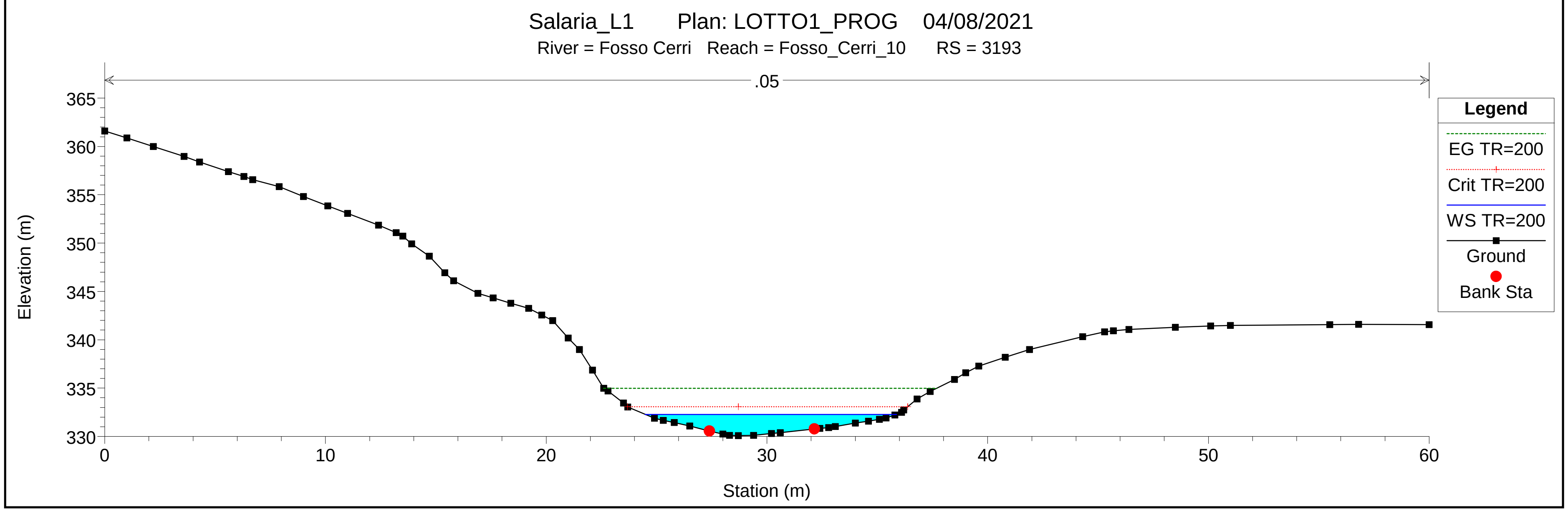


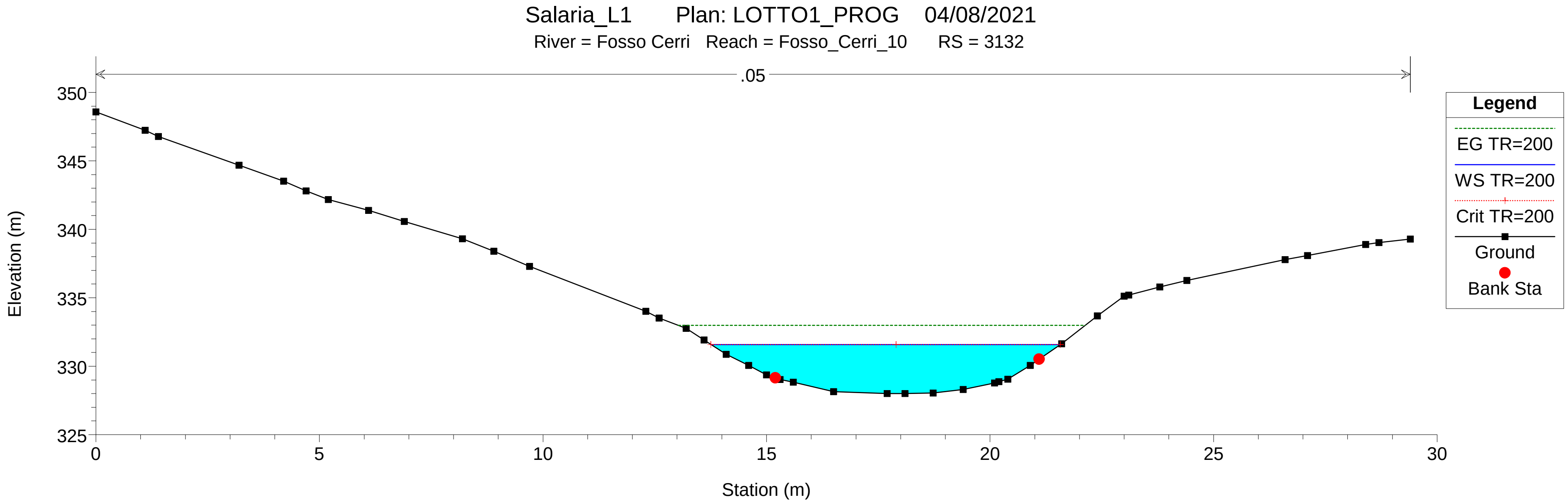
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3388
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

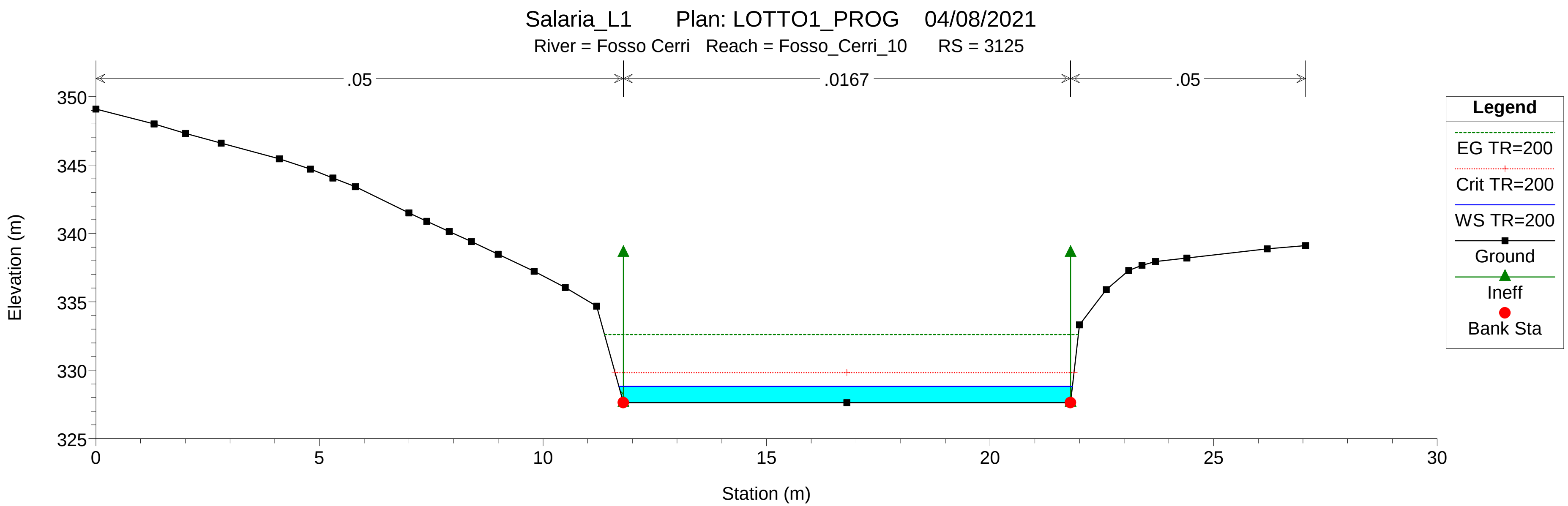


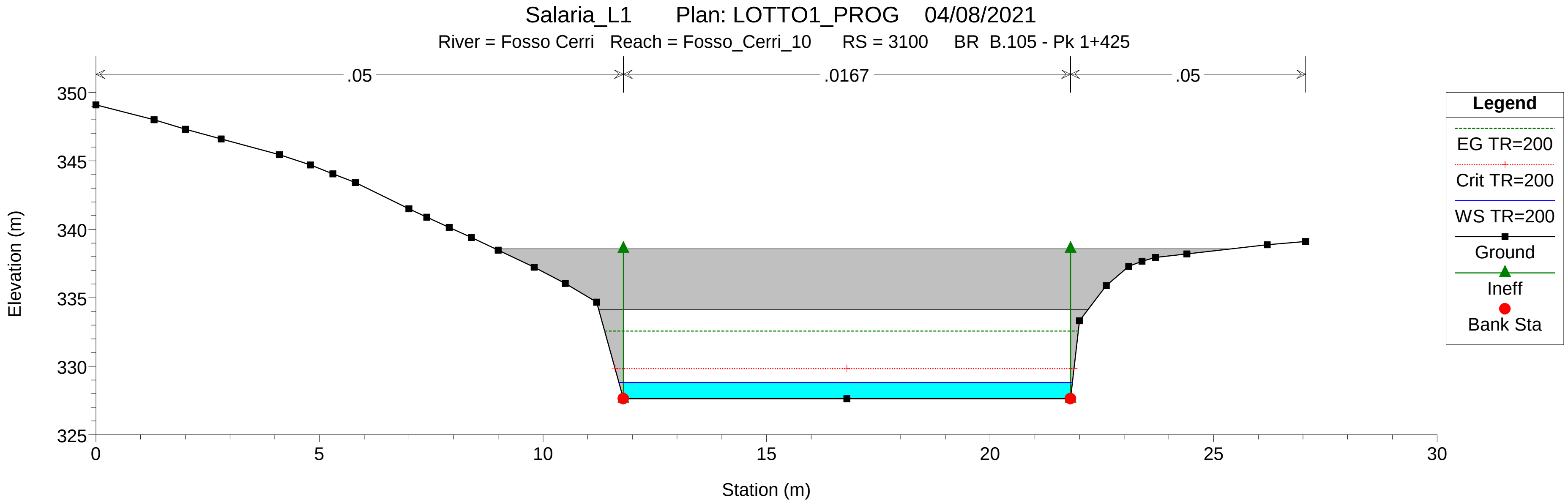
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_9 RS = 3343
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

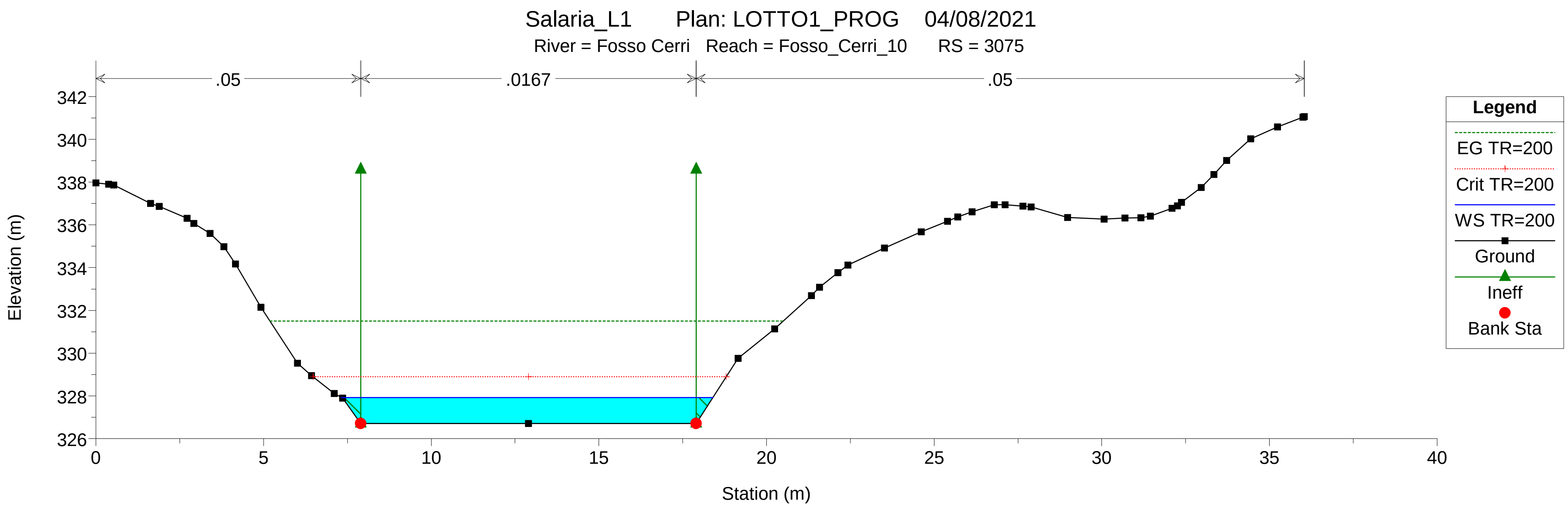

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3246
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

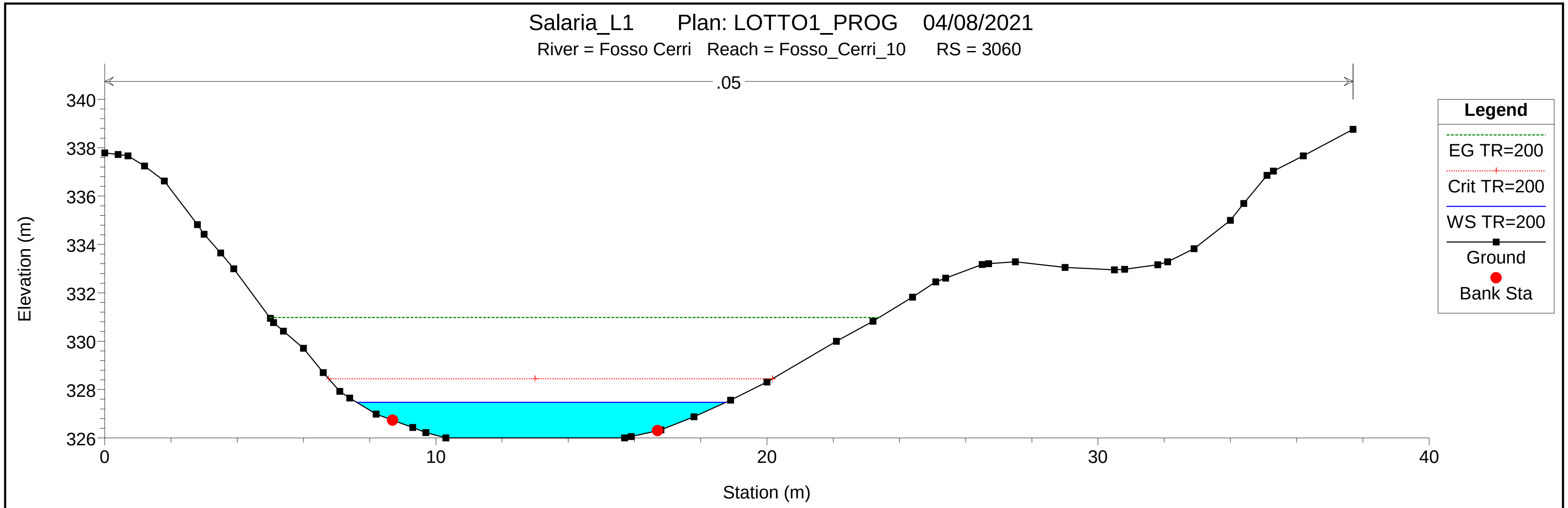

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3193
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

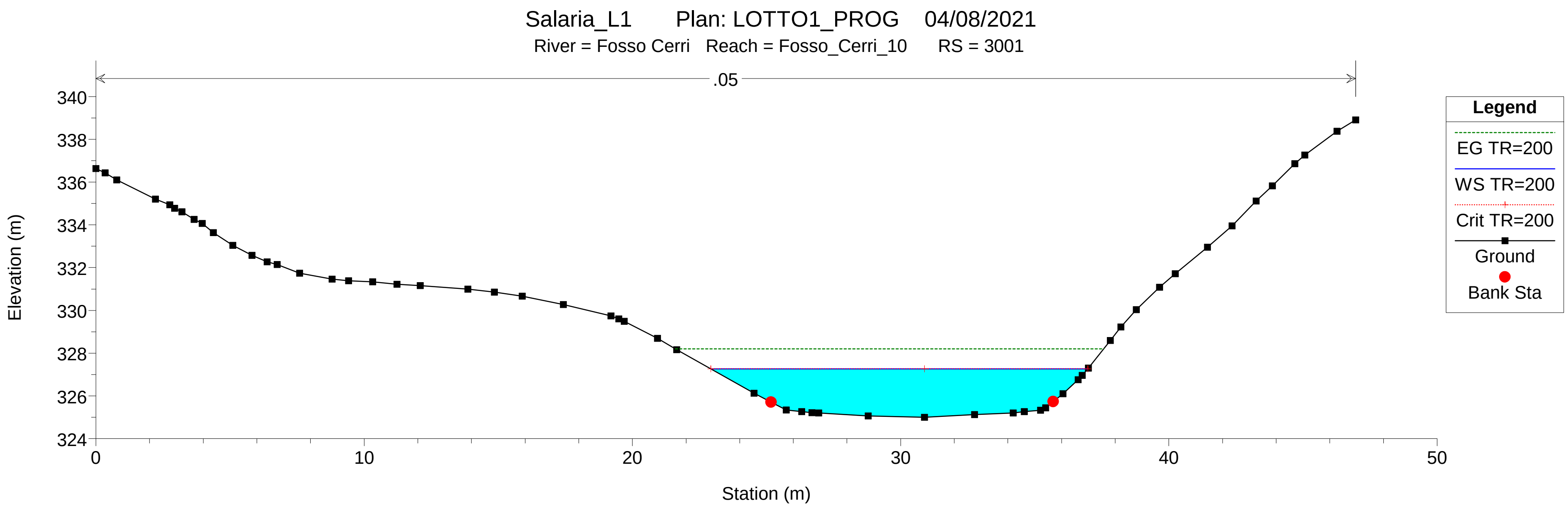

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3132
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

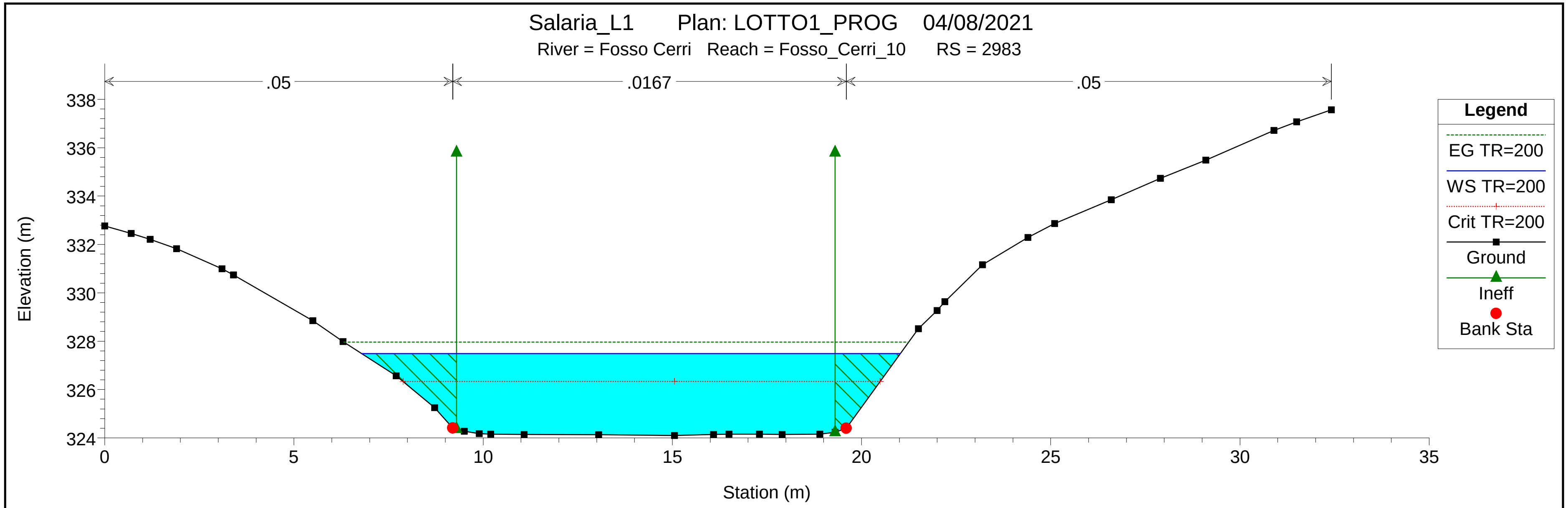

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3125
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3100 BR B.105 - Pk 1+425
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

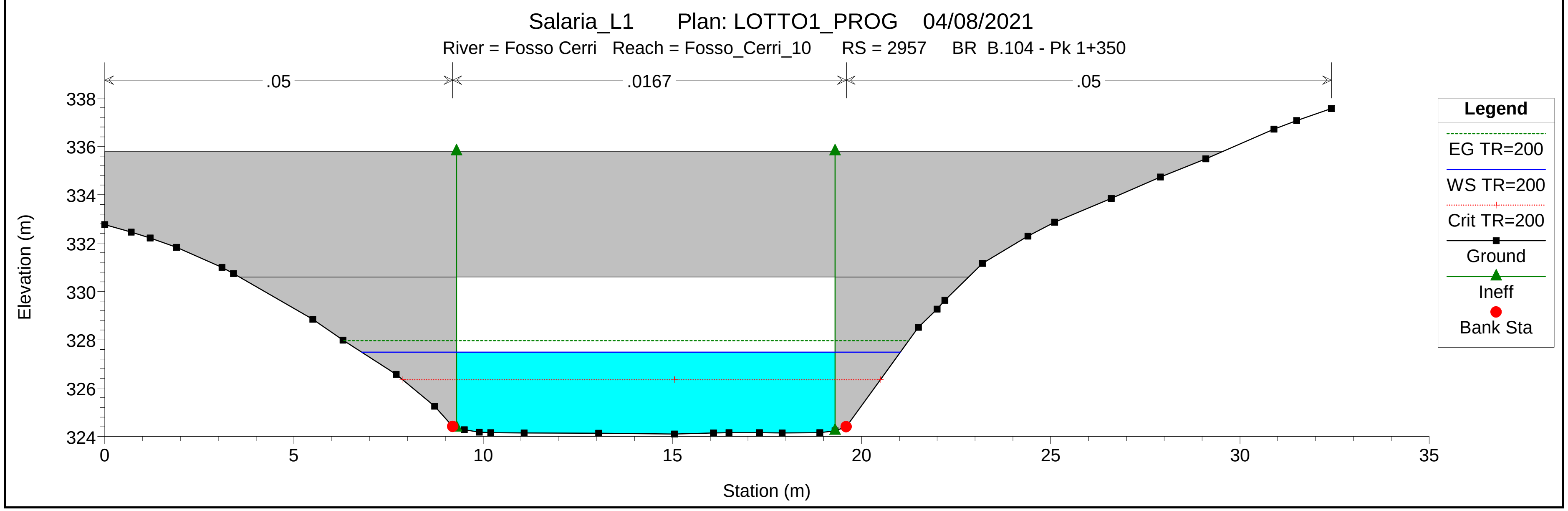

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3075
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3060
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

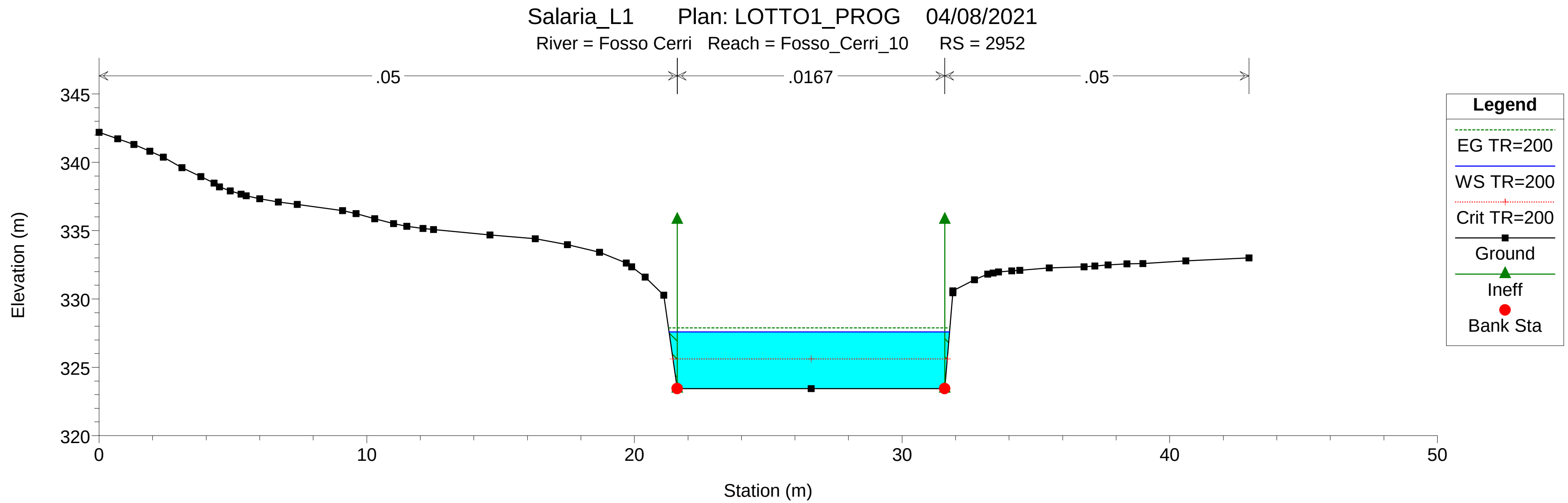

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 3001
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

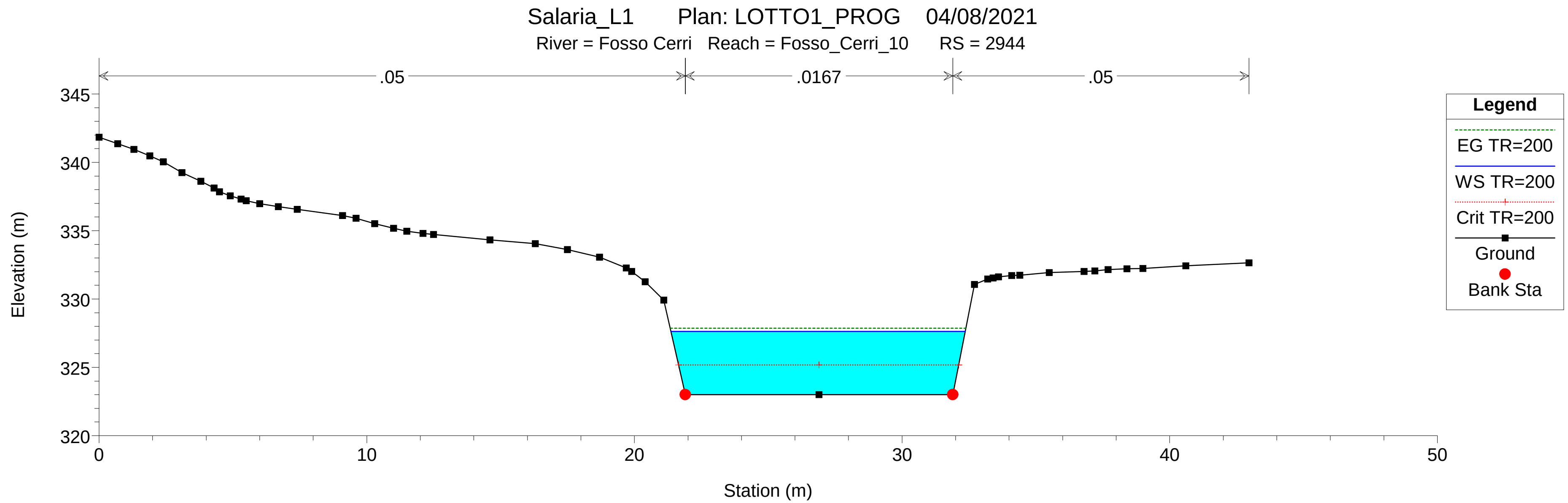


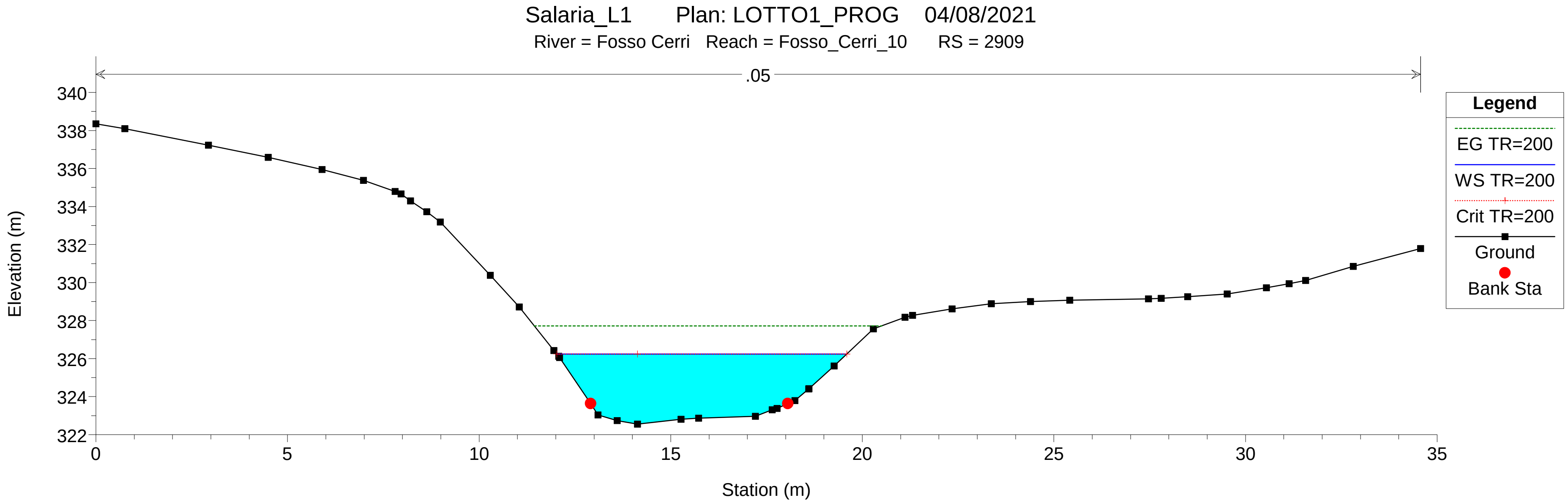
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2983
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

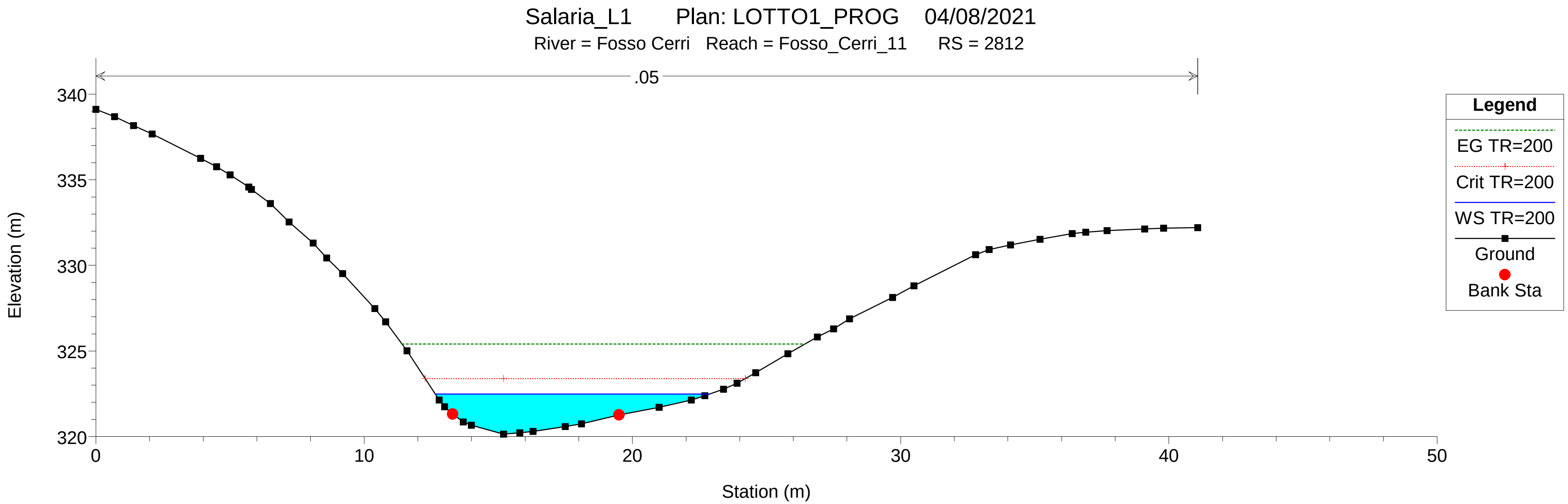


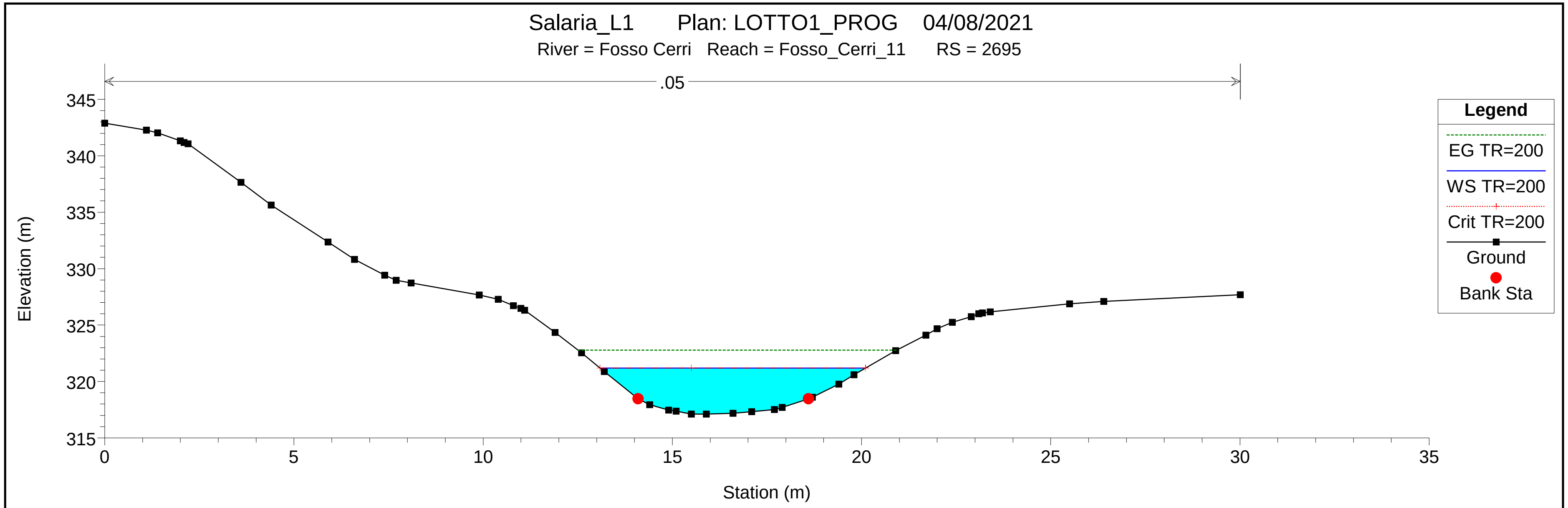
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2957 BR B.104 - Pk 1+350
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2952
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

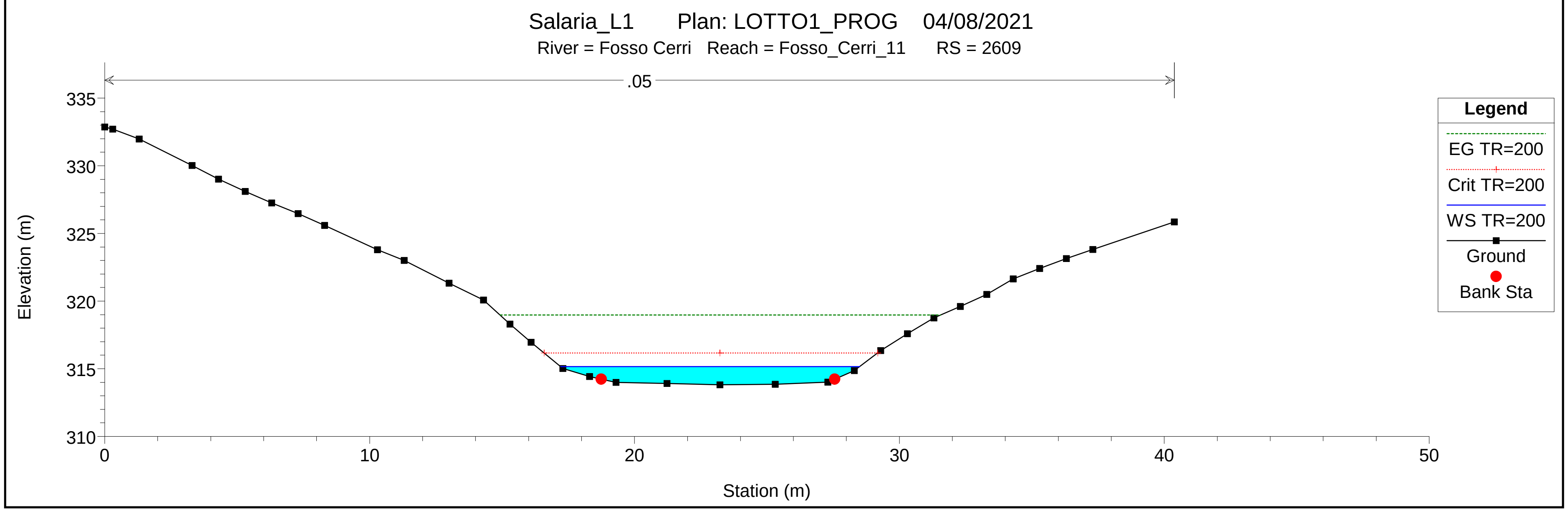

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2944
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_10 RS = 2909
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

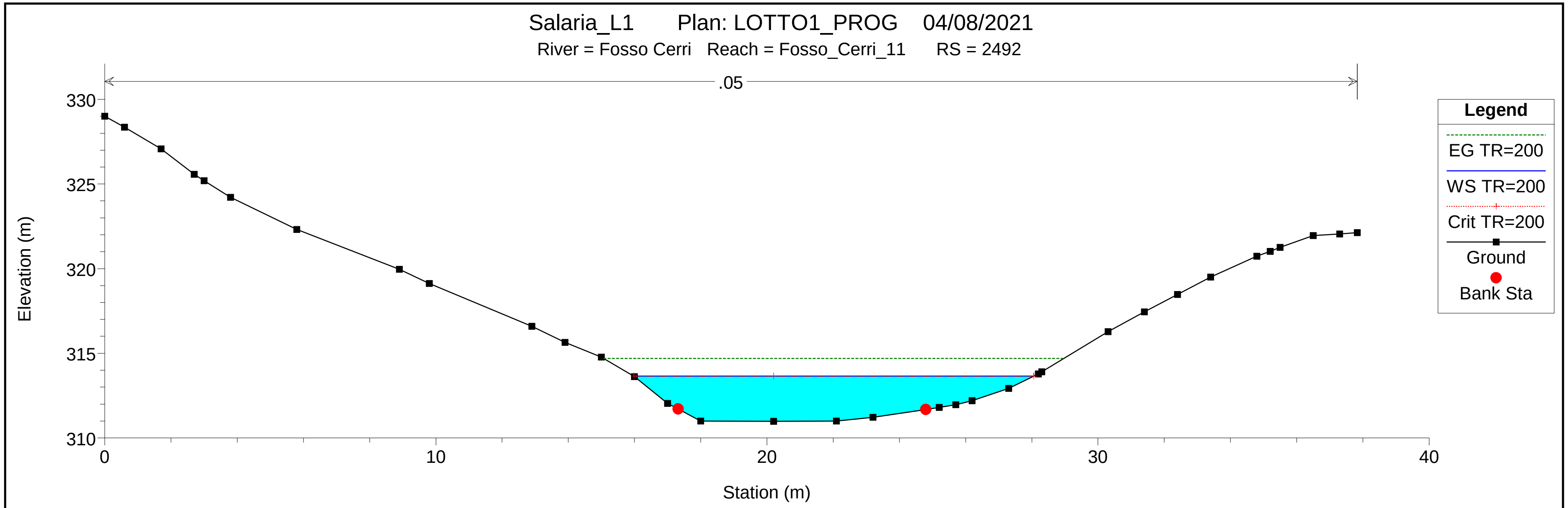

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2812
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

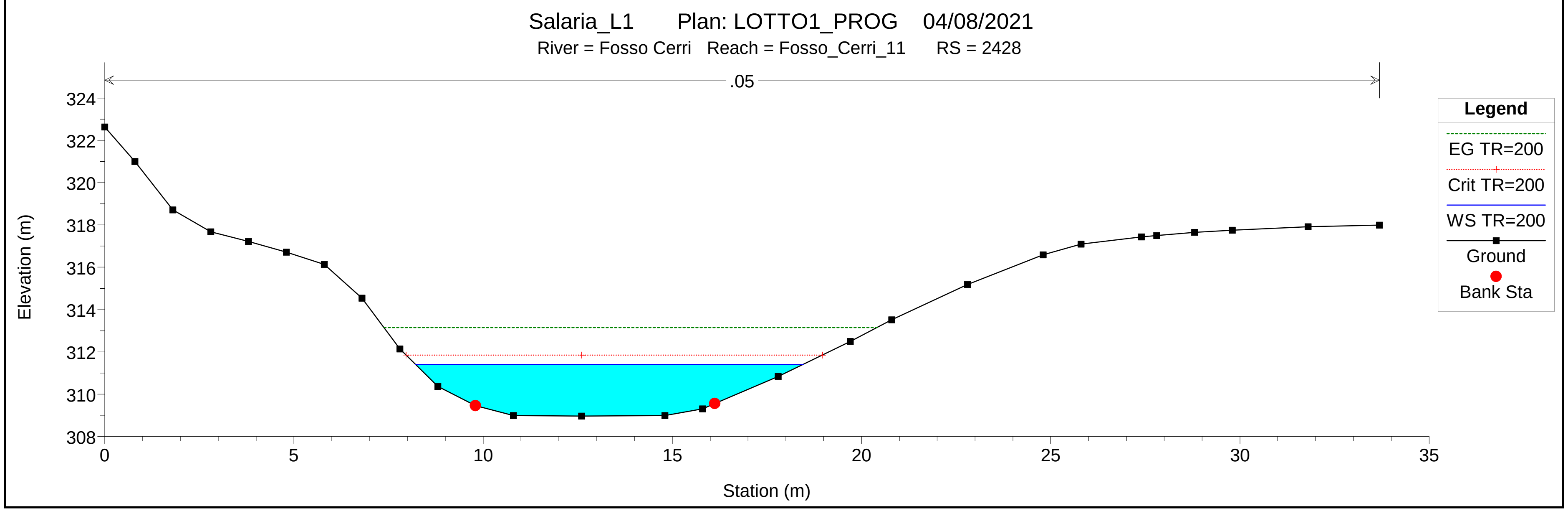


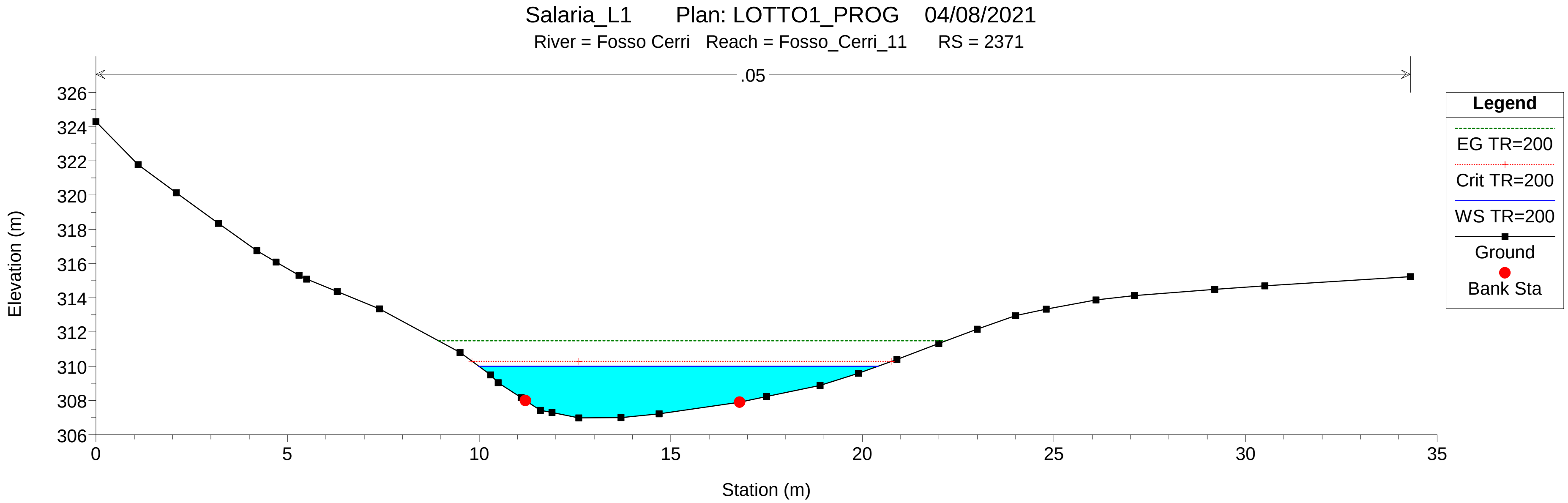
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2695
.05
Elevation (m)
345
340
335
330
325
320
315
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

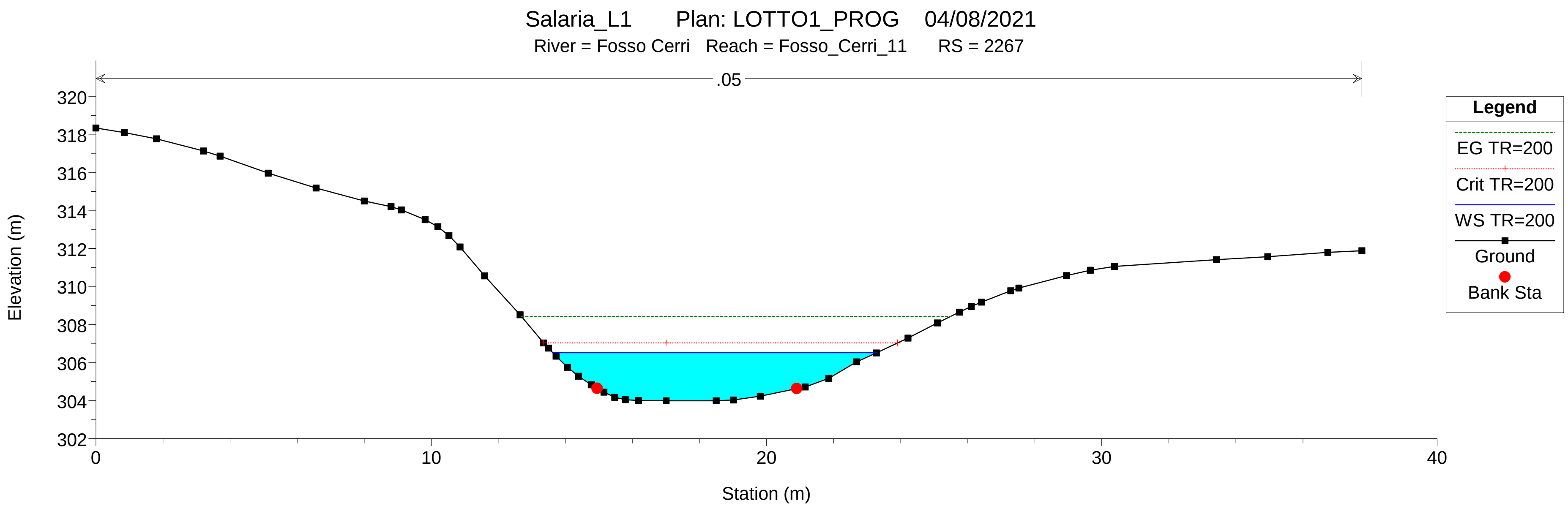


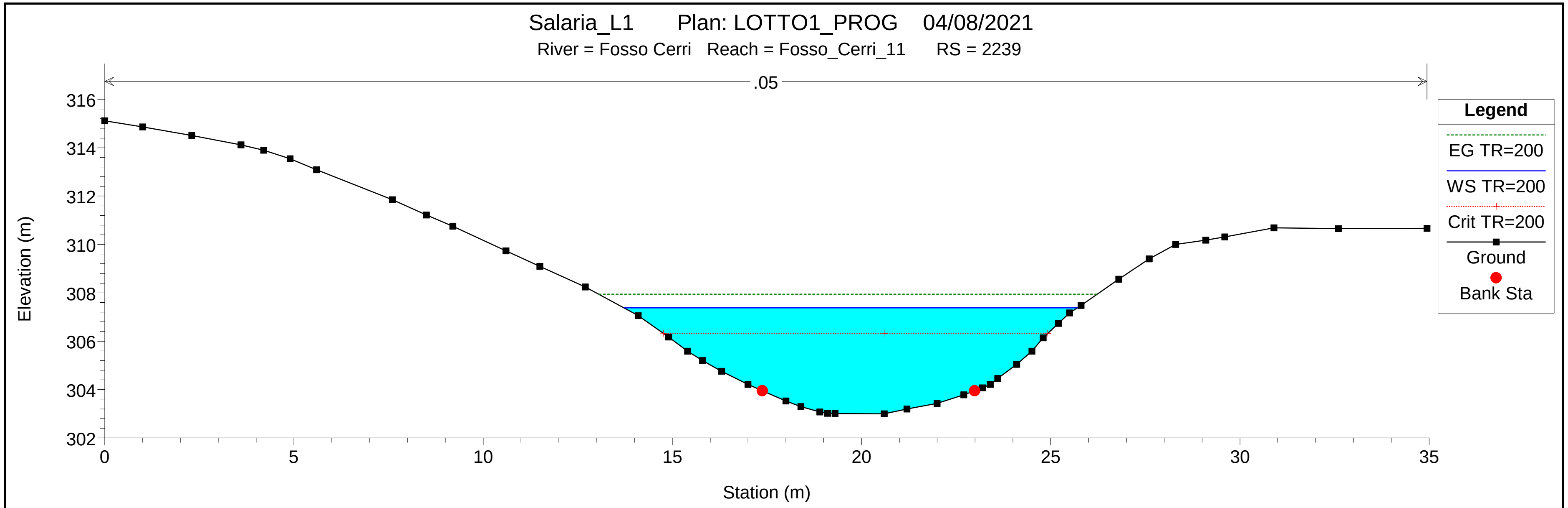
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2609
.05
Elevation (m)
335
330
325
320
315
310
0
10
20
30
40
50
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

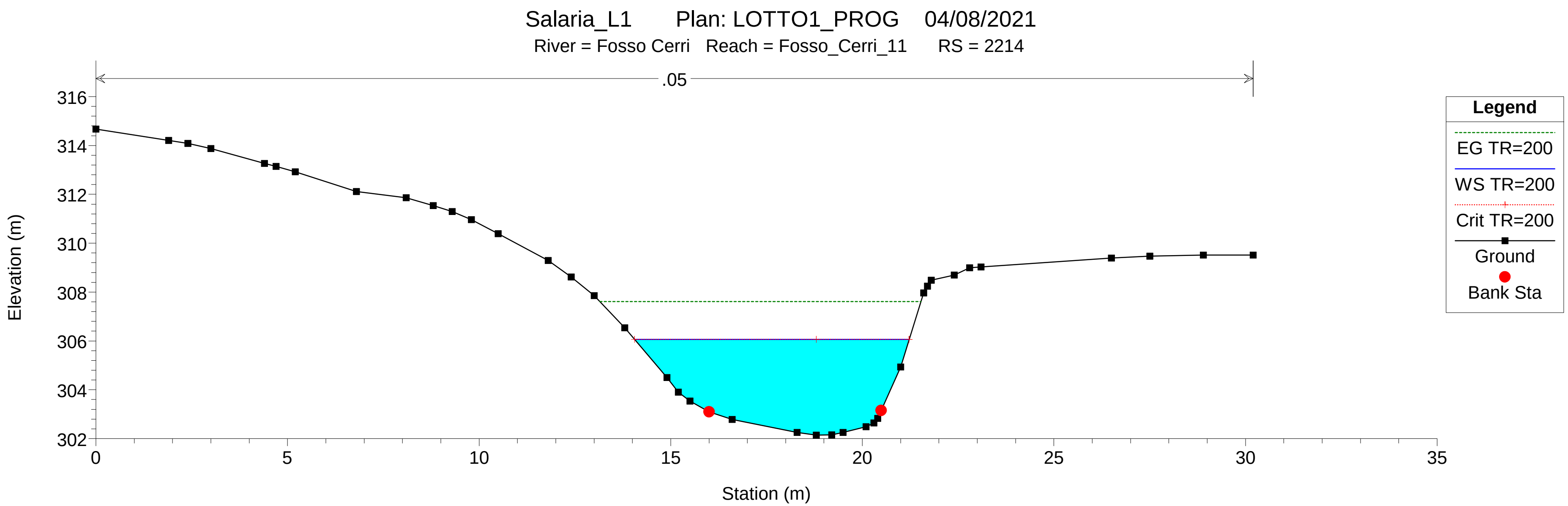

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2492
.05
Elevation (m)
330
325
320
315
310
0
10
20
30
40
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

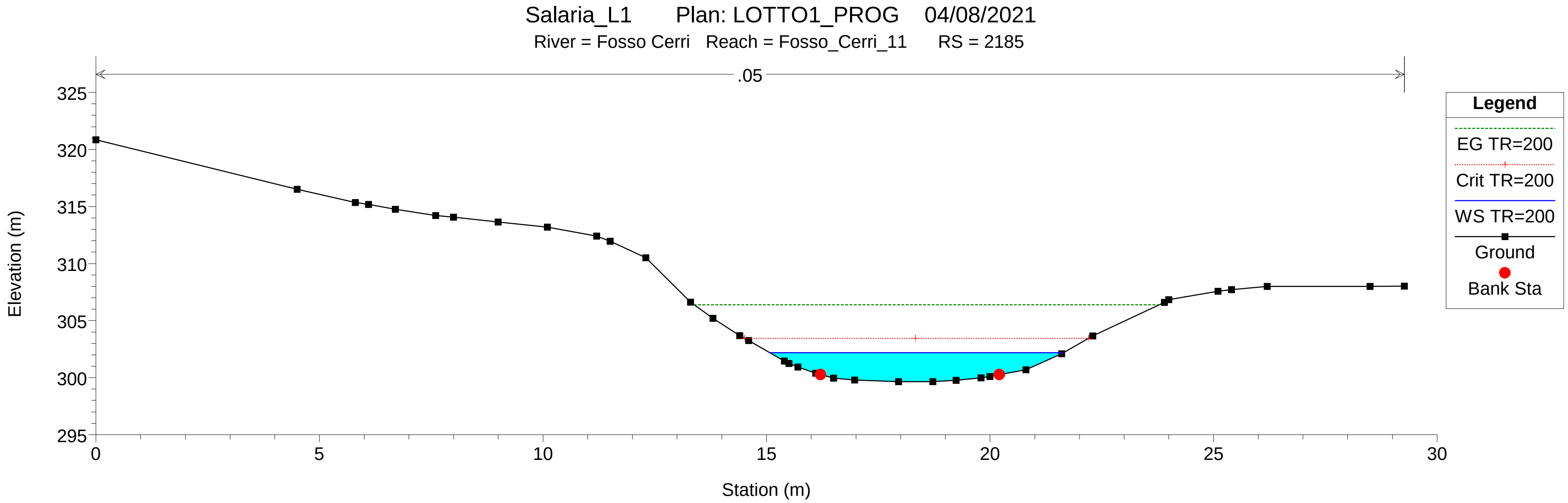

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2428
.05
Elevation (m)
324
322
320
318
316
314
312
310
308
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

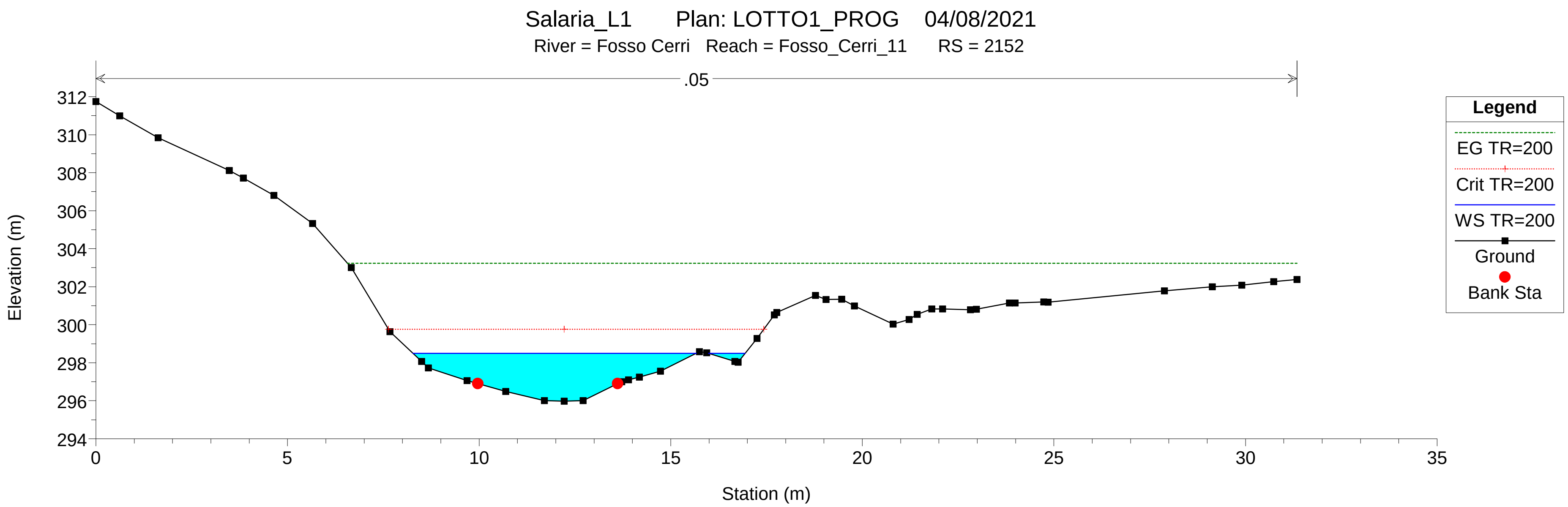

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2371
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
326
324
322
320
318
316
314
312
310
308
306
0
5
10
15
20
25
30
35

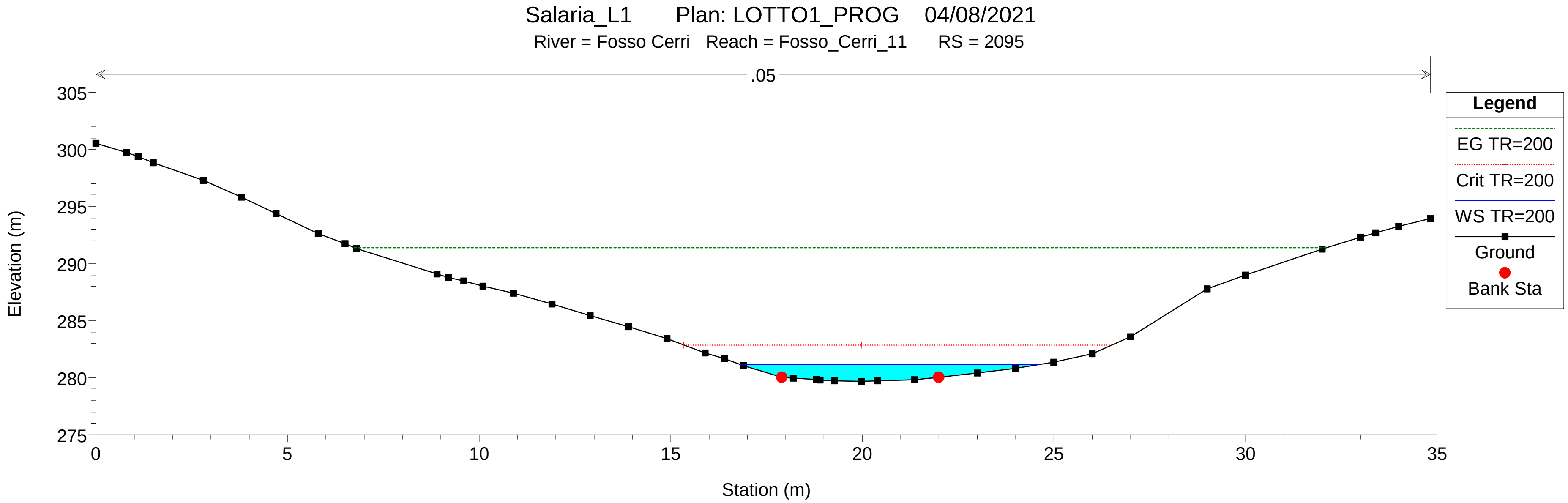

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2267
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
320
318
316
314
312
310
308
306
304
302
0
10
20
30
40

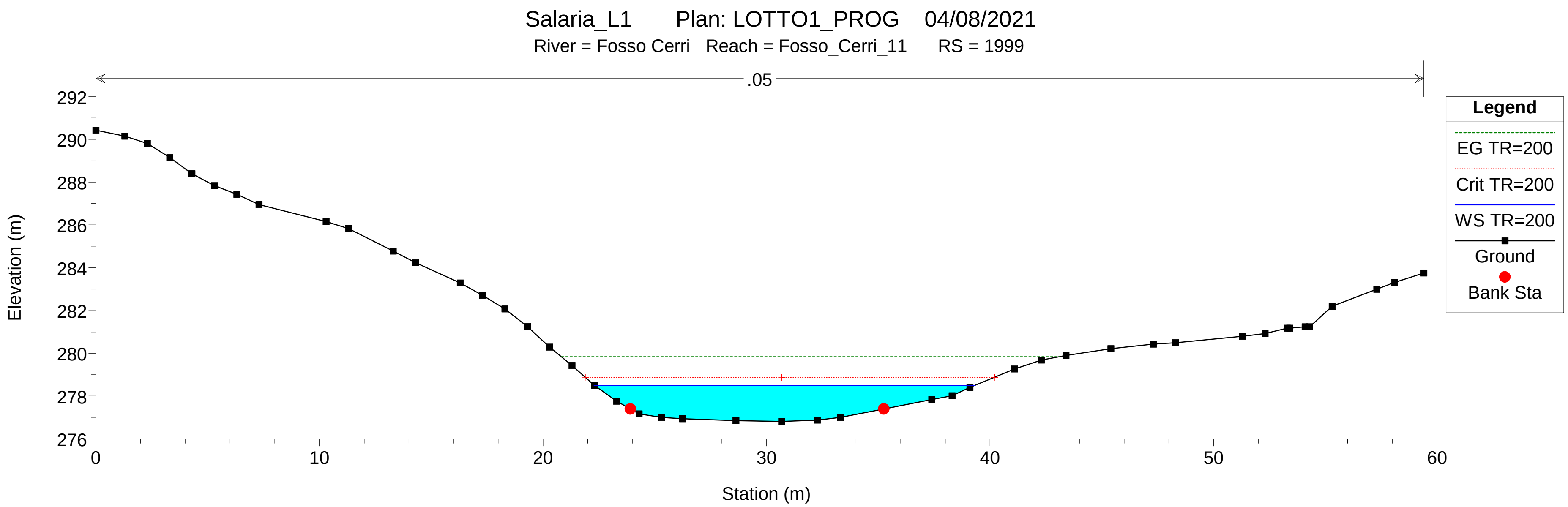

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2239
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

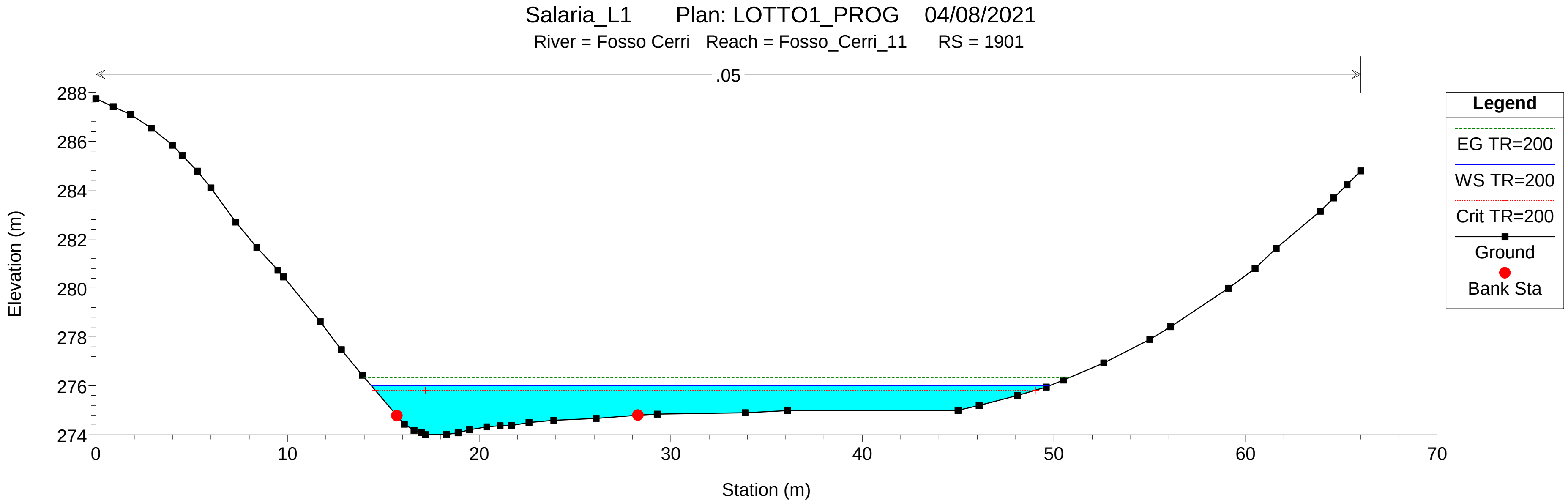

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2214
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

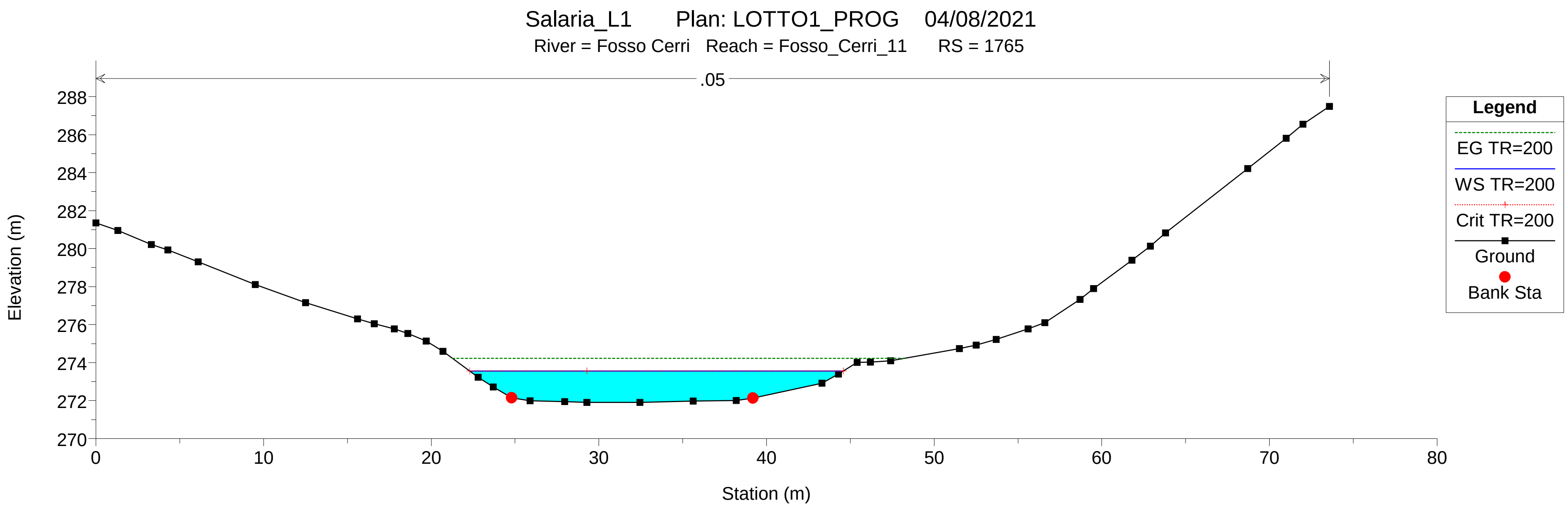

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2185
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

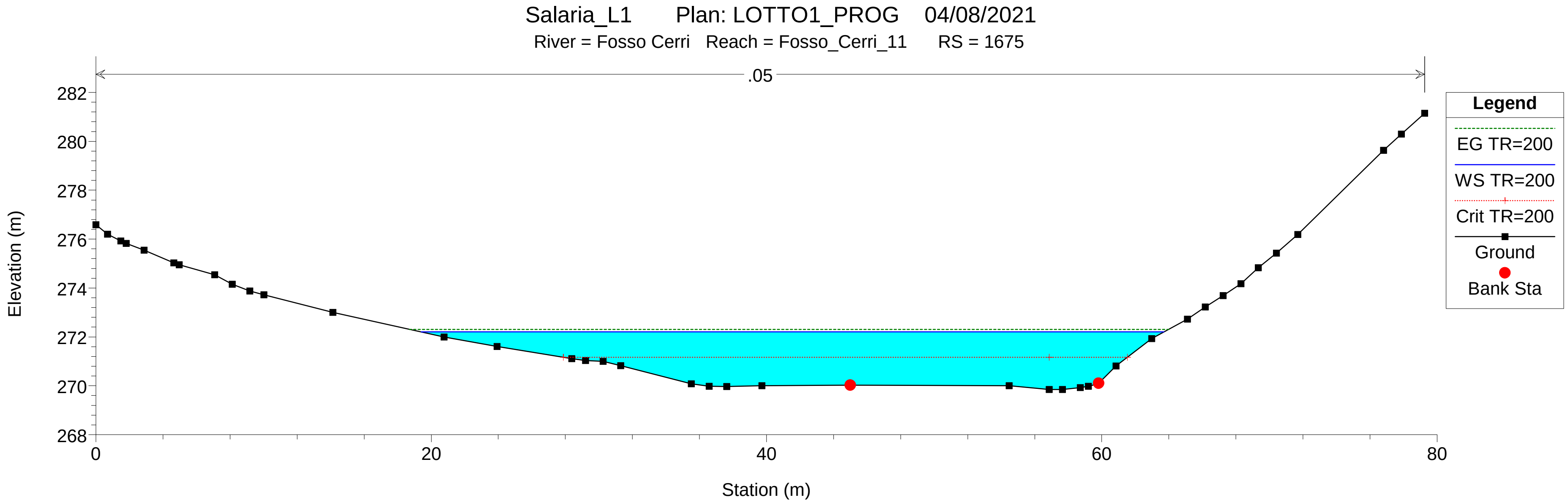

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2152
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

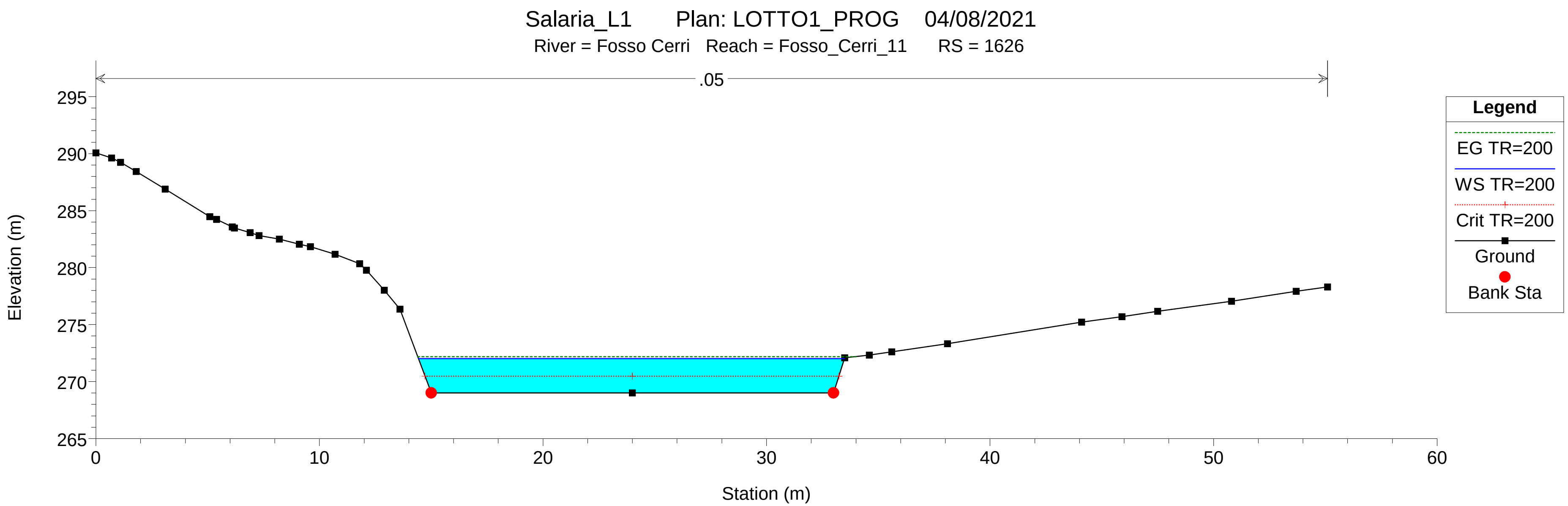

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 2095
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

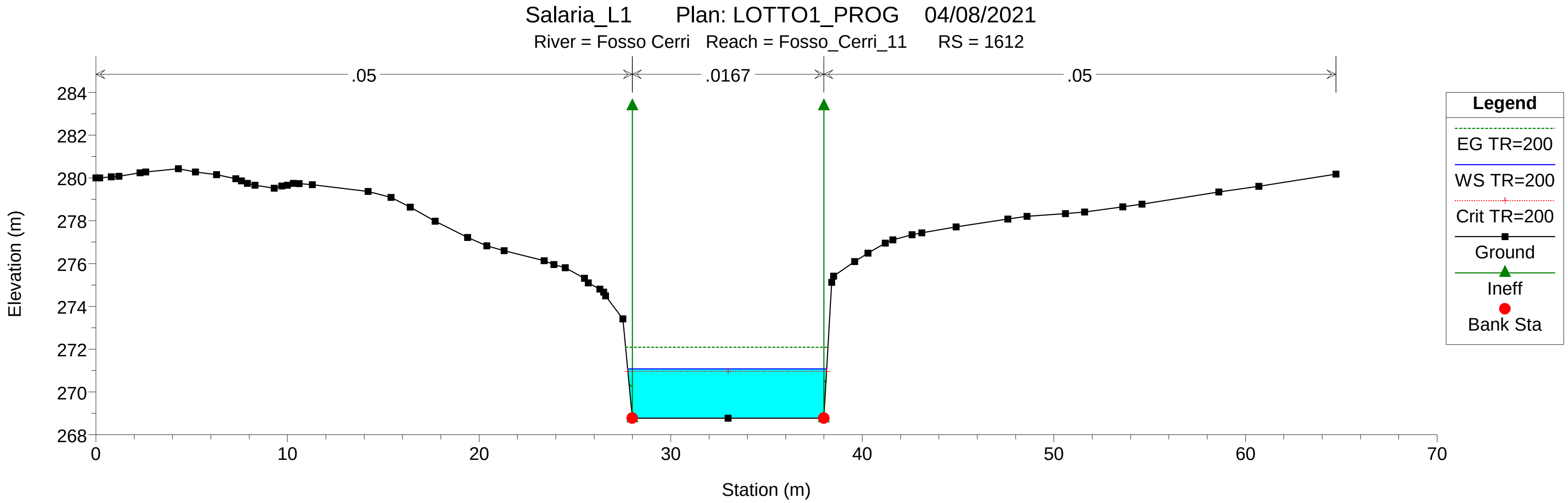

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1999
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

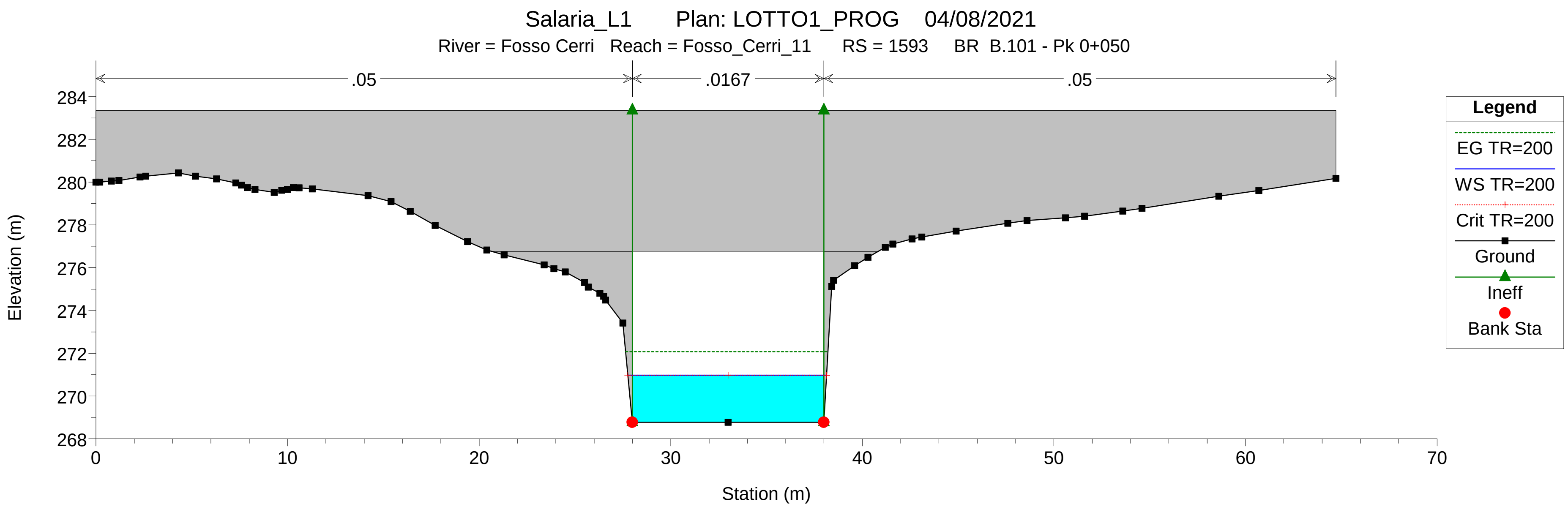

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1901
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

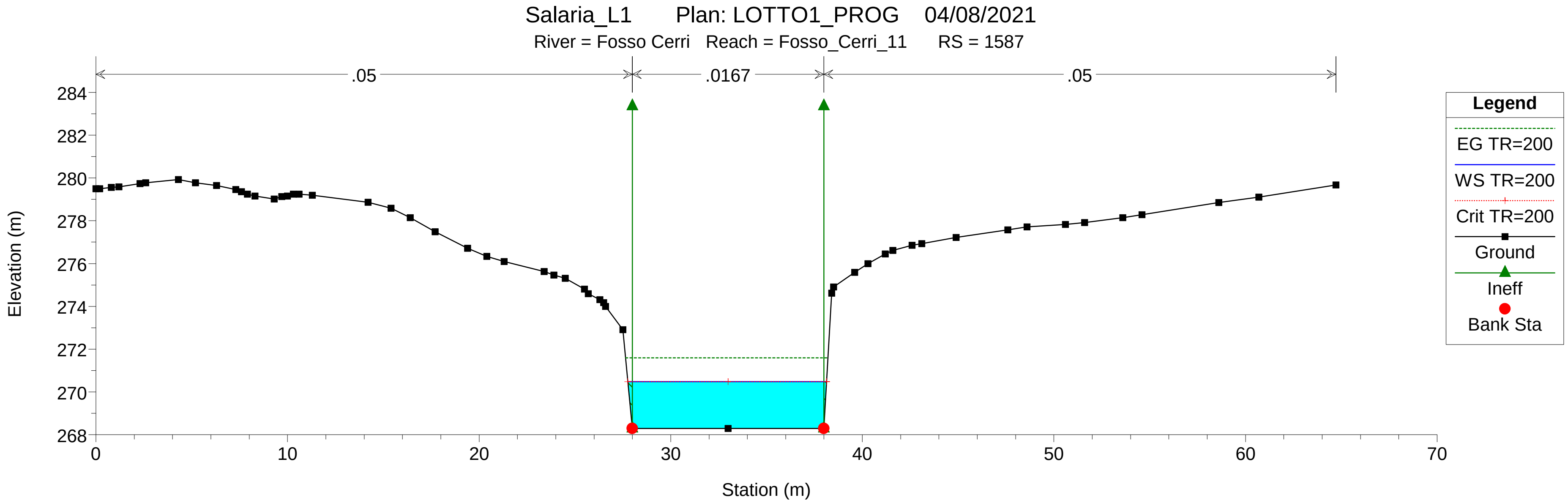

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1765
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1675
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)

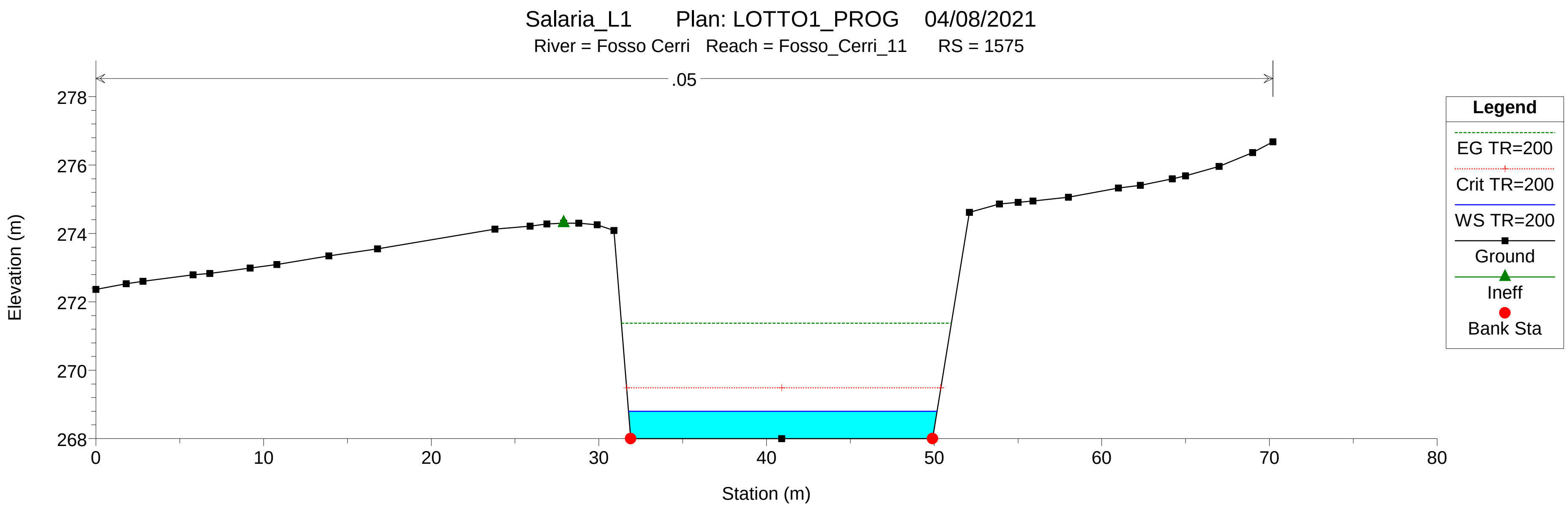

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1626
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1612
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

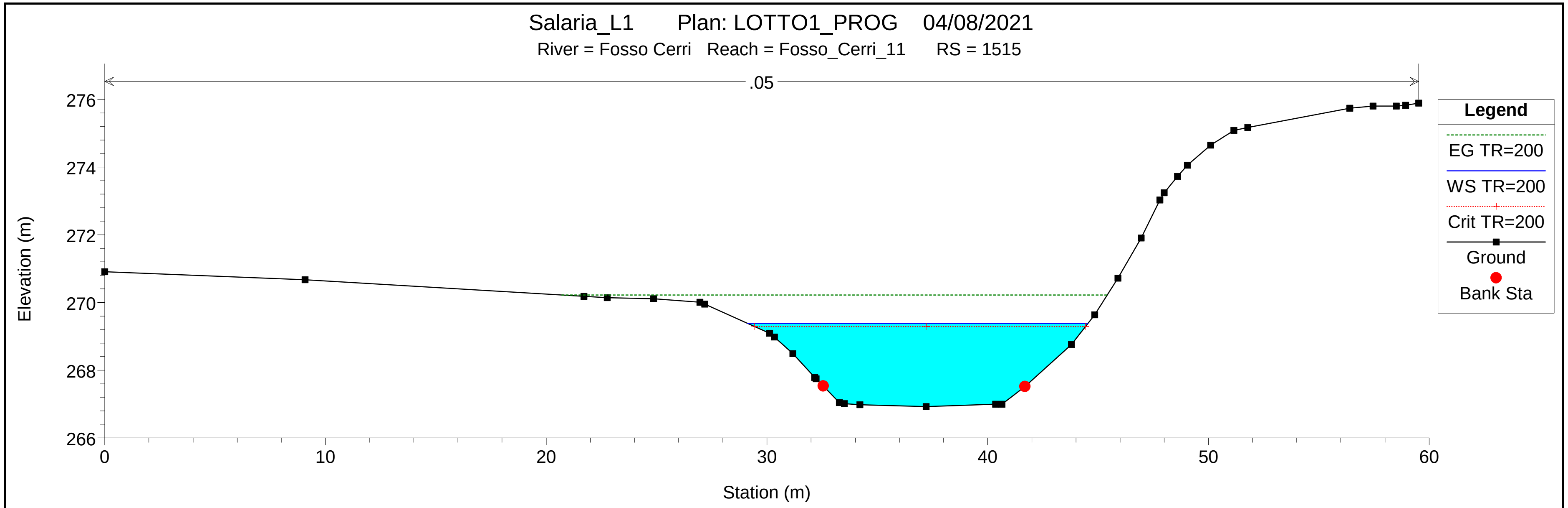

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1593 BR B.101 - Pk 0+050
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

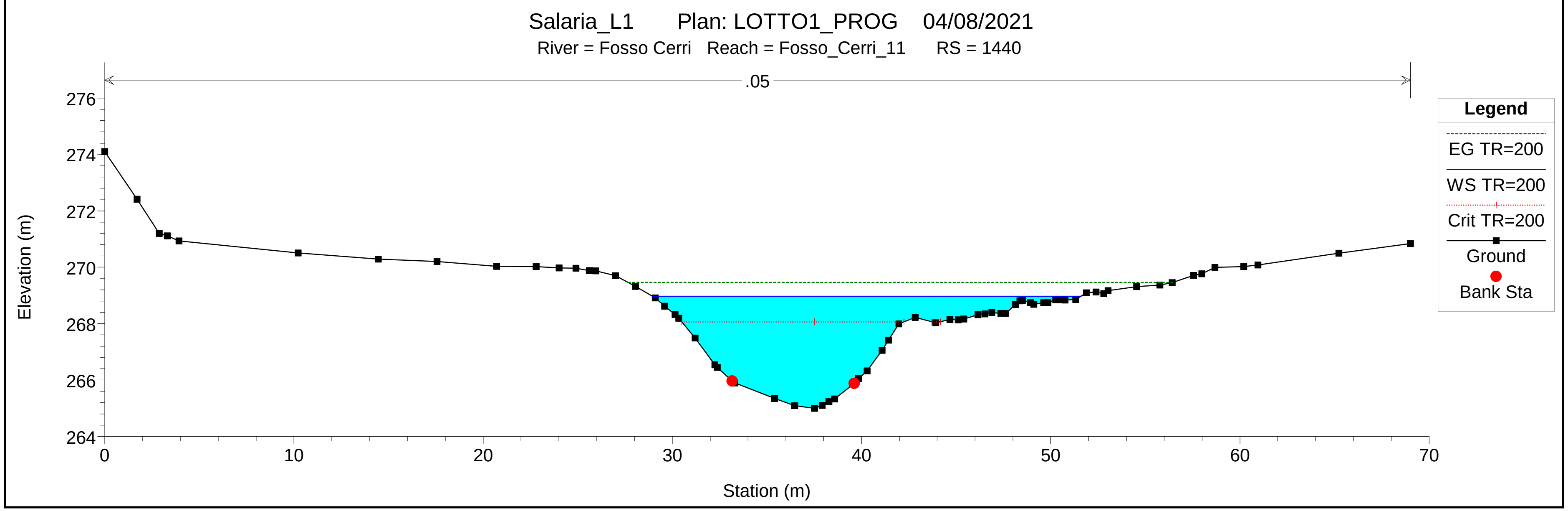


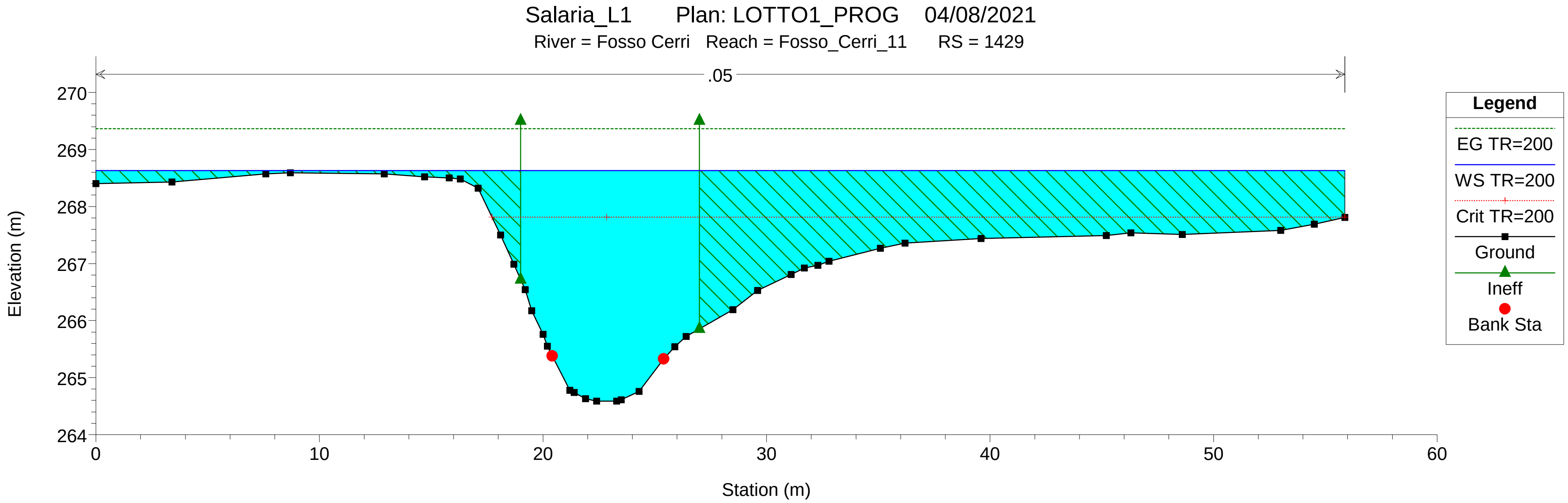
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1587
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



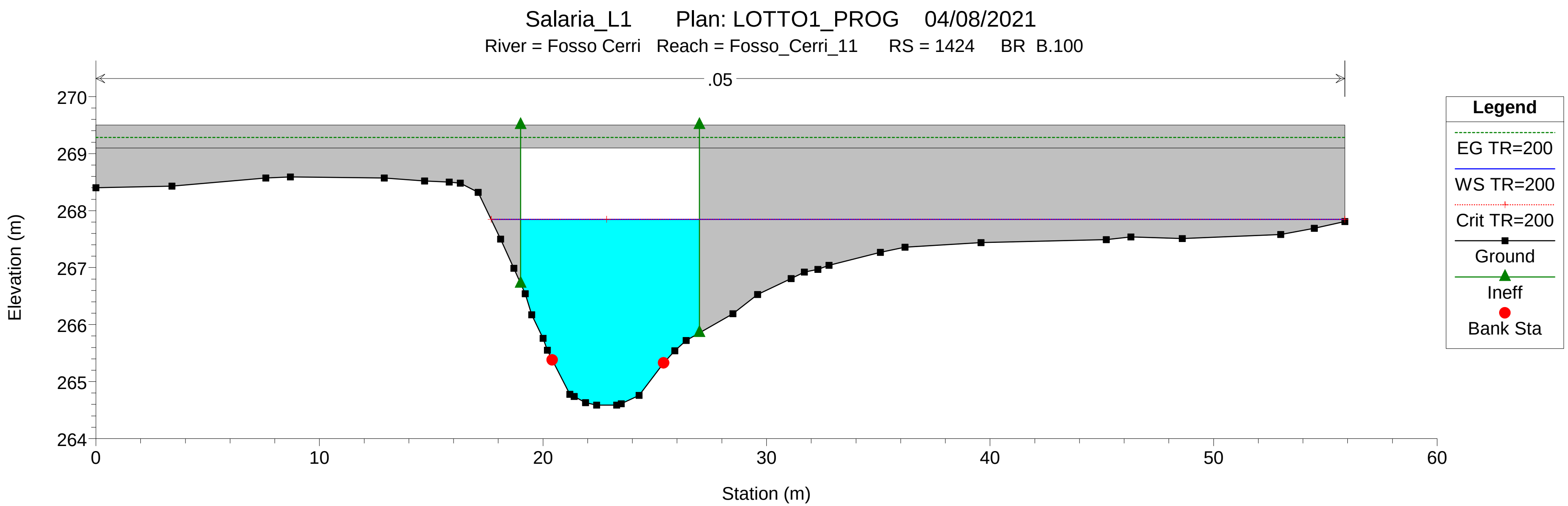
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1575
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1515
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)

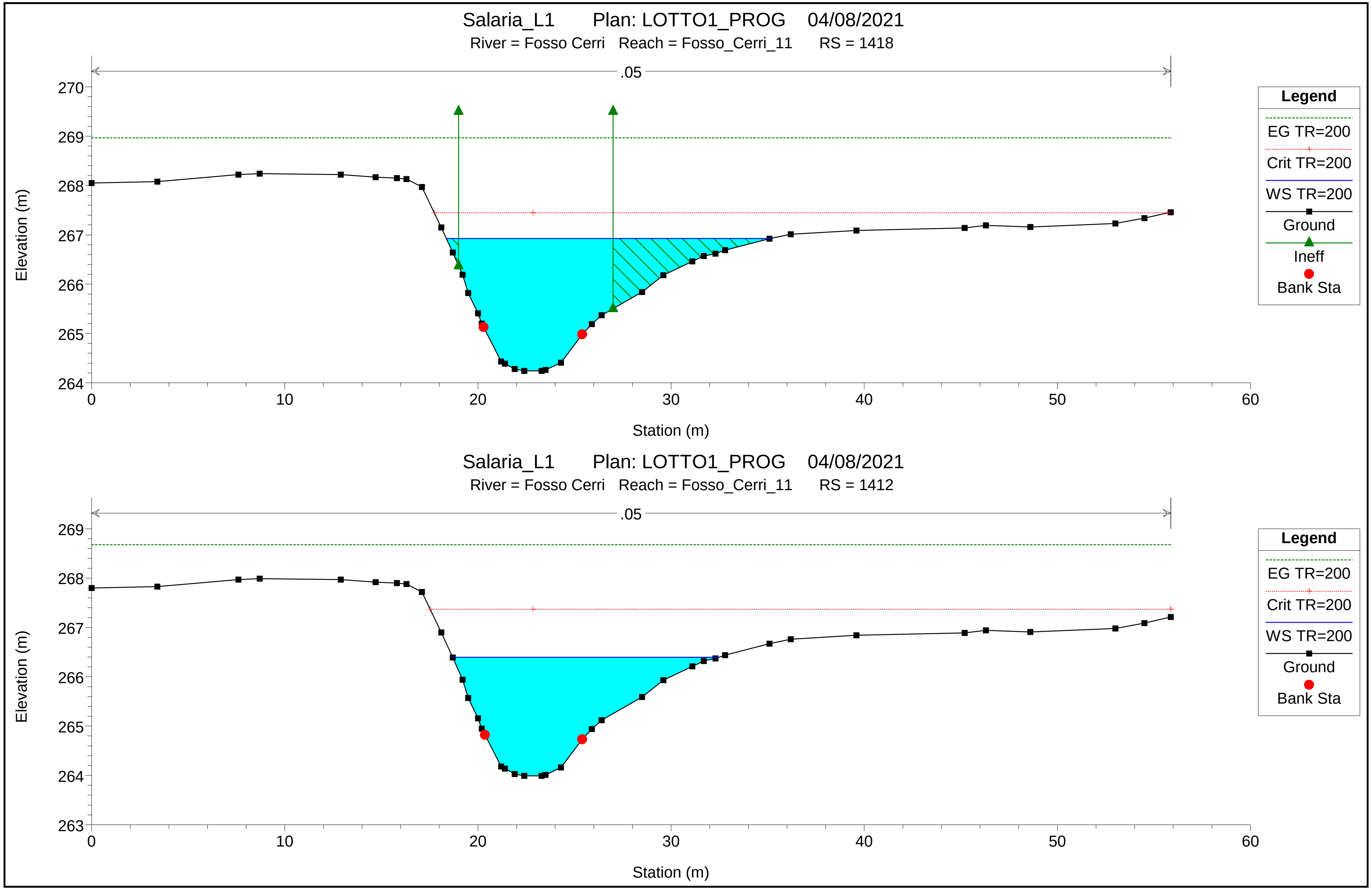

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1440
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)

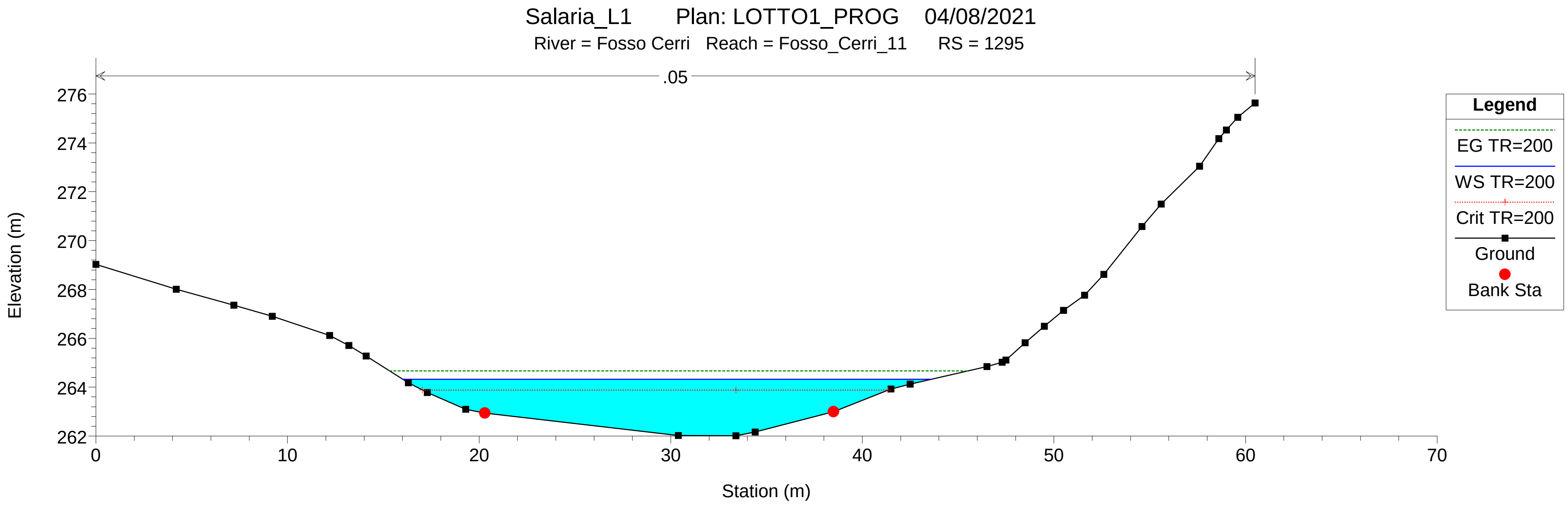


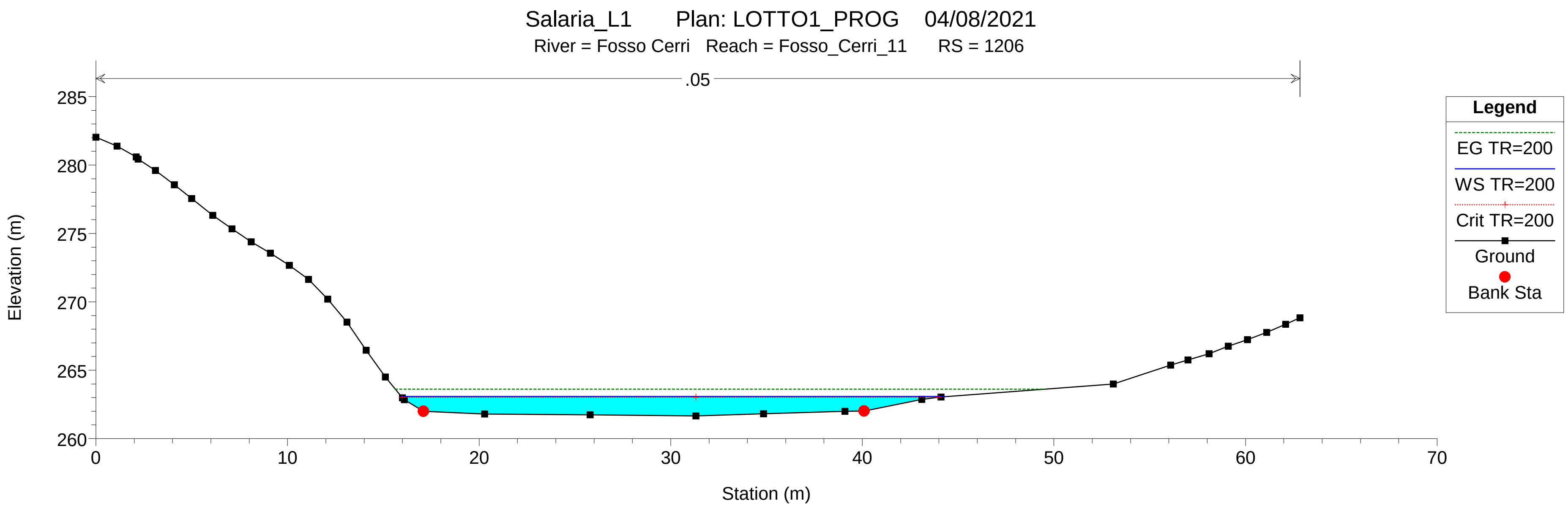
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1429
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta



Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1424 BR B.100
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Ineff
Bank Sta

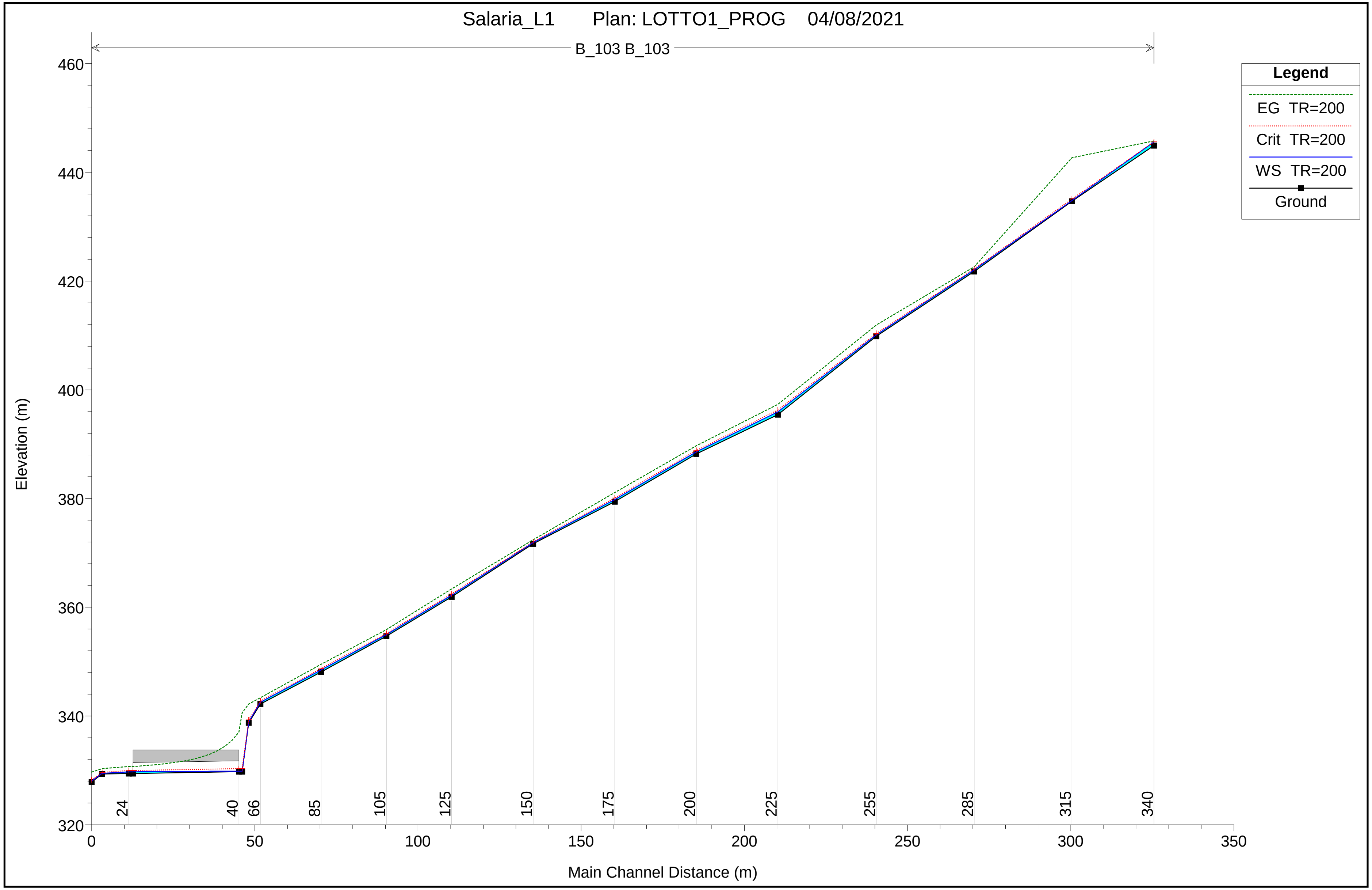

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1418
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1412
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1295
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = Fosso Cerri Reach = Fosso_Cerri_11 RS = 1206
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

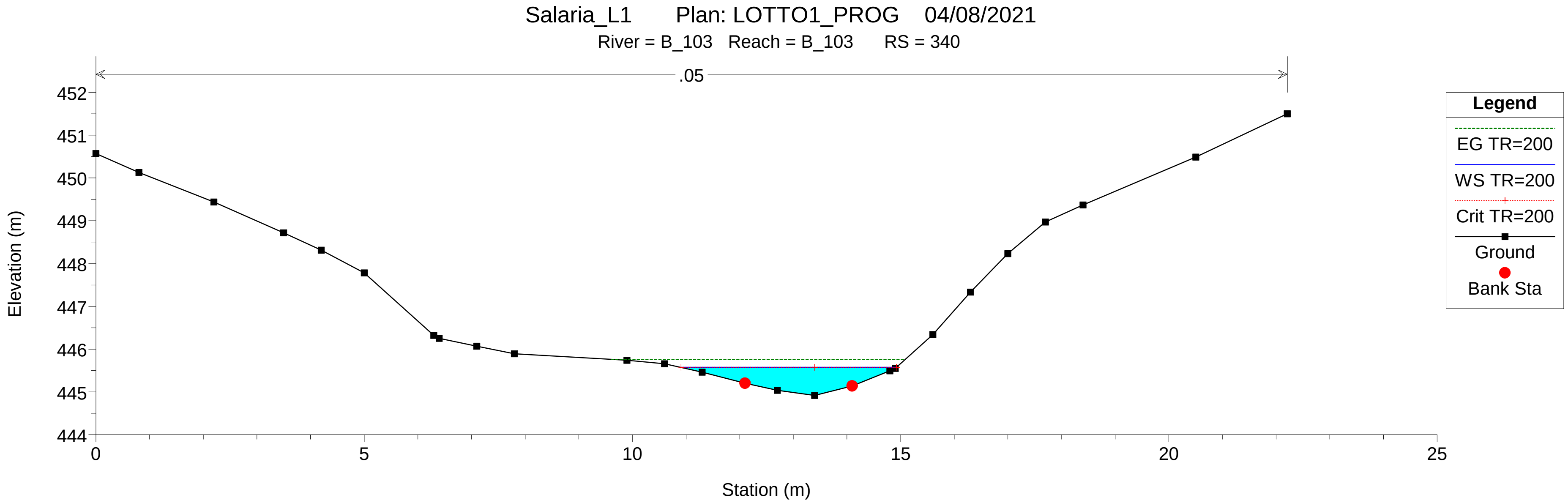
2.2.2. PROGETTO

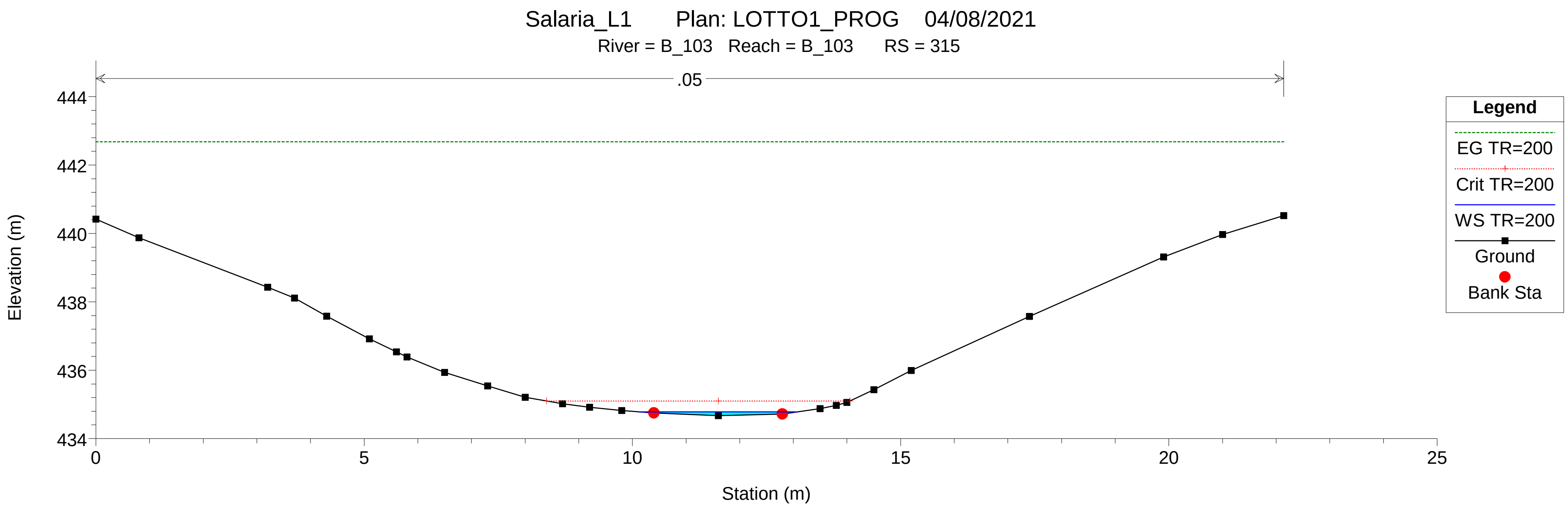
B.103 - Progr.1+267

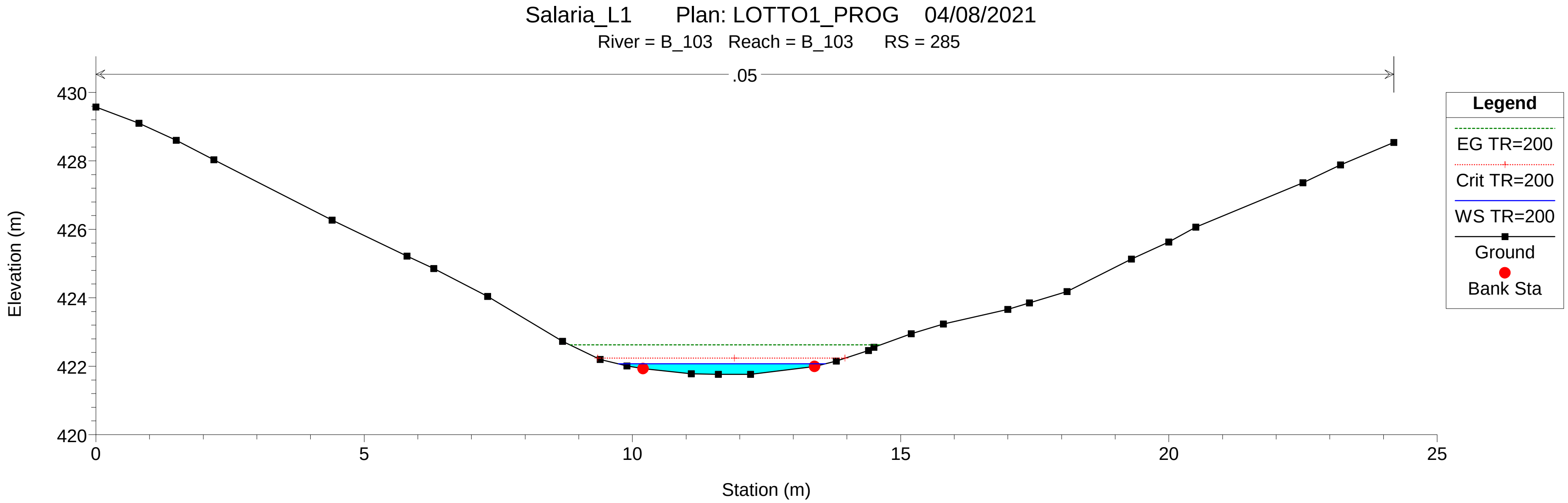

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
B_103 B_103
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
Main Channel Distance (m)
460
440
420
400
380
360
340
320
0
50
100
150
200
250
300
350
24
40
66
85
105
125
150
175
200
225
255
285
315
340

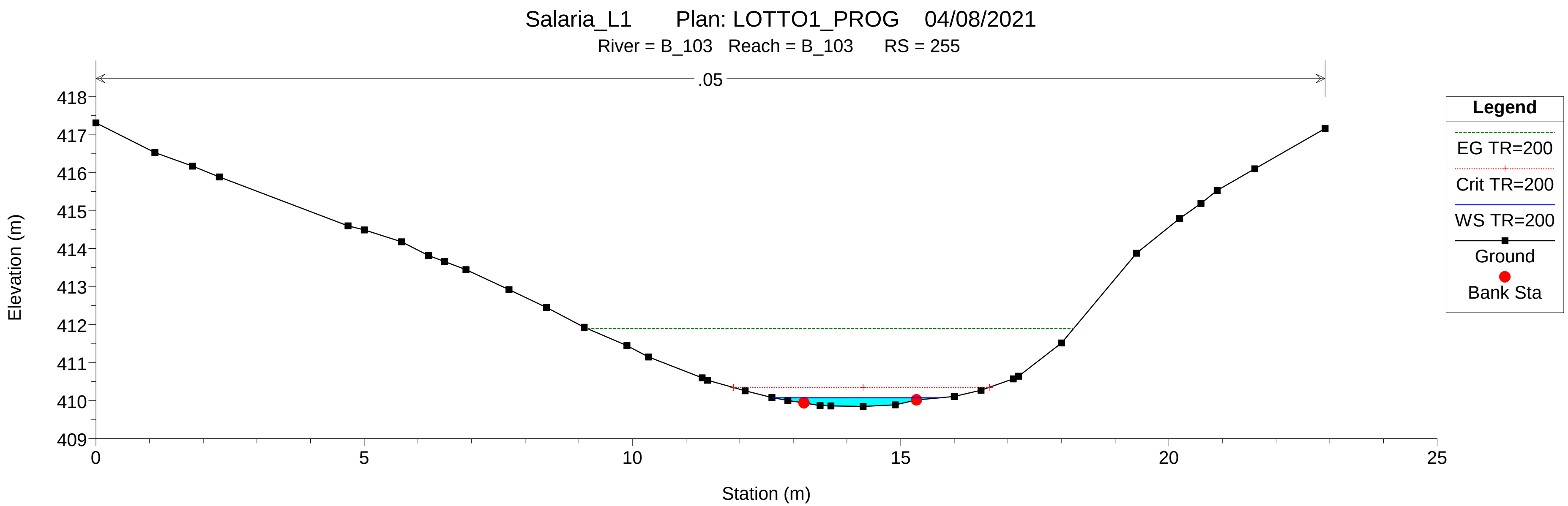
HEC-RAS Plan: L1_PROG River: B_103 Reach: B_103 Profile: TR=200

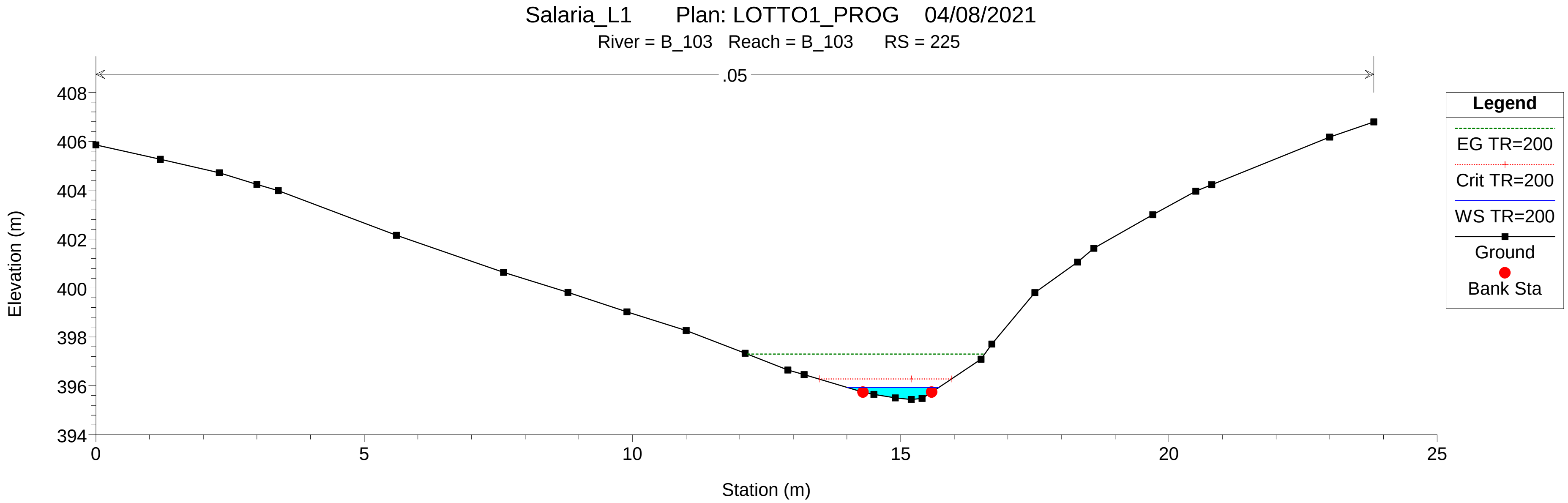
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_103	340	TR=200	2.60	444.92	0.65	445.57	445.57	0.00	0.90	445.76	2.05	1.77	0.52	128.35	0.37
B_103	315	TR=200	2.60	434.67	0.12	434.79	435.10	-0.31	13.96	442.68	12.60	12.14	0.08	8928.92	0.07
B_103	285	TR=200	2.60	421.76	0.31	422.07	422.23	-0.16	2.18	422.62	3.33	3.23	0.24	440.17	0.21
B_103	255	TR=200	2.60	409.85	0.23	410.08	410.35	-0.27	4.48	411.89	6.11	5.72	0.19	1599.89	0.15
B_103	225	TR=200	2.60	395.44	0.49	395.93	396.27	-0.34	2.72	397.29	5.23	4.97	0.33	974.32	0.31
B_103	200	TR=200	2.60	388.21	0.36	388.57	388.84	-0.27	2.83	389.70	4.93	4.43	0.30	888.13	0.23
B_103	175	TR=200	2.60	379.40	0.40	379.80	380.10	-0.30	3.13	381.10	5.07	4.94	0.25	994.63	0.23
B_103	150	TR=200	2.60	371.69	0.21	371.90	372.04	-0.14	2.52	372.40	3.15	3.13	0.16	449.44	0.15
B_103	125	TR=200	2.60	361.92	0.28	362.20	362.45	-0.25	3.34	363.37	4.92	4.58	0.22	983.68	0.18
B_103	105	TR=200	2.60	354.67	0.33	355.00	355.21	-0.21	2.75	355.87	4.21	4.06	0.23	704.13	0.21
B_103	85	TR=200	2.60	348.10	0.37	348.47	348.72	-0.25	2.87	349.52	4.59	4.40	0.25	815.78	0.22
B_103	66	TR=200	2.60	342.20	0.32	342.52	342.74	-0.22	2.77	343.38	4.09	4.09	0.21	684.83	0.22
B_103	62	TR=200	2.60	338.76	0.16	338.92	339.32	-0.40	6.39	342.21	8.04	7.90	0.16	324.99	0.16
B_103	60	TR=200	2.60	329.76	0.09	329.85	330.32	-0.47	15.49	340.59	14.52	14.52	0.09	1287.91	0.09
B_103	40		Culvert												
B_103	24	TR=200	2.60	329.44	0.30	329.74	329.99	-0.25	2.54	330.70	4.35	4.35	0.30	77.27	0.30
B_103	15	TR=200	2.60	329.33	0.14	329.47	329.65	-0.18	3.61	330.35	4.16	4.08	0.14	92.29	0.13
B_103	12	TR=200	2.60	327.89	0.14	328.04	328.23	-0.19	5.64	329.66	6.33	5.22	0.13	1944.59	0.09

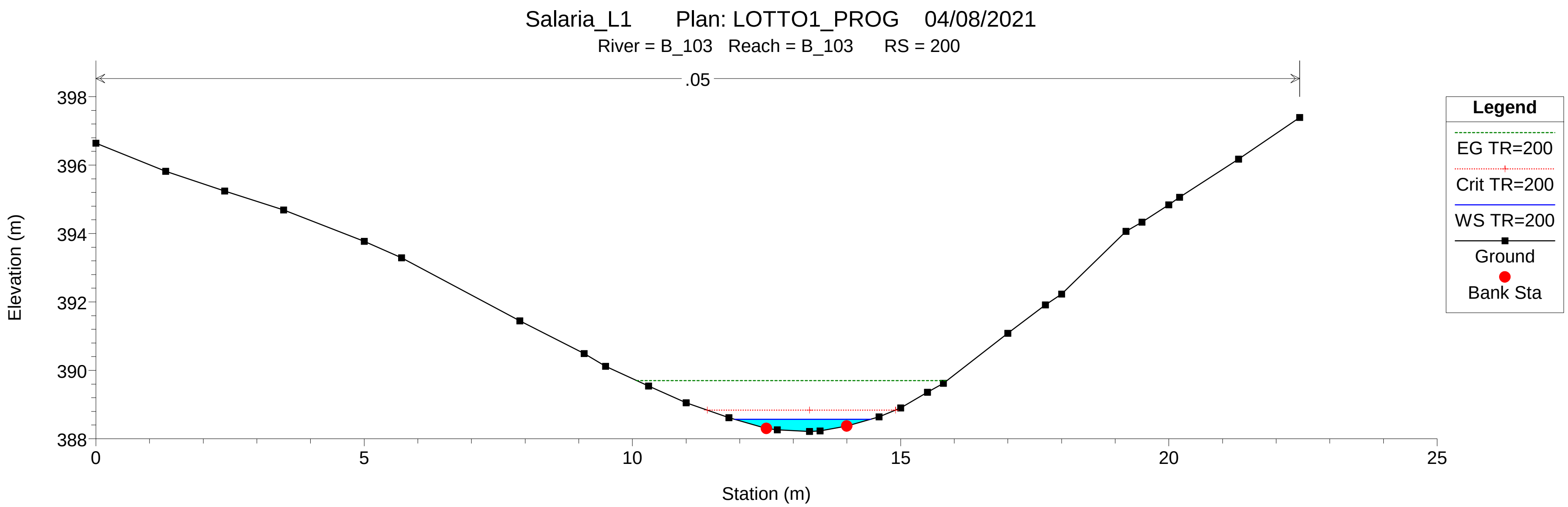

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 340
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

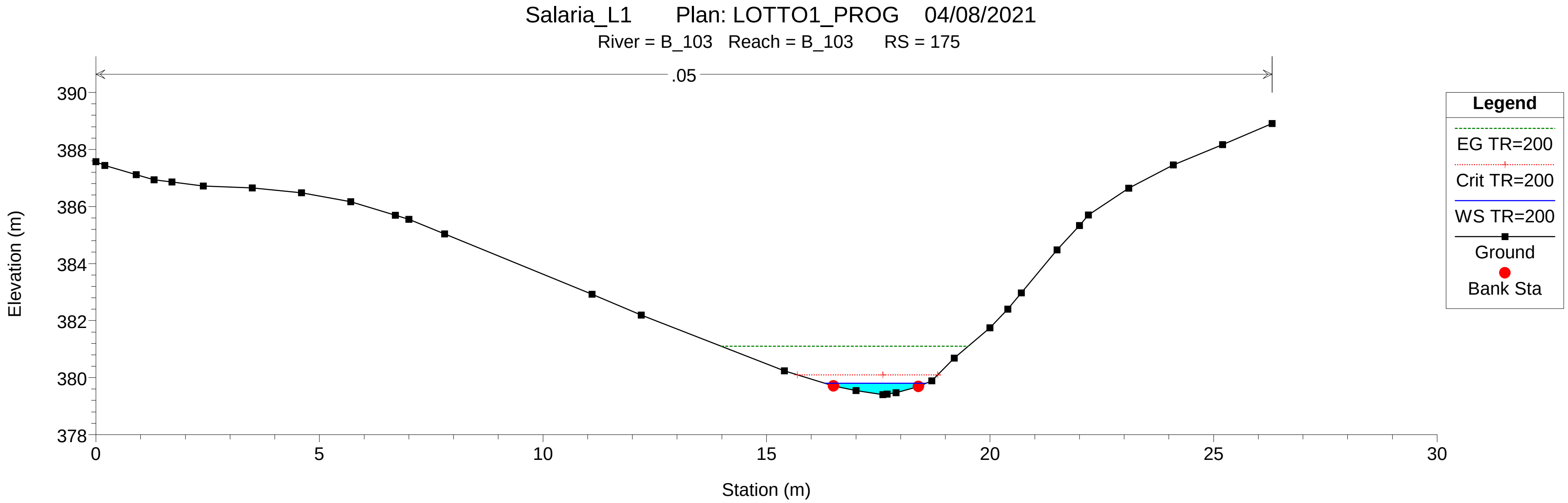

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 315
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

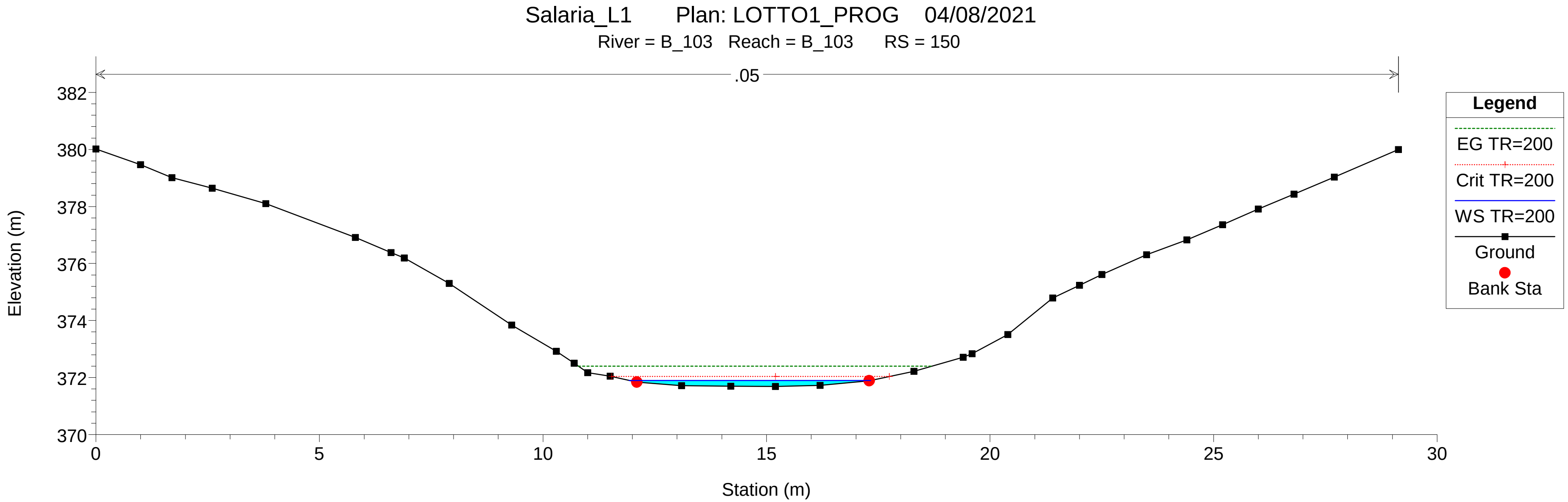

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 285
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

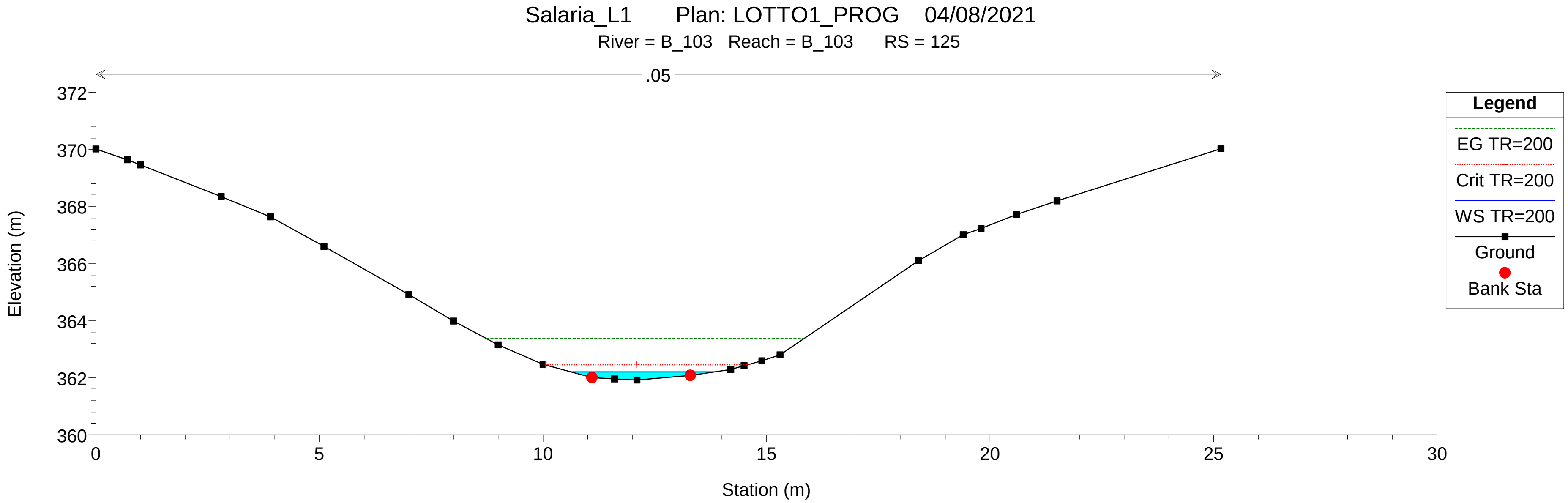

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 255
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

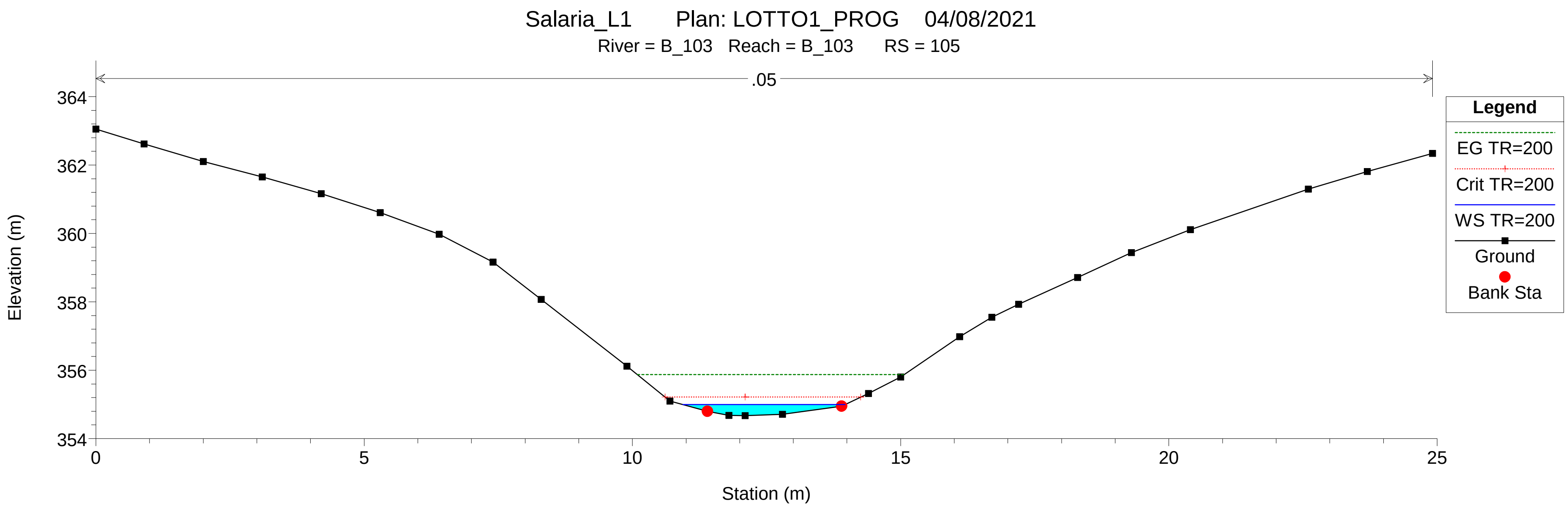

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 225
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

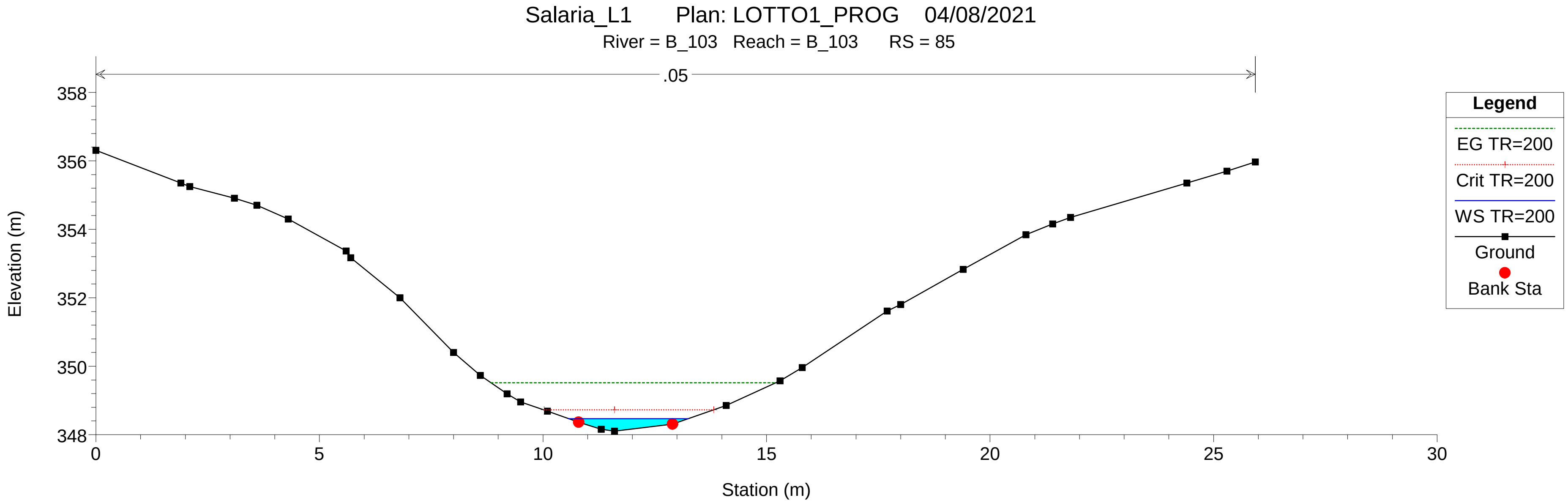

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 200
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 175
.05
Elevation (m)
390
388
386
384
382
380
378
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

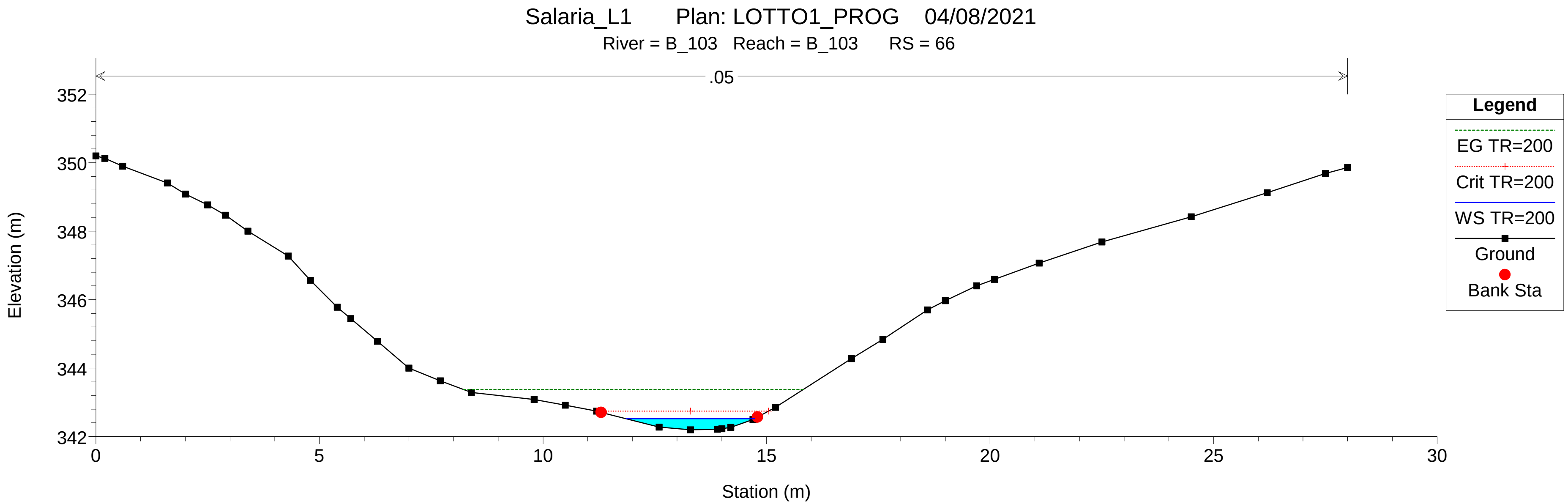

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 150
.05
Elevation (m)
382
380
378
376
374
372
370
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 125
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

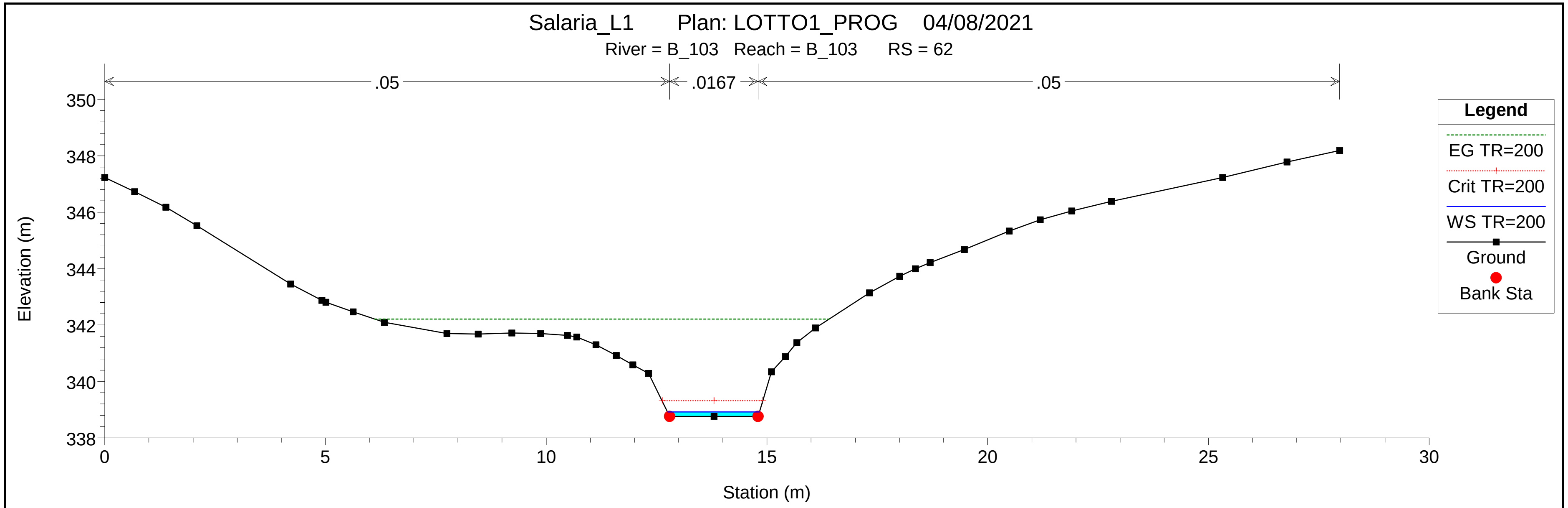

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 105
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

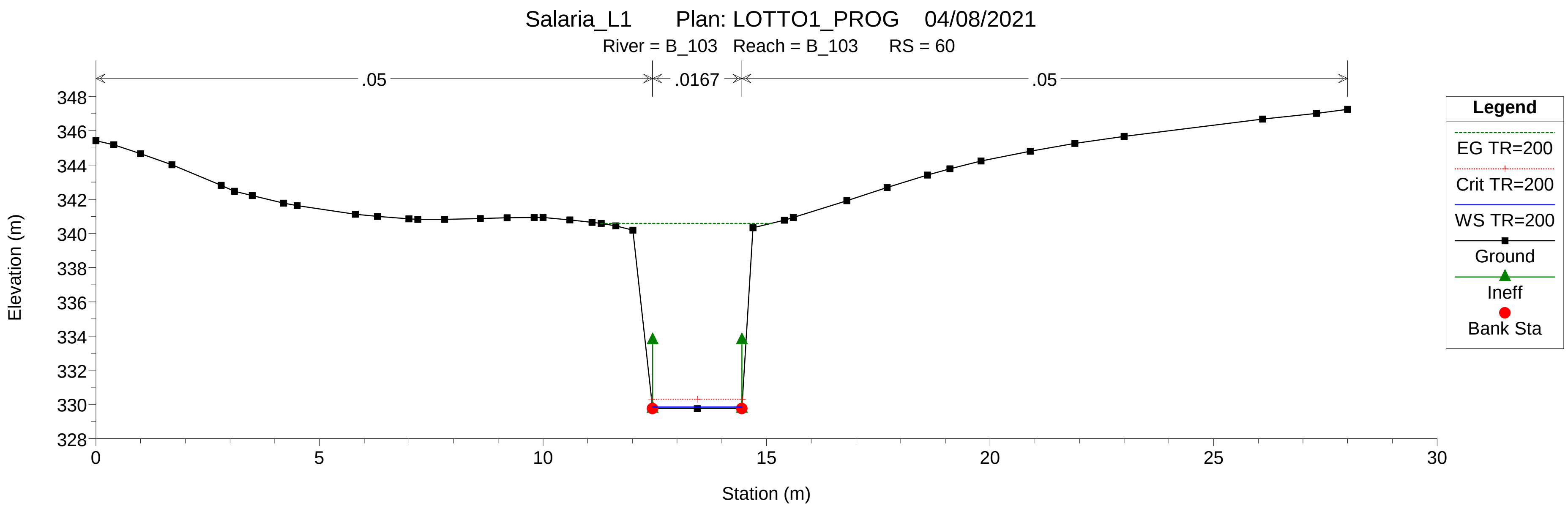


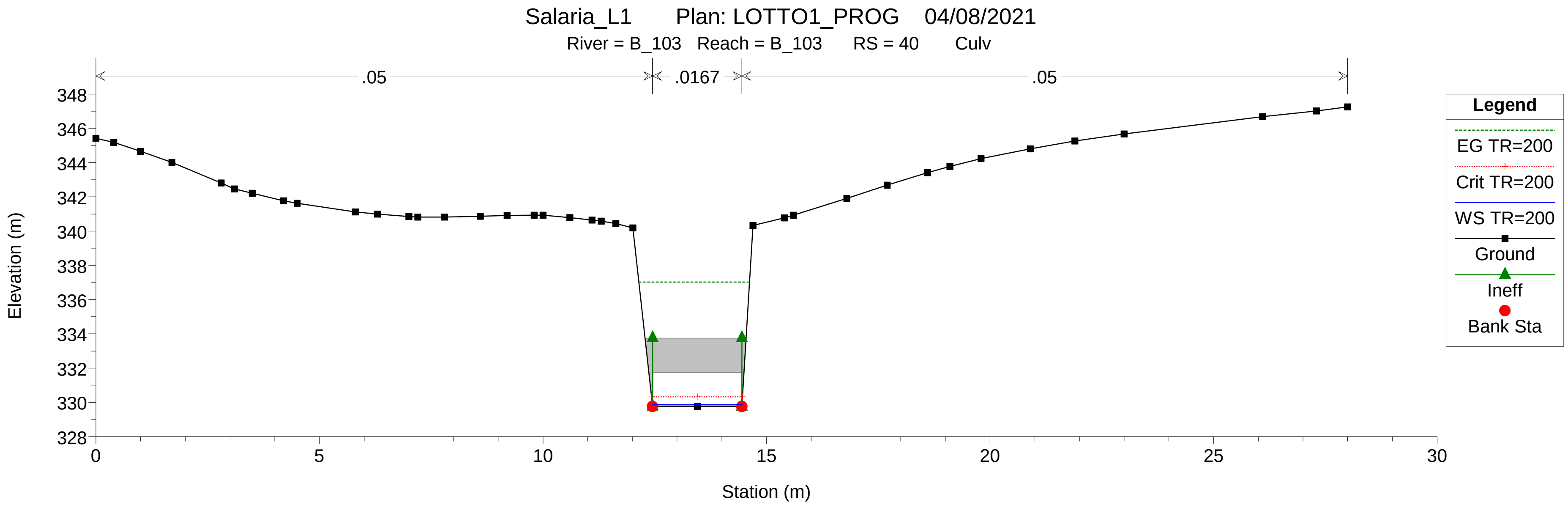
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 85
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

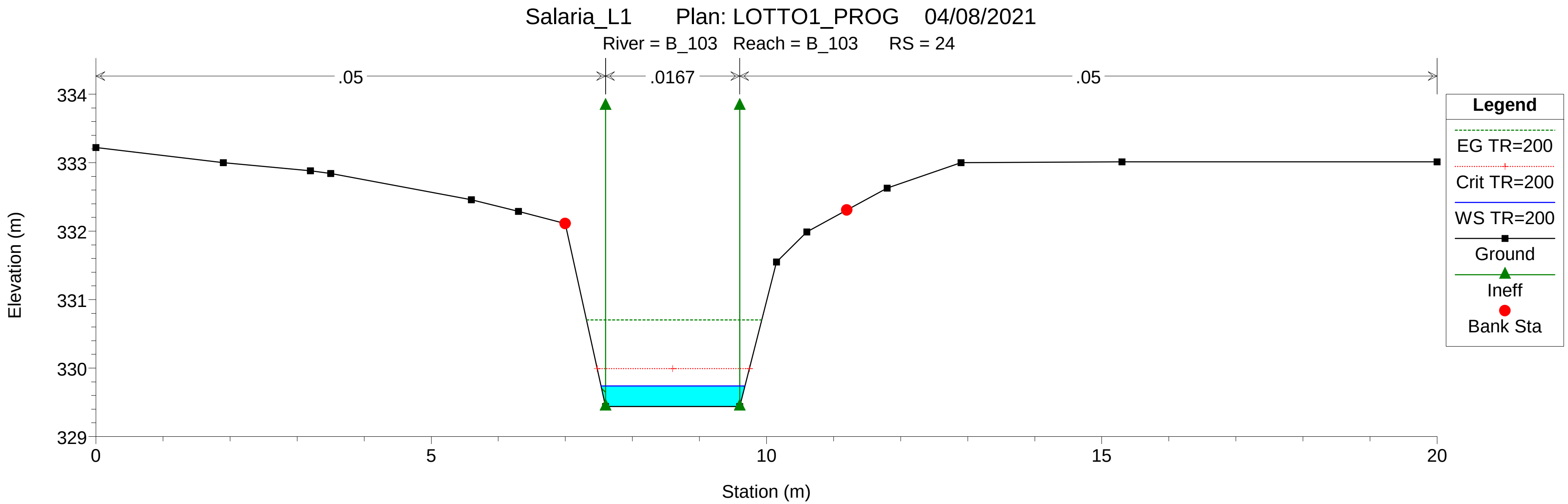


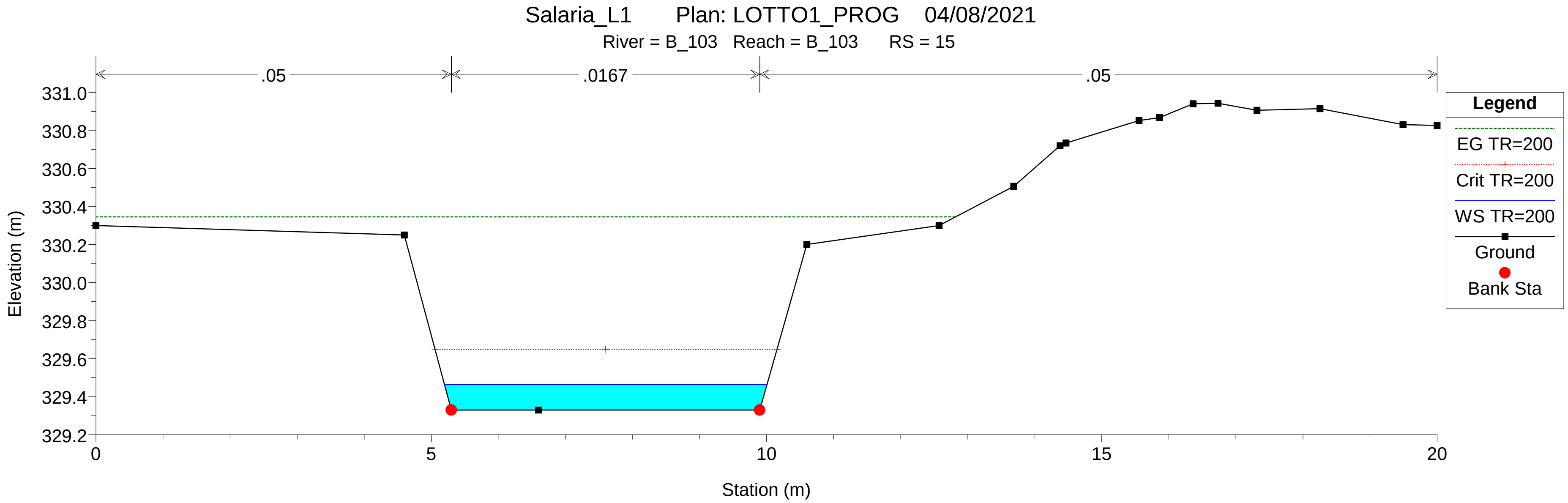
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 66
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

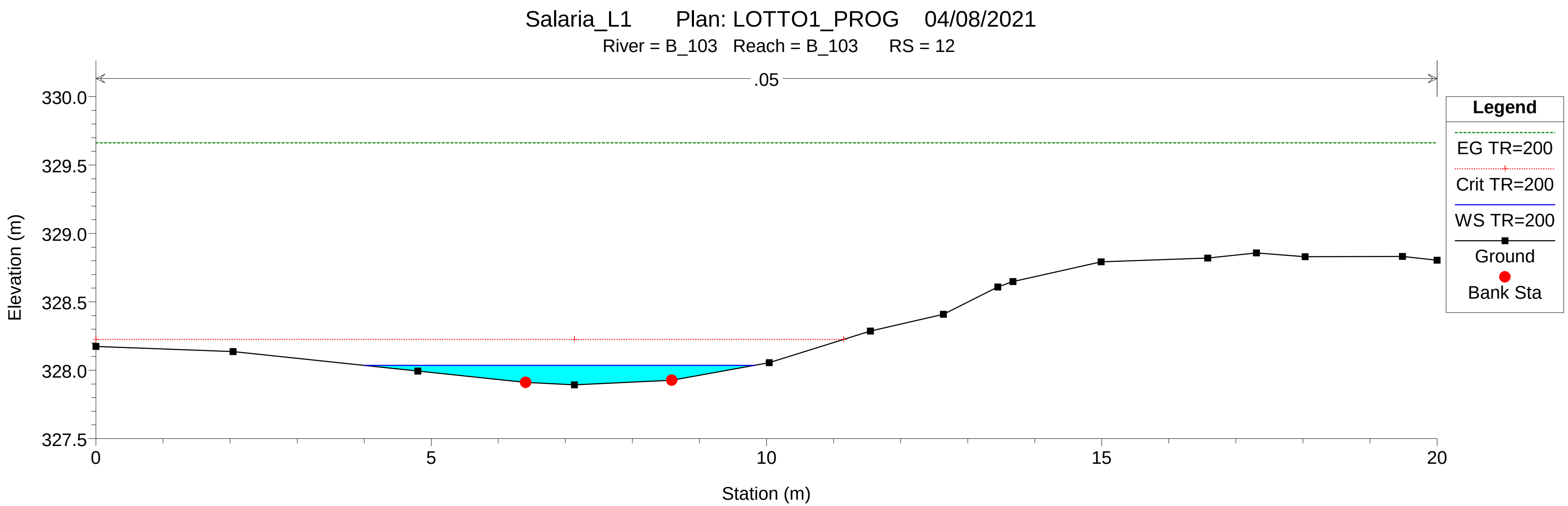

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 62
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 60
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 40 Culv
.05
.0167
.05
Elevation (m)
348
346
344
342
340
338
336
334
332
330
328
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

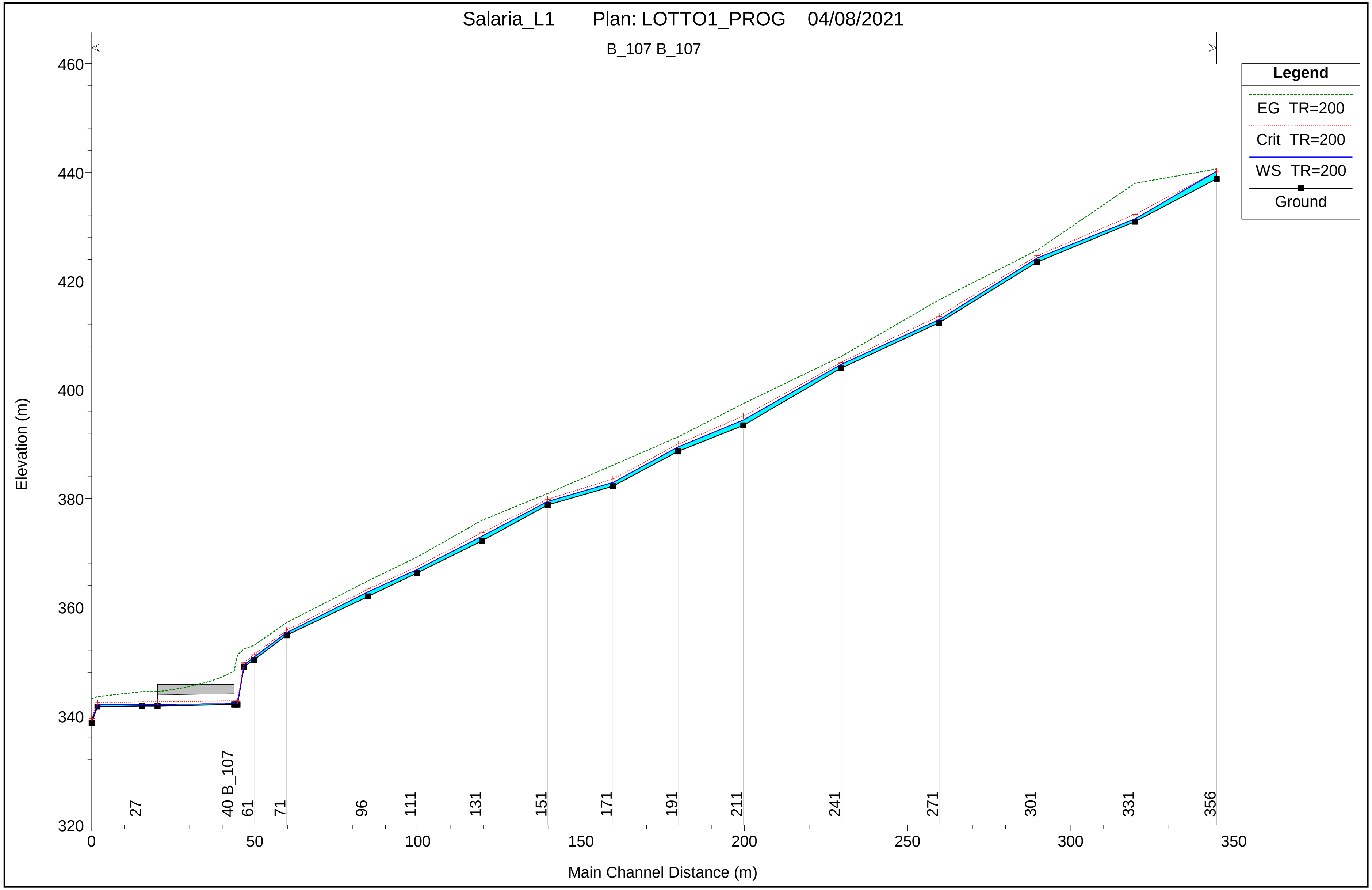

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 24
.05
.0167
.05
Elevation (m)
334
333
332
331
330
329
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 15
.05
.0167
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_103 Reach = B_103 RS = 12
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)

2.2.3. PROGETTO

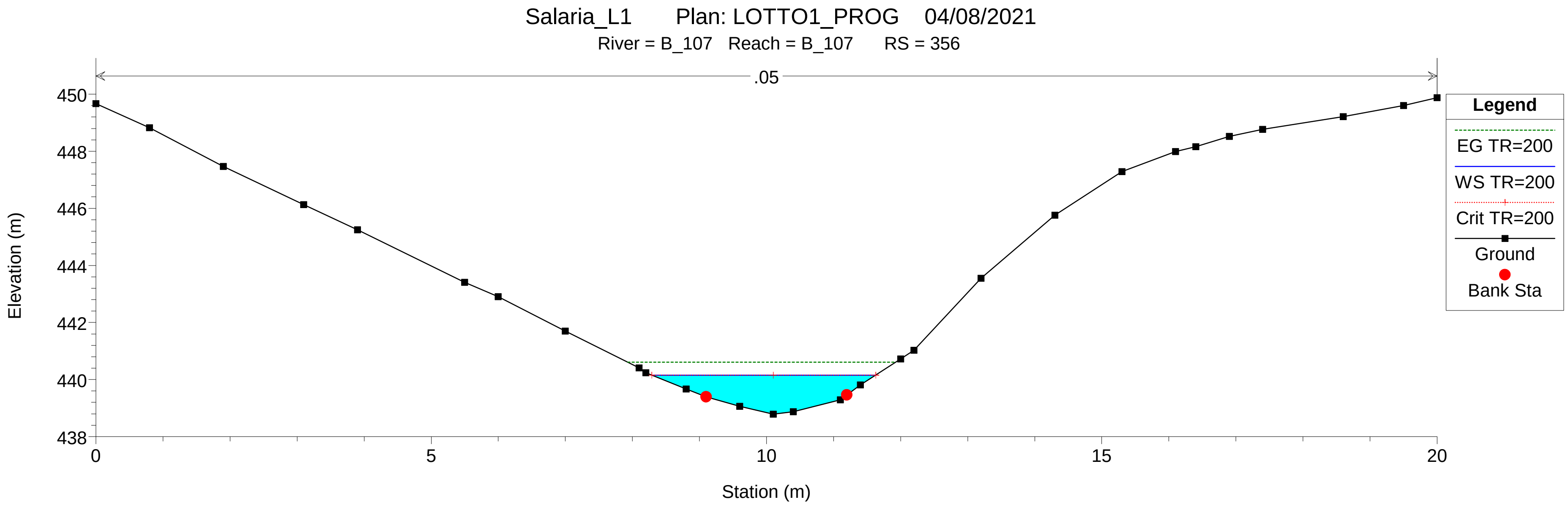
B.107 - Progr.1+632

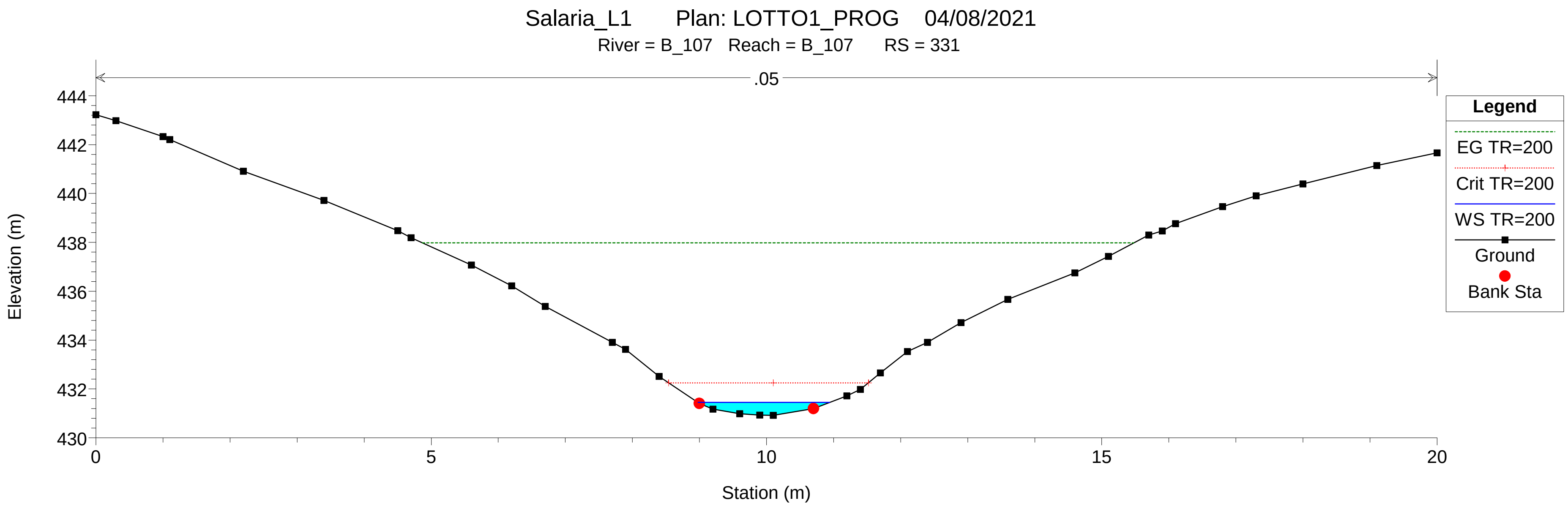


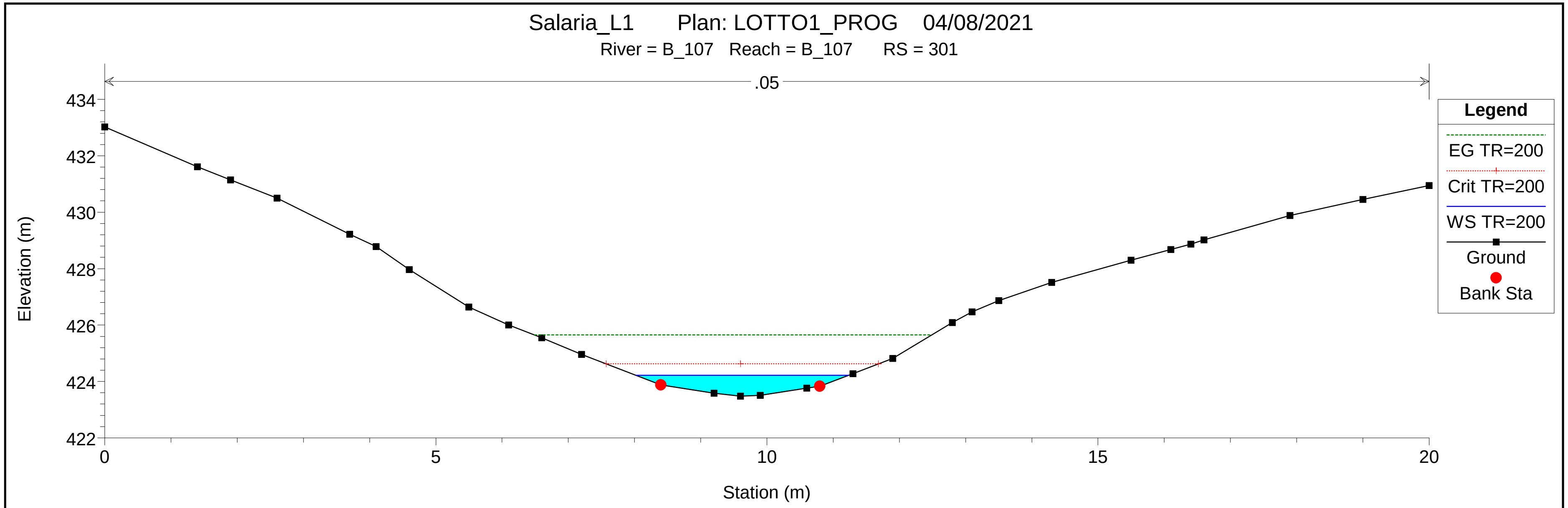
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
B_107 B_107
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
460
440
420
400
380
360
340
320
0
50
100
150
200
250
300
350
Main Channel Distance (m)
27
40 B_107
61
71
96
111
131
151
171
191
211
241
271
301
331
356

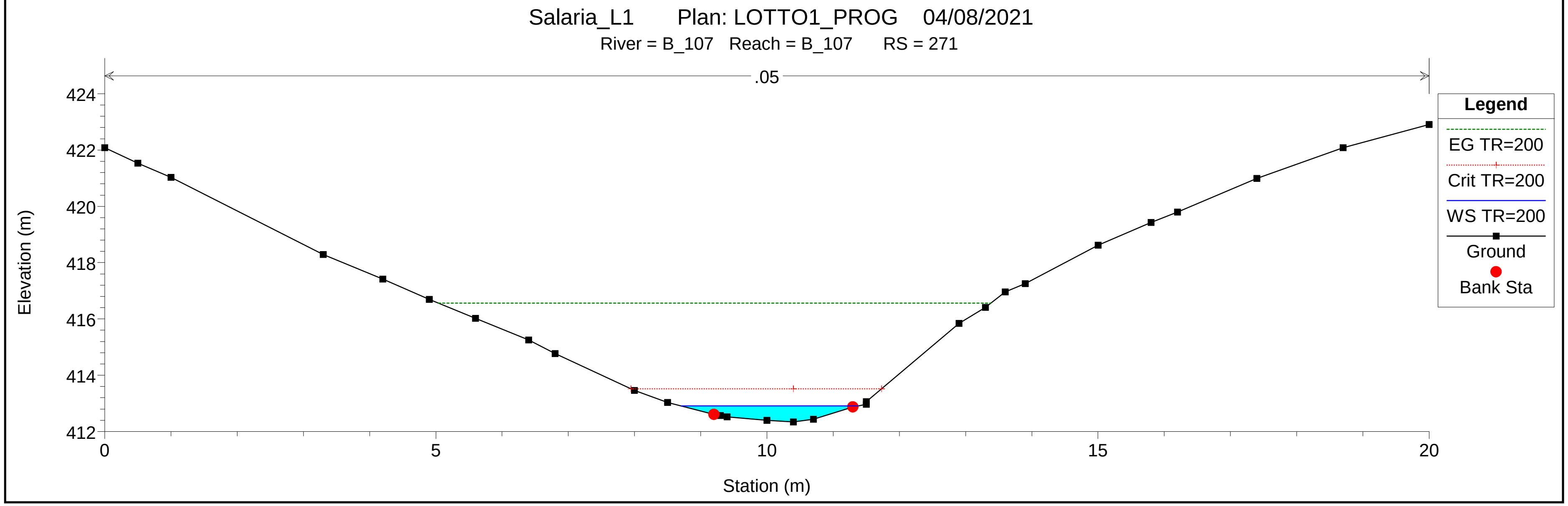
HEC-RAS Plan: L1_PROG River: B_107 Reach: B_107 Profile: TR=200

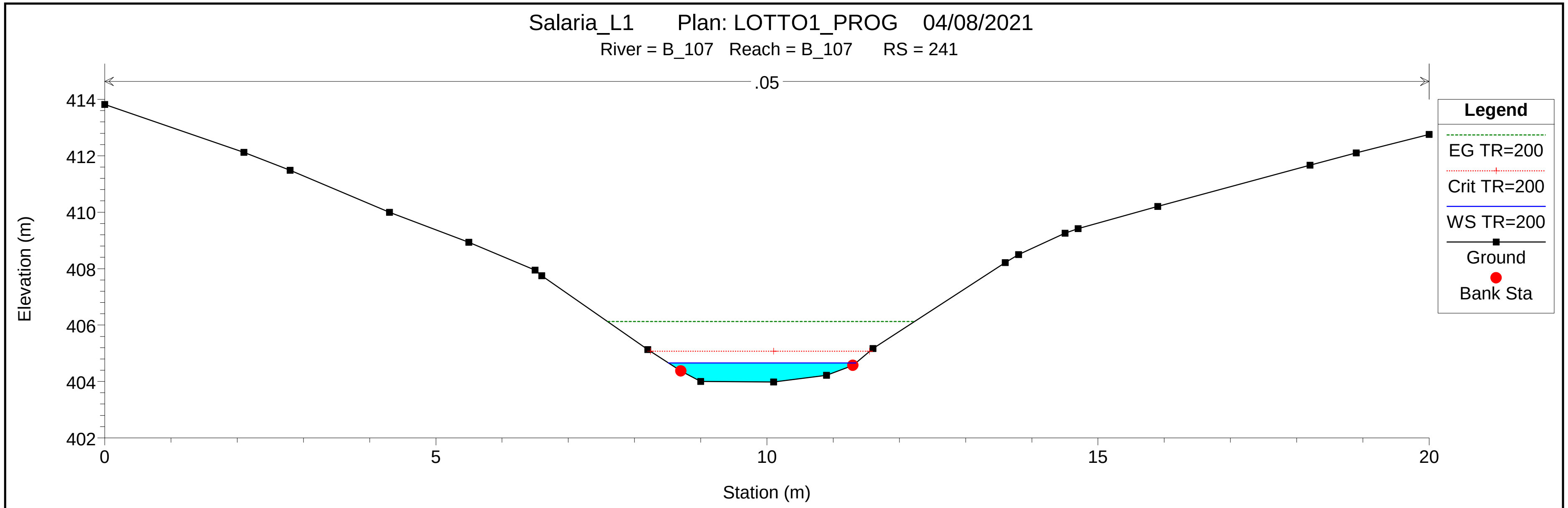
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_107	356	TR=200	7.70	438.79	1.37	440.16	440.16	0.00	0.94	440.61	3.08	2.78	0.93	238.85	0.83
B_107	331	TR=200	7.70	430.92	0.53	431.45	432.25	-0.80	5.84	437.98	11.41	11.10	0.35	4545.70	0.35
B_107	301	TR=200	7.70	423.48	0.74	424.22	424.62	-0.40	2.28	425.65	5.39	5.08	0.54	873.37	0.47
B_107	271	TR=200	7.70	412.34	0.57	412.91	413.52	-0.61	4.30	416.56	8.60	8.24	0.38	2516.10	0.35
B_107	241	TR=200	7.70	403.98	0.68	404.66	405.07	-0.41	2.32	406.12	5.38	5.30	0.48	902.94	0.51
B_107	211	TR=200	7.70	393.44	0.99	394.43	395.15	-0.72	3.01	397.45	7.73	7.56	0.42	1951.59	0.61
B_107	191	TR=200	7.70	388.68	0.82	389.50	389.99	-0.49	2.43	391.32	6.03	5.79	0.56	1079.27	0.55
B_107	171	TR=200	7.70	382.25	0.67	382.92	383.60	-0.68	3.32	386.14	8.31	7.27	0.61	2000.39	0.49
B_107	151	TR=200	7.70	378.80	0.66	379.46	379.86	-0.40	2.32	380.91	5.47	5.08	0.53	904.61	0.46
B_107	131	TR=200	7.70	372.21	0.87	373.08	373.72	-0.64	3.08	376.02	7.82	7.13	0.54	1835.07	0.50
B_107	111	TR=200	7.70	366.29	0.66	366.95	367.47	-0.52	3.03	369.20	6.73	6.46	0.46	1437.53	0.43
B_107	96	TR=200	7.70	361.99	0.86	362.85	363.39	-0.54	2.61	364.88	6.34	6.18	0.50	1243.03	0.52
B_107	71	TR=200	7.70	354.87	0.46	355.33	355.74	-0.41	3.23	357.17	6.02	5.95	0.34	1268.04	0.32
B_107	61	TR=200	7.70	350.35	0.50	350.85	351.29	-0.44	3.57	353.00	6.54	6.39	0.33	1516.72	0.32
B_107	58	TR=200	7.70	349.10	0.25	349.35	349.81	-0.46	4.89	352.33	7.66	7.44	0.25	254.76	0.24
B_107	56	TR=200	7.70	342.10	0.14	342.24	342.82	-0.58	11.19	351.30	13.32	13.32	0.14	925.23	0.14
B_107	40		Culvert												
B_107	27	TR=200	7.70	341.86	0.29	342.15	342.58	-0.43	4.04	344.47	6.75	6.75	0.29	189.48	0.29
B_107	13	TR=200	7.70	341.71	0.34	342.05	342.42	-0.37	3.00	343.58	5.51	5.13	0.34	118.63	0.32
B_107	11	TR=200	7.70	338.76	0.38	339.13	339.57	-0.44	5.72	343.14	8.86	8.83	0.24	3112.06	0.24


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 356
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

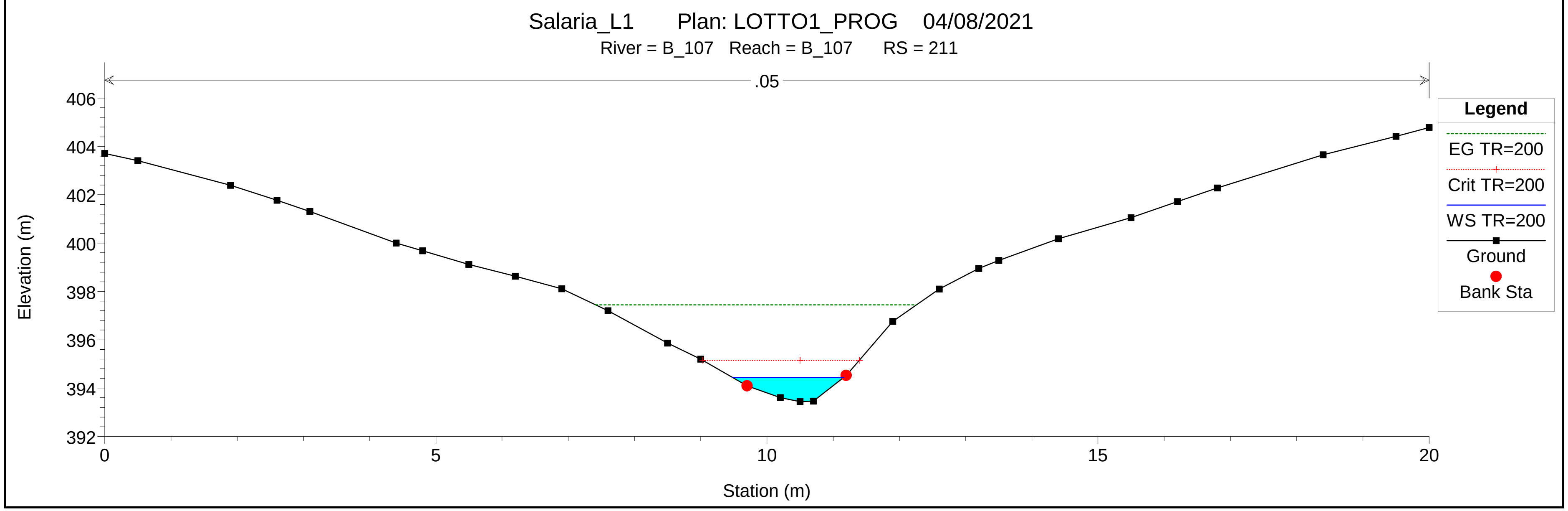

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 331
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 301
.05
Elevation (m)
434
432
430
428
426
424
422
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

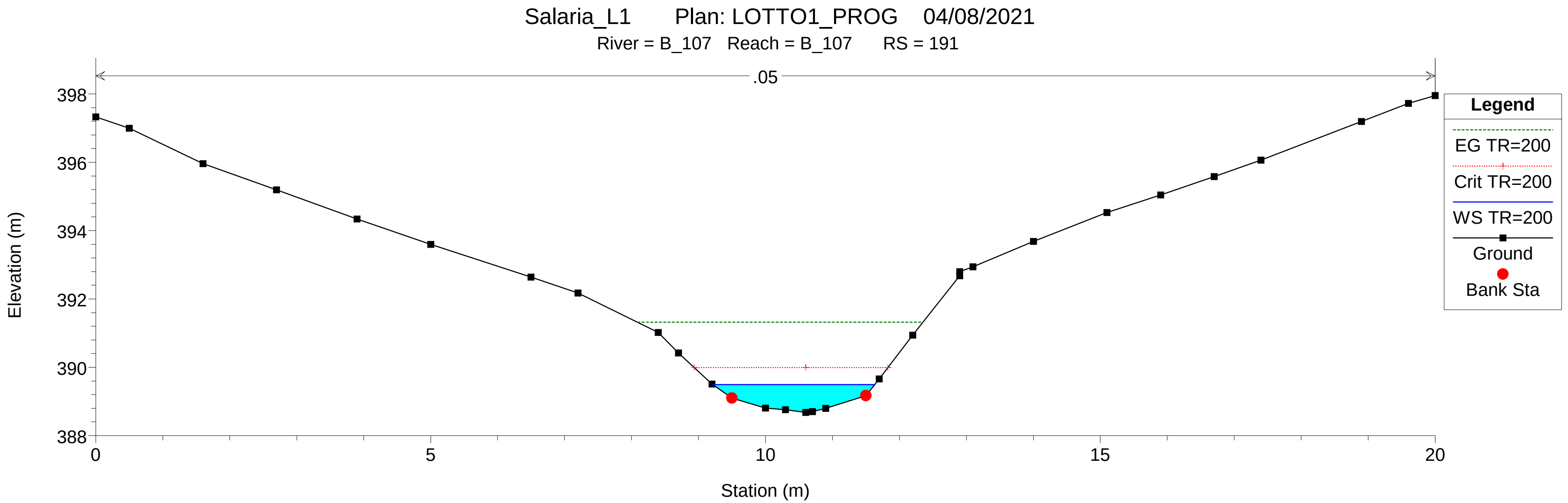

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 271
.05
Elevation (m)
424
422
420
418
416
414
412
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

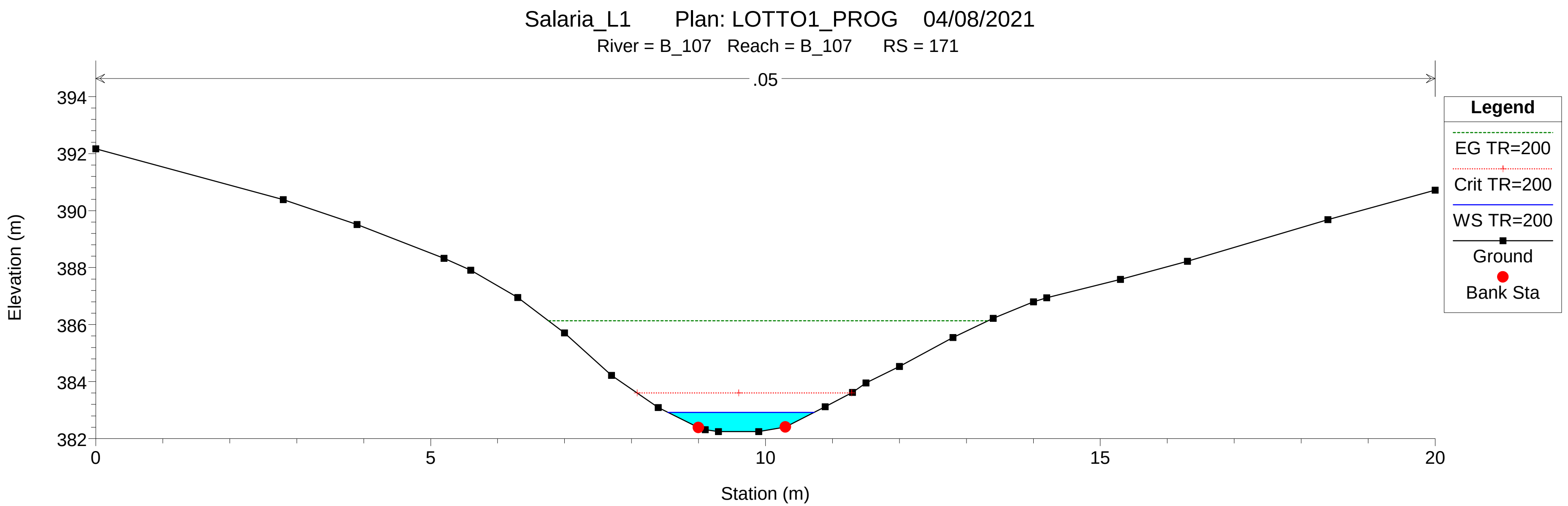


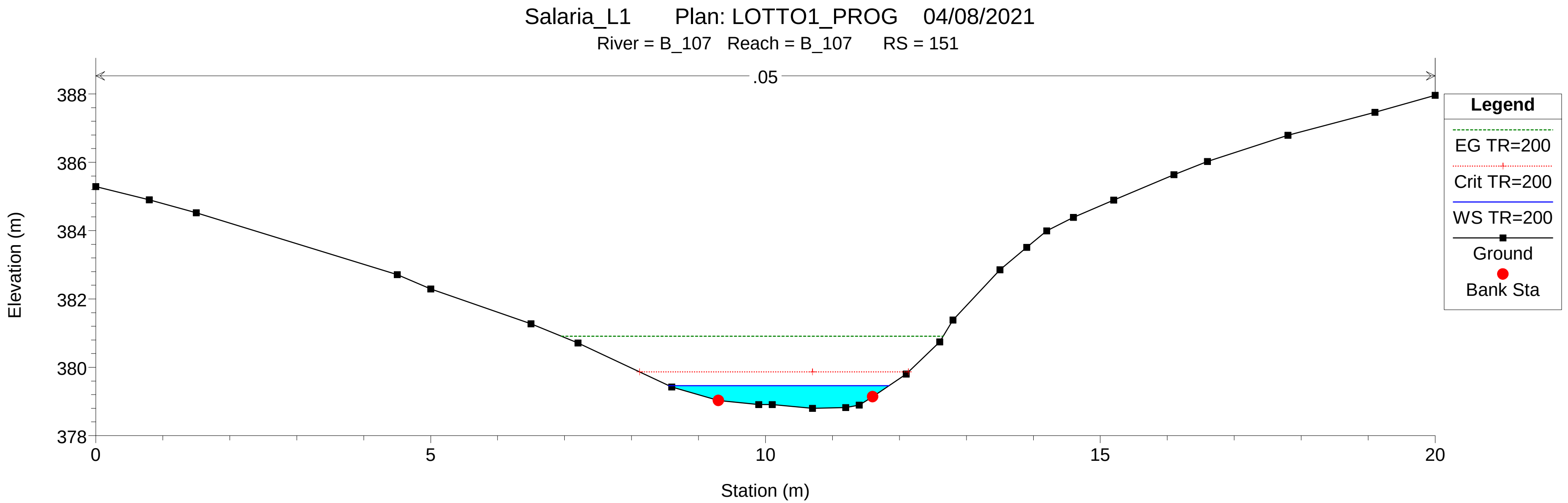
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 241
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

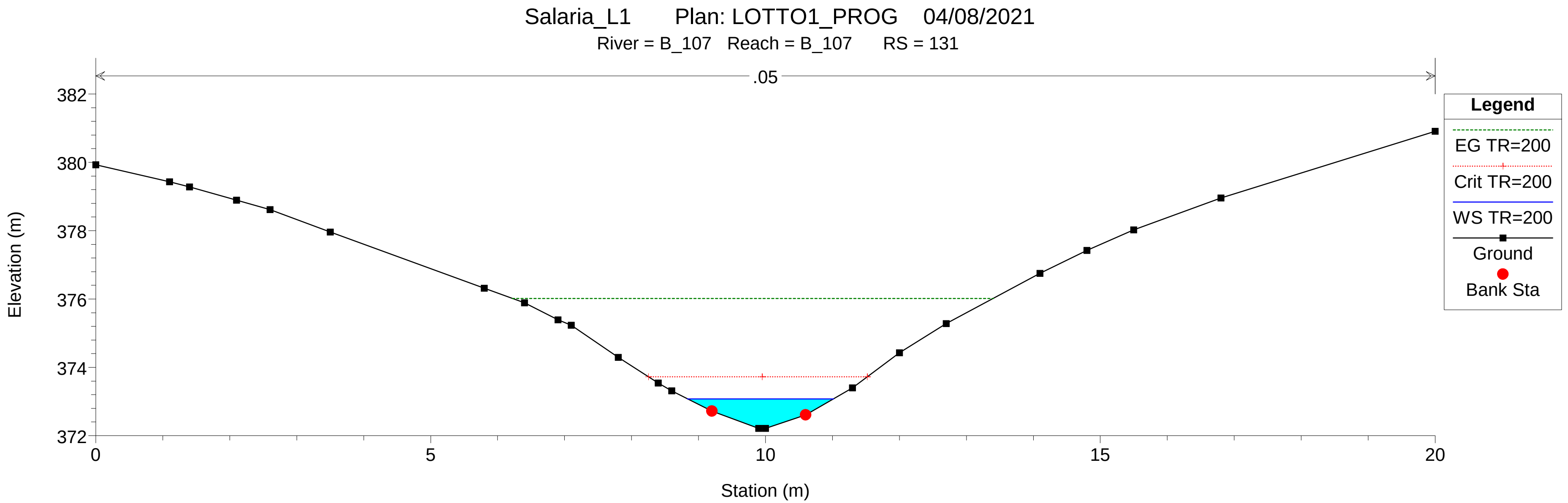


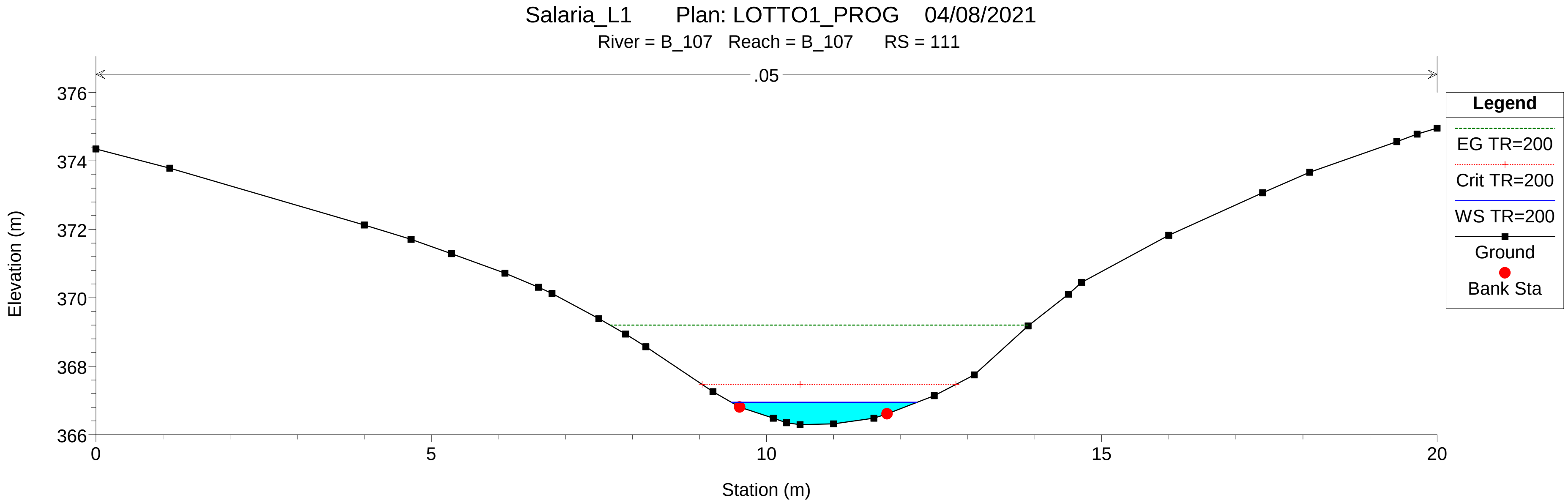
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 211
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 191
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

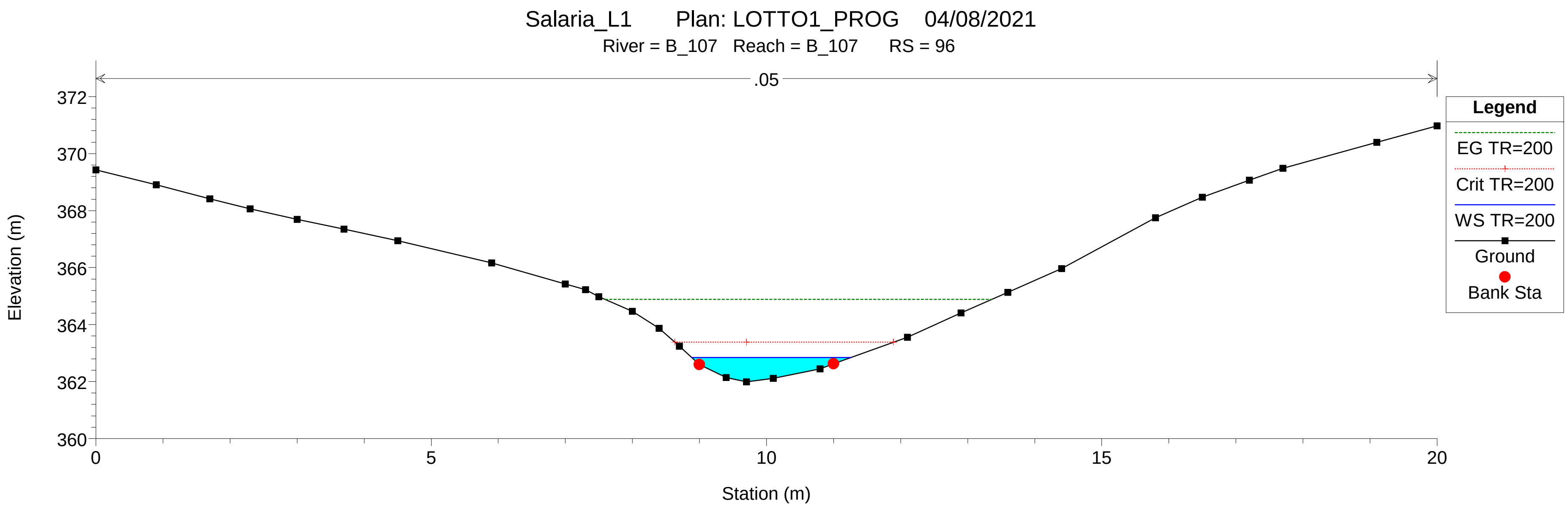

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 171
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 151
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

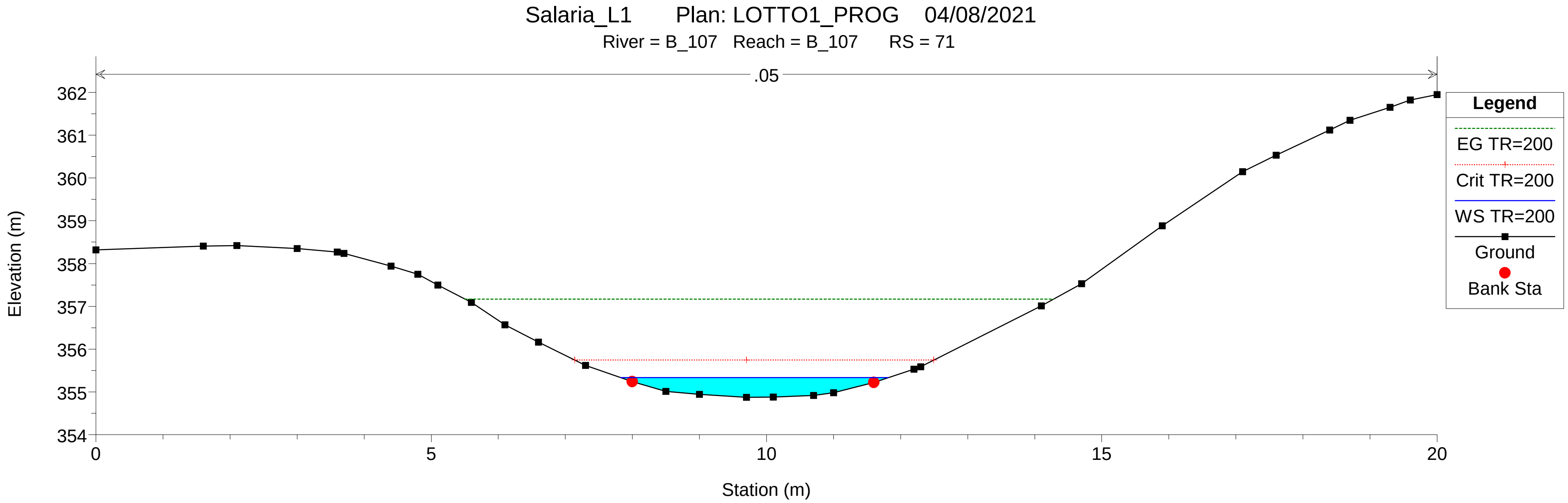

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 131
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

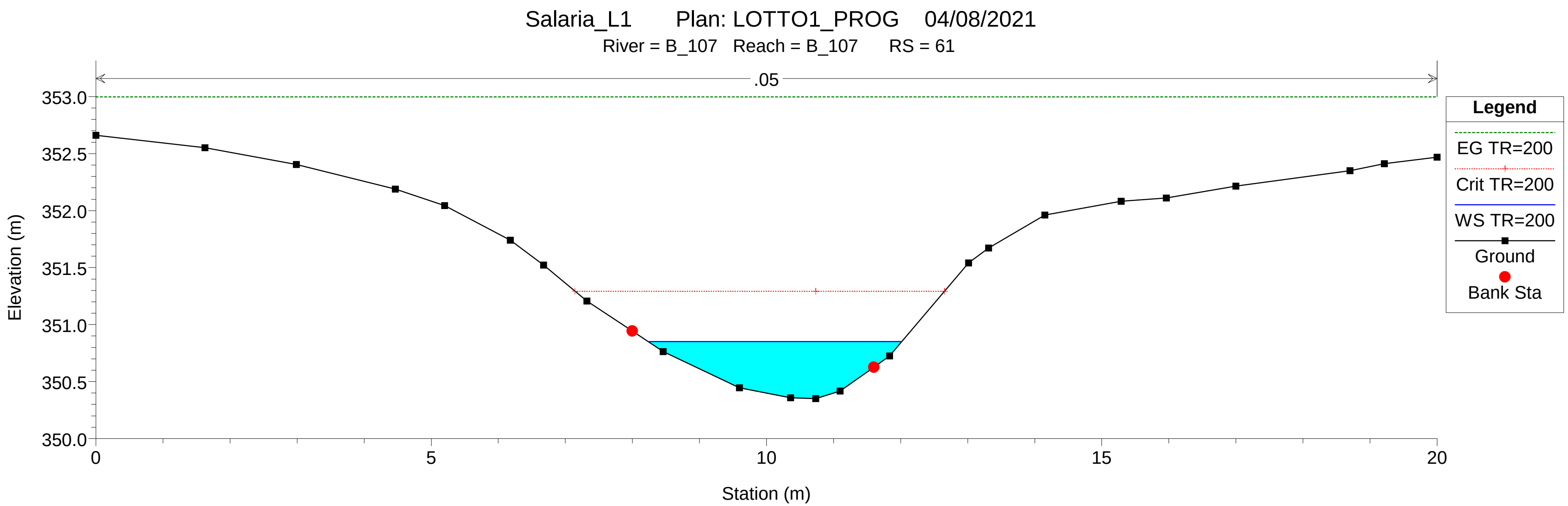


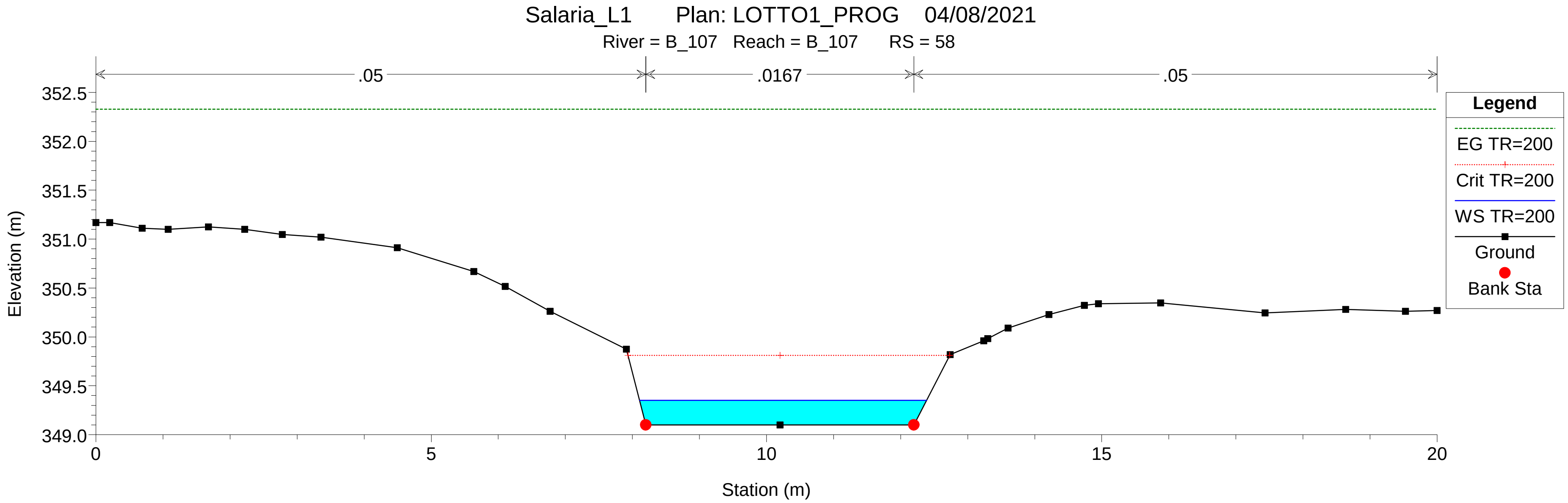
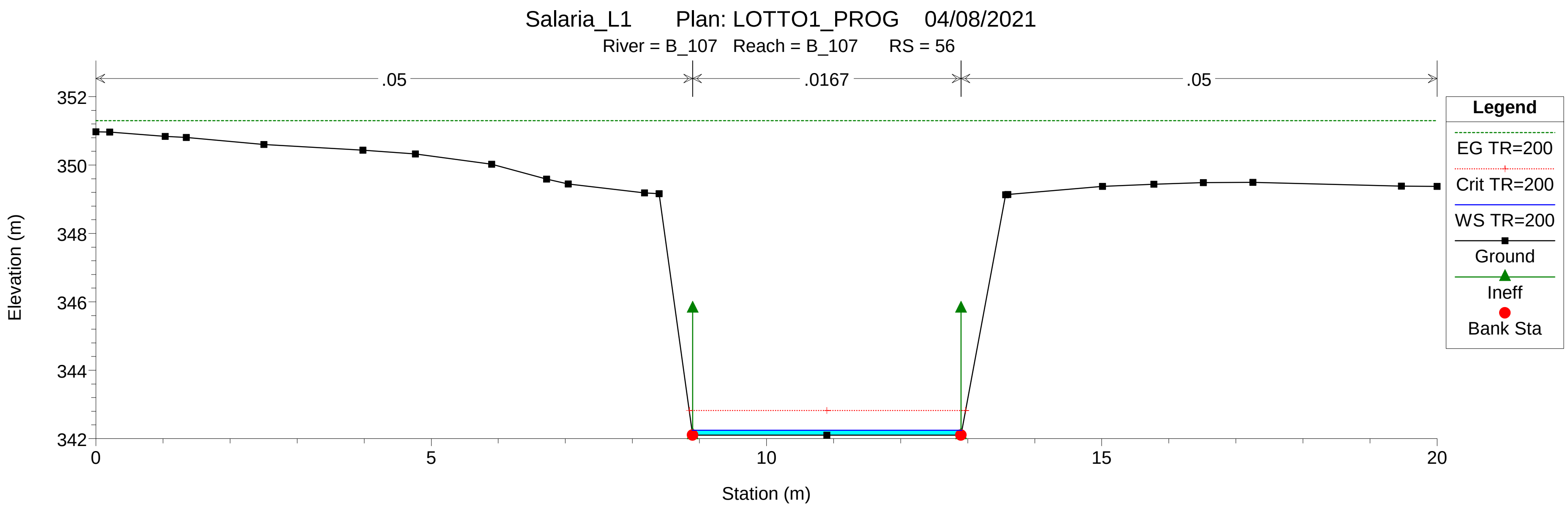
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 111
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)

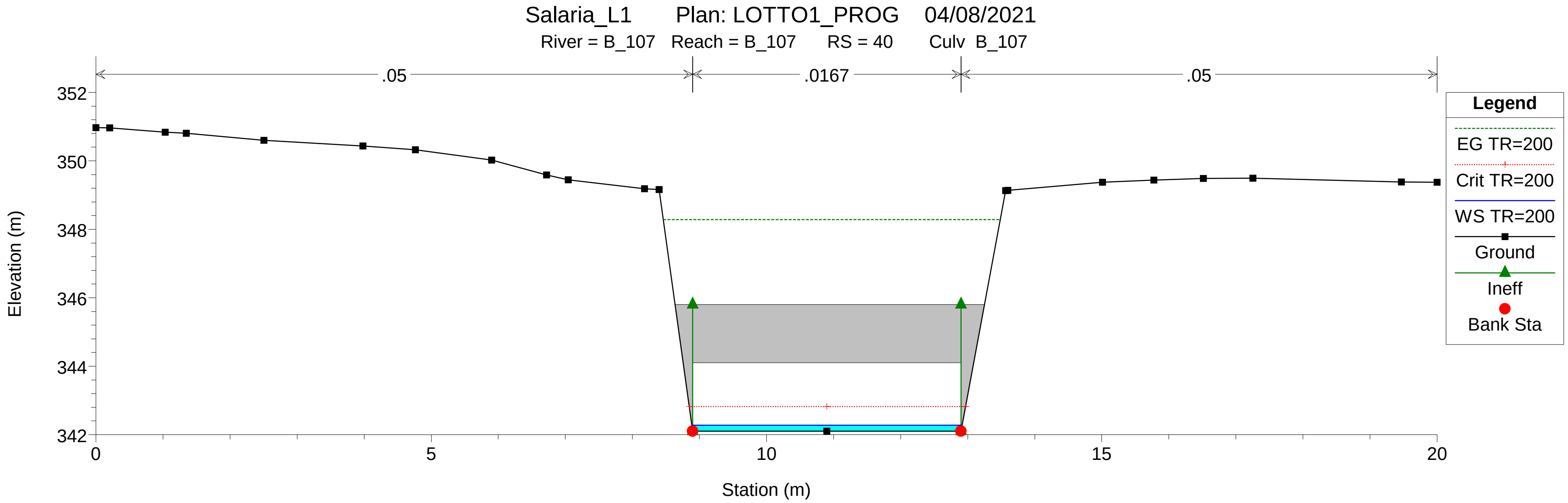


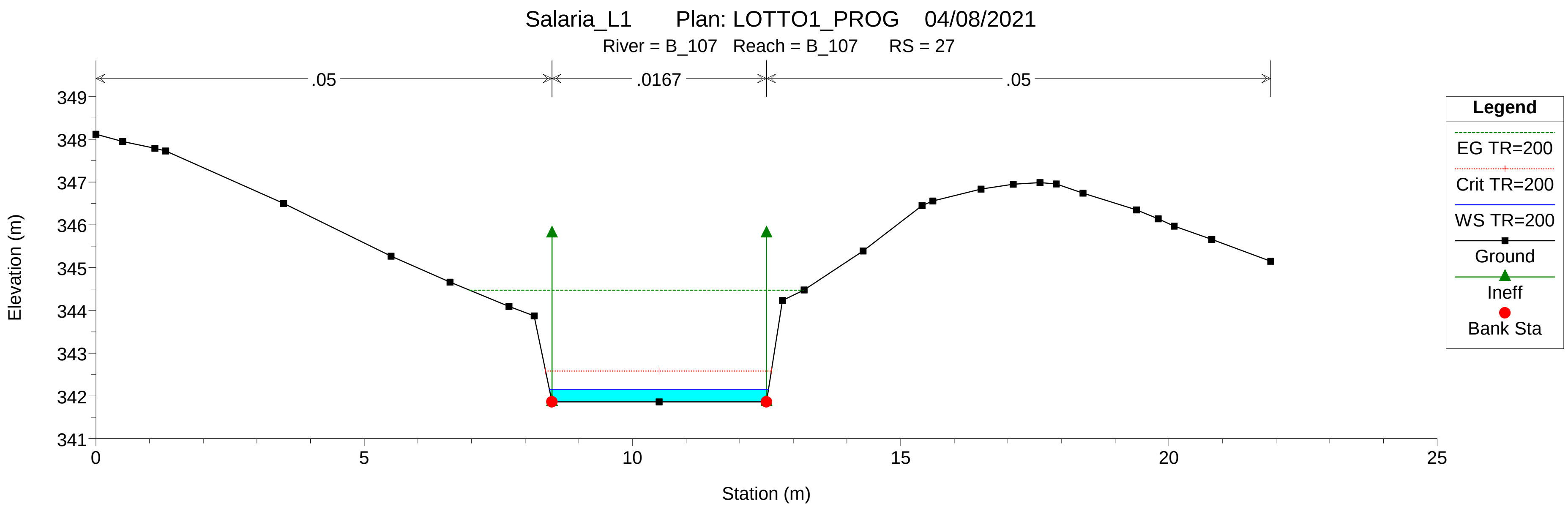
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 96
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)

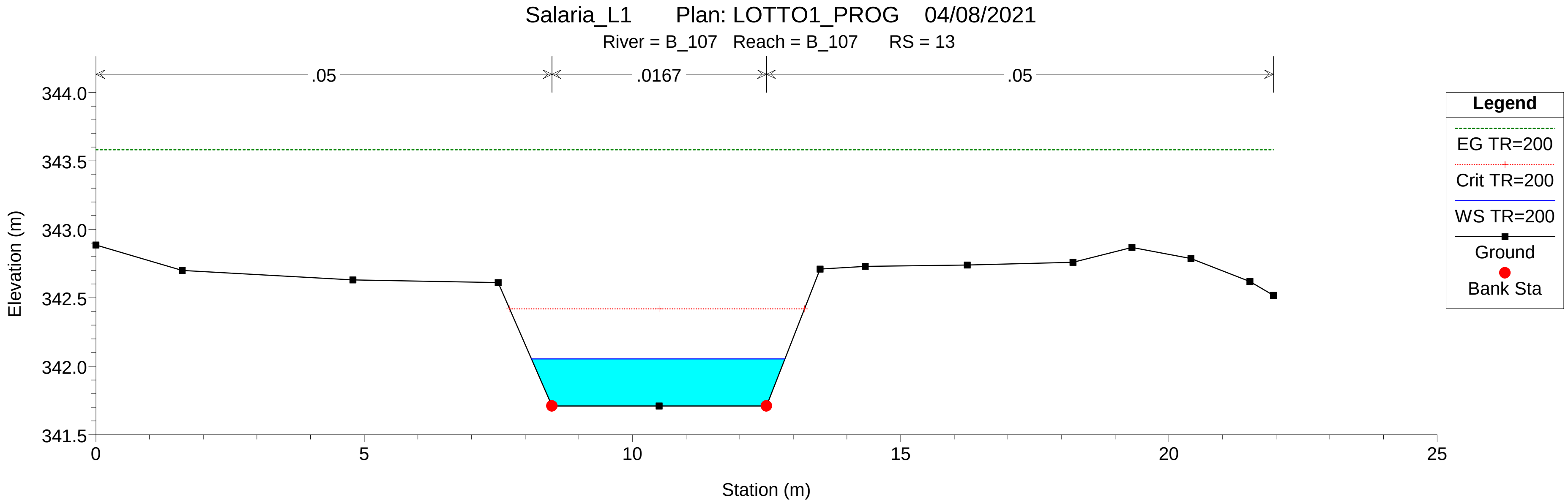

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 71
.05
Elevation (m)
362
361
360
359
358
357
356
355
354
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 61
.05
Elevation (m)
353.0
352.5
352.0
351.5
351.0
350.5
350.0
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

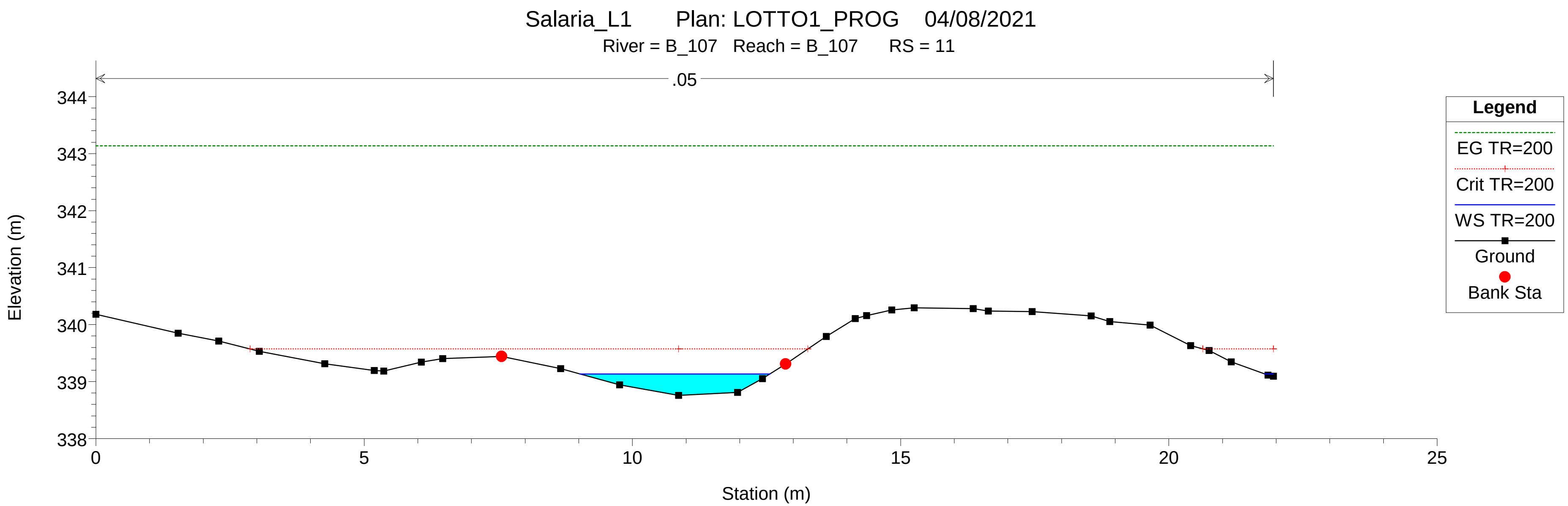

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 58
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 56
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 40 Culv B_107
.05
.0167
.05
Elevation (m)
352
350
348
346
344
342
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 27
.05
.0167
.05
Elevation (m)
349
348
347
346
345
344
343
342
341
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

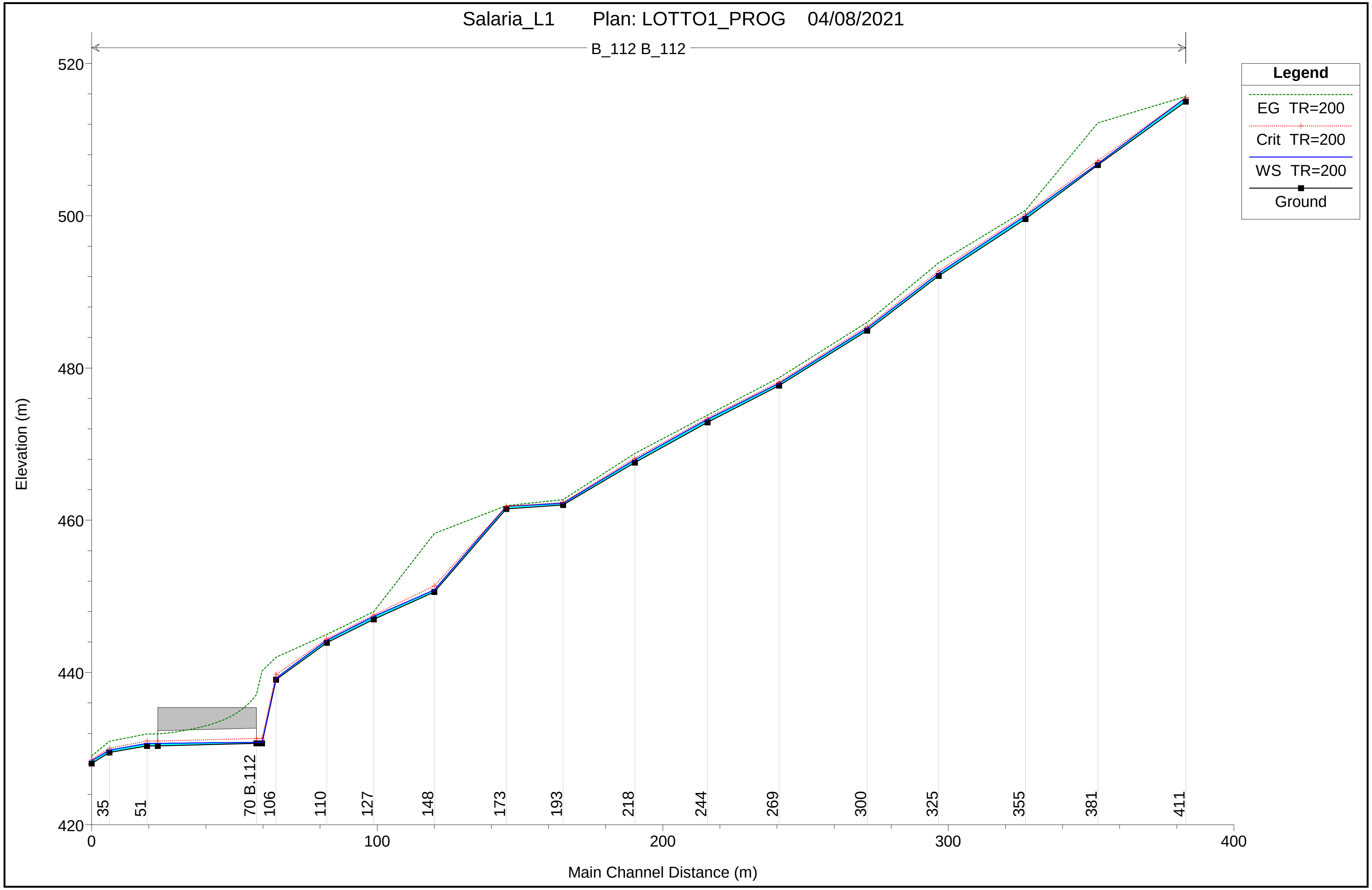


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 13
.05
.0167
.05
Elevation (m)
344.0
343.5
343.0
342.5
342.0
341.5
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



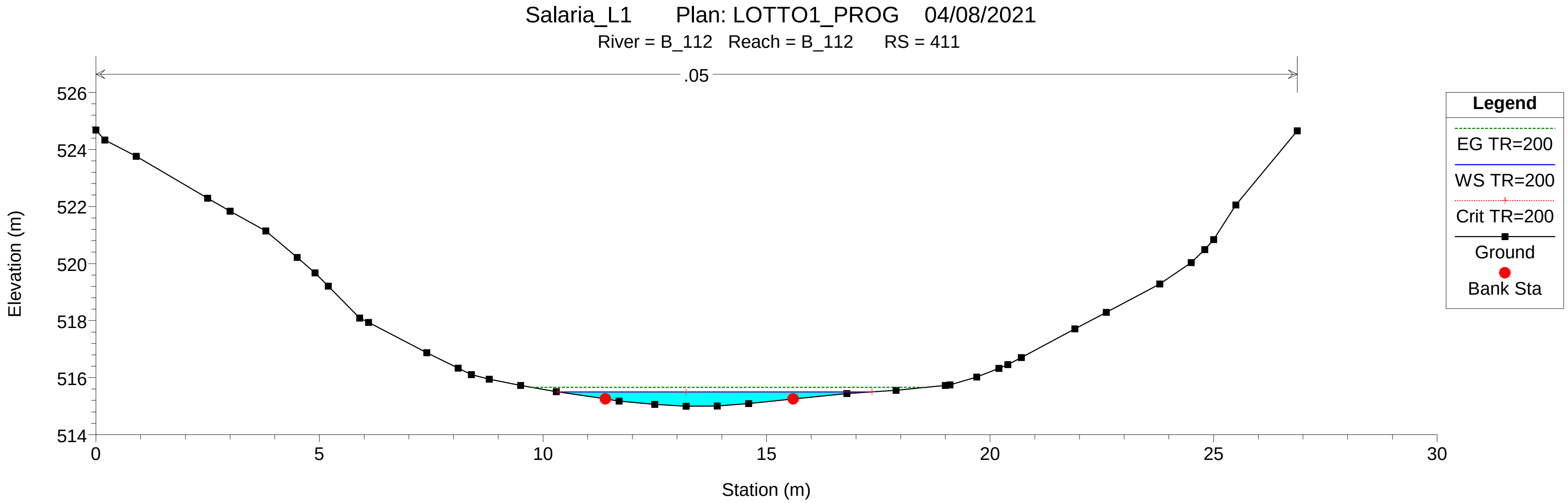
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_107 Reach = B_107 RS = 11
.05
Elevation (m)
344
343
342
341
340
339
338
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

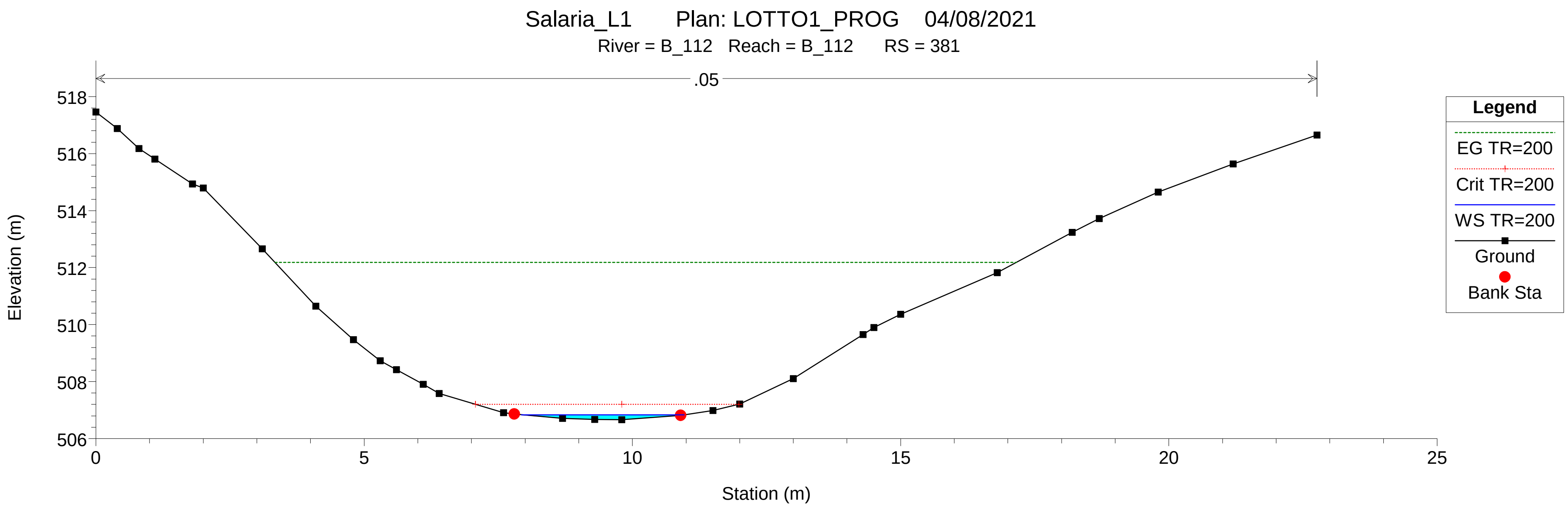
2.2.4. PROGETTO
B.112 - Progr.3+591

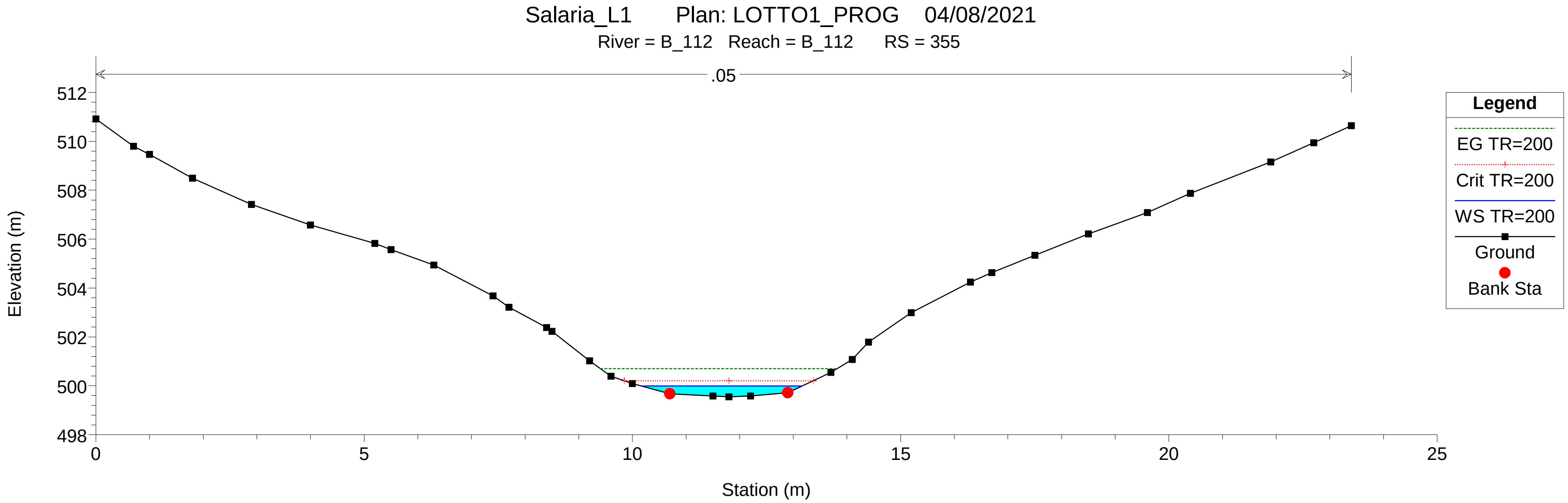

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
B_112 B_112
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
520
500
480
460
440
420
35
51
70 B.112
106
110
127
148
173
193
218
244
269
300
325
355
381
411
0
100
200
300
400
Main Channel Distance (m)

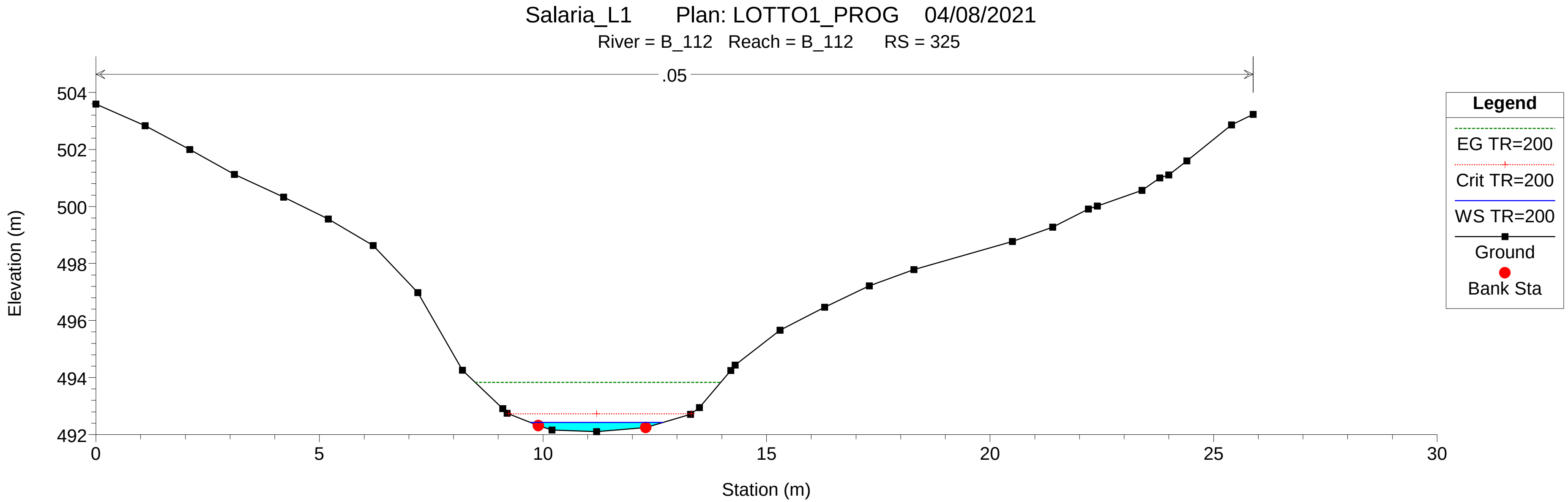
HEC-RAS Plan: L1_PROG River: B_112 Reach: B_112 Profile: TR=200

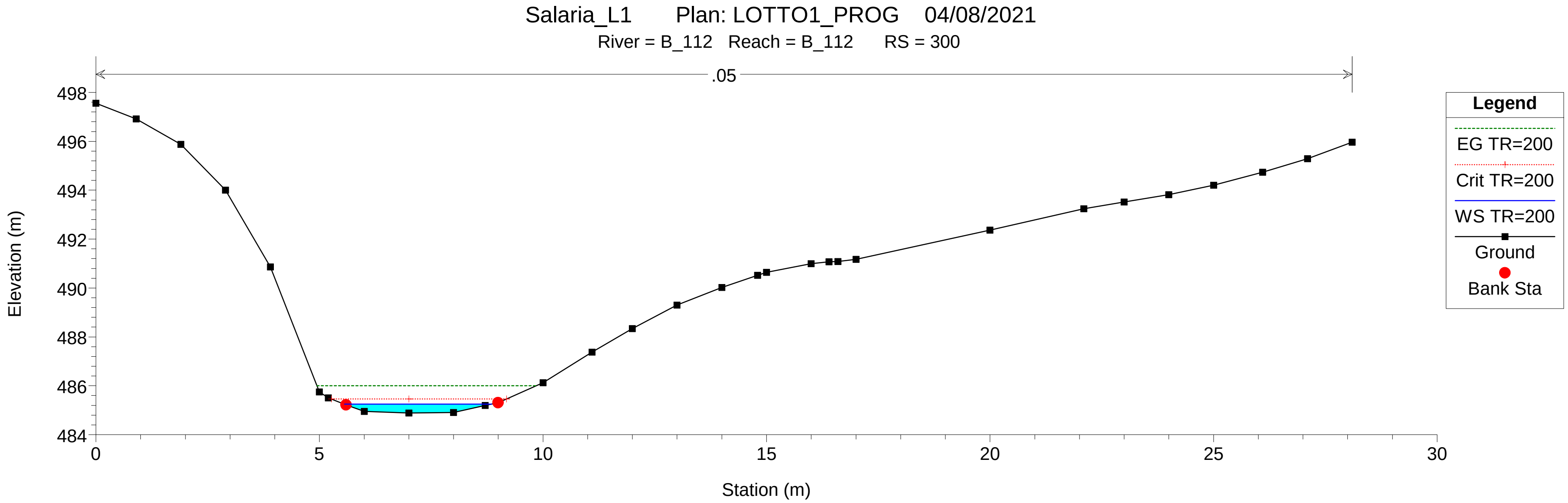
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_112	411	TR=200	3.40	515.00	0.50	515.50	515.50	0.00	0.91	515.66	1.83	1.66	0.40	110.44	0.29
B_112	381	TR=200	3.40	506.66	0.18	506.84	507.20	-0.36	9.78	512.18	10.24	10.23	0.11	5349.12	0.11
B_112	355	TR=200	3.40	499.55	0.44	499.99	500.20	-0.21	1.98	500.70	3.82	3.56	0.37	495.58	0.32
B_112	325	TR=200	3.40	492.10	0.32	492.42	492.73	-0.31	3.34	493.83	5.32	5.12	0.25	1094.61	0.22
B_112	300	TR=200	3.40	484.89	0.36	485.25	485.46	-0.21	2.36	486.00	3.85	3.85	0.26	570.82	0.27
B_112	269	TR=200	3.40	477.68	0.31	477.99	478.19	-0.20	2.50	478.73	3.91	3.68	0.25	598.25	0.21
B_112	244	TR=200	3.40	472.85	0.41	473.26	473.43	-0.17	2.02	473.82	3.34	3.28	0.27	421.74	0.25
B_112	218	TR=200	3.40	467.58	0.35	467.93	468.16	-0.23	2.53	468.77	4.06	4.03	0.25	637.28	0.25
B_112	193	TR=200	3.40	462.00	0.21	462.21	462.35	-0.14	2.27	462.70	3.11	3.08	0.19	411.96	0.18
B_112	173	TR=200	3.40	461.50	0.32	461.82	461.82	0.00	0.95	461.91	1.54	1.28	0.27	89.83	0.19
B_112	148	TR=200	3.40	450.58	0.28	450.86	451.39	-0.53	9.34	458.27	12.05	12.05	0.16	6584.21	0.17
B_112	127	TR=200	3.40	446.97	0.42	447.39	447.58	-0.19	1.93	448.00	3.50	3.35	0.33	435.47	0.29
B_112	110	TR=200	3.40	443.91	0.29	444.20	444.41	-0.21	2.61	444.98	4.28	3.75	0.27	691.00	0.21
B_112	106	TR=200	3.40	439.05	0.23	439.28	439.70	-0.42	4.89	441.99	7.33	7.02	0.23	240.12	0.22
B_112	105	TR=200	3.40	430.68	0.13	430.81	431.34	-0.53	12.24	440.19	13.57	13.57	0.13	1006.41	0.13
B_112	70		Culvert												
B_112	51	TR=200	3.40	430.35	0.35	430.70	431.01	-0.31	2.63	431.91	4.87	4.87	0.35	92.27	0.35
B_112	35	TR=200	3.40	429.51	0.30	429.81	430.06	-0.25	3.36	430.96	4.76	4.74	0.20	946.81	0.20
B_112	29	TR=200	3.40	428.06	0.36	428.42	428.60	-0.18	2.20	429.04	3.56	3.38	0.26	482.73	0.22

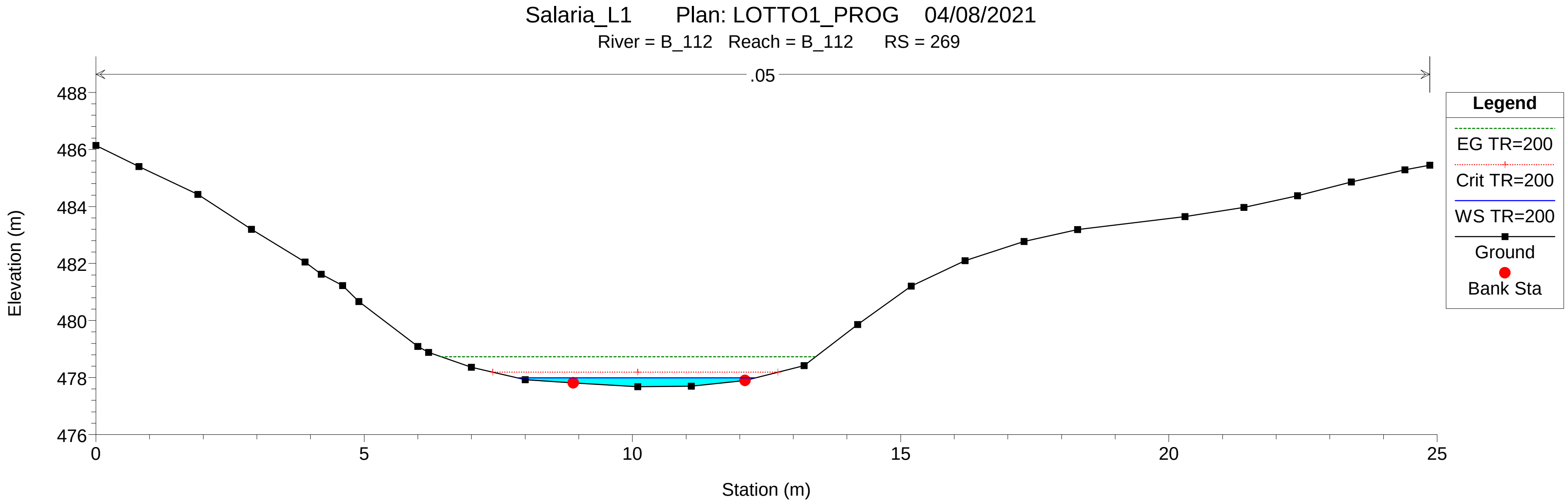

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 411
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
526
524
522
520
518
516
514
0
5
10
15
20
25
30

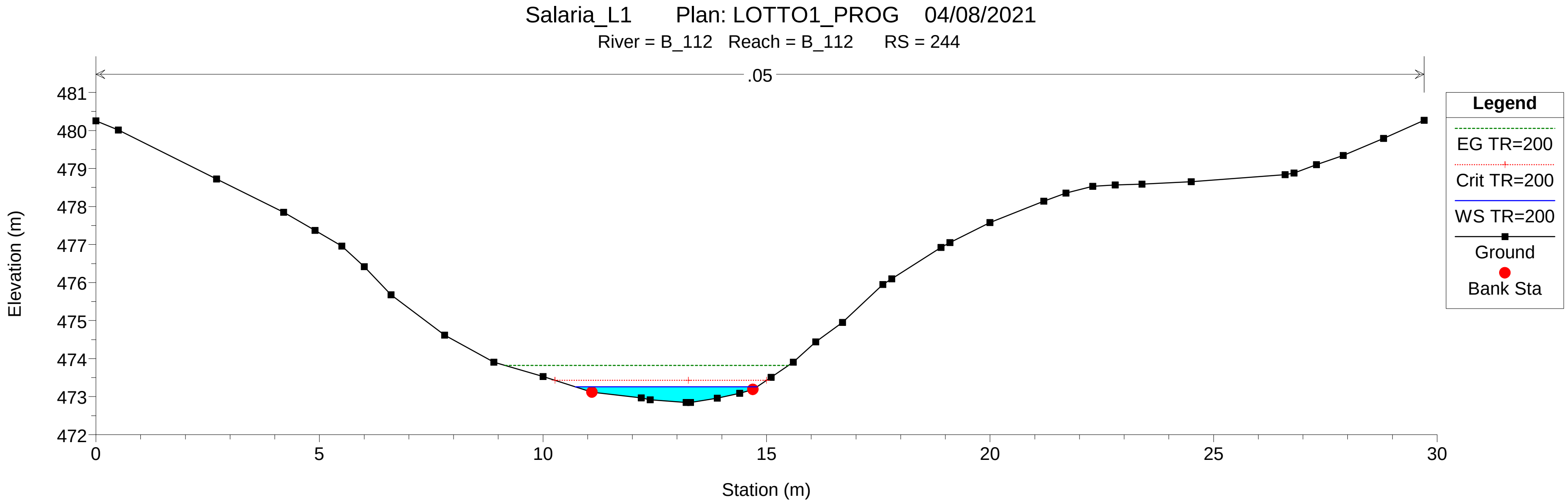

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 381
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
518
516
514
512
510
508
506
0
5
10
15
20
25


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 355
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

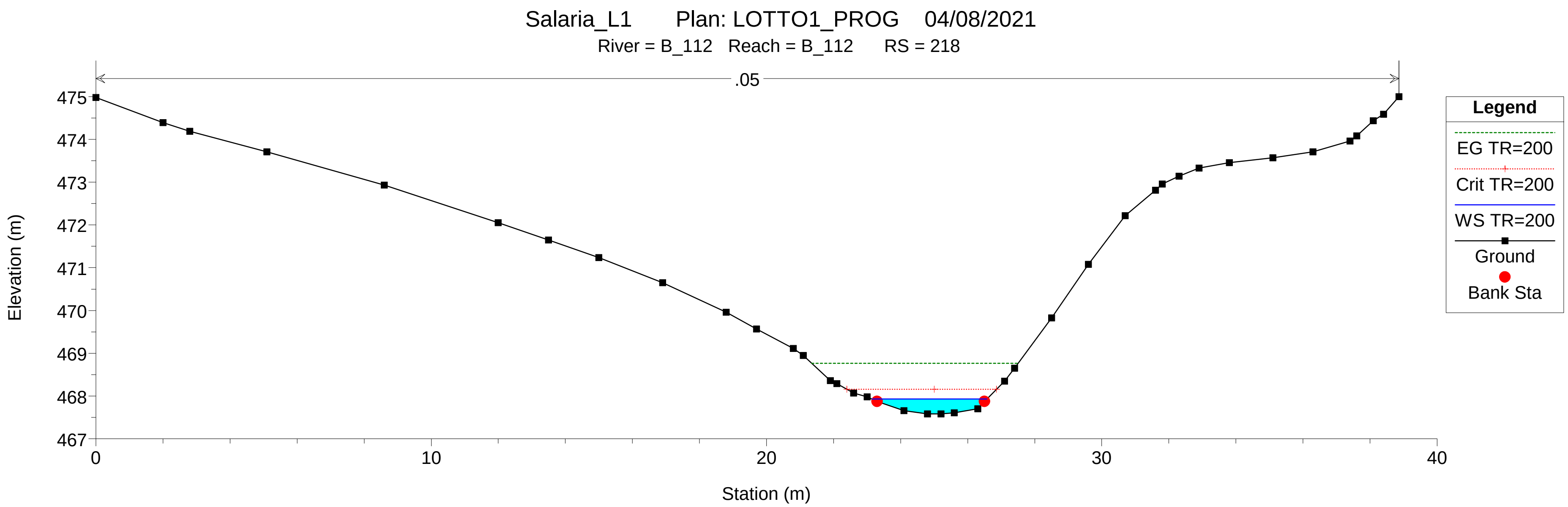

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 325
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 300
.05
Elevation (m)
498
496
494
492
490
488
486
484
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

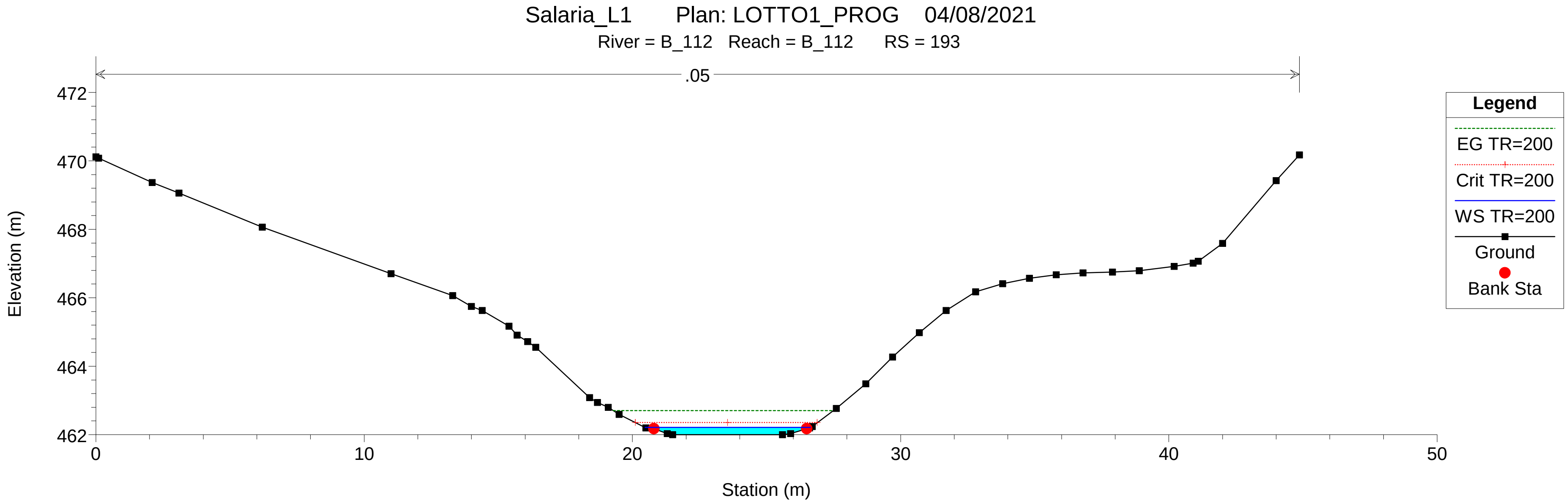

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 269
.05
Elevation (m)
488
486
484
482
480
478
476
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

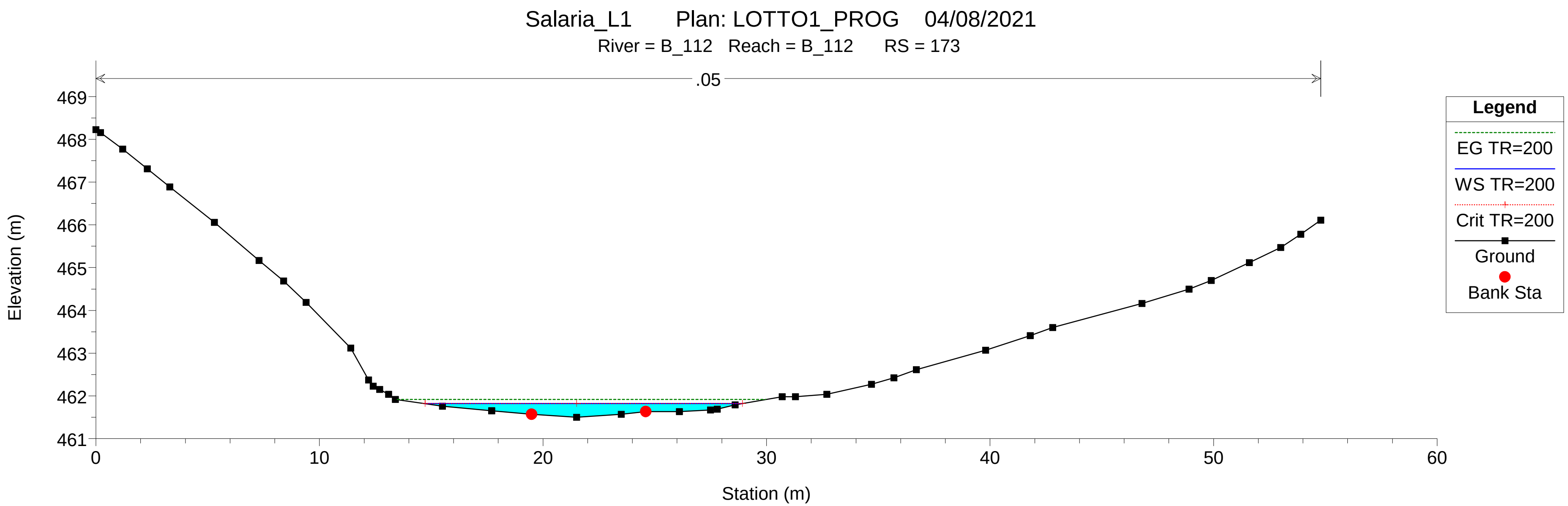


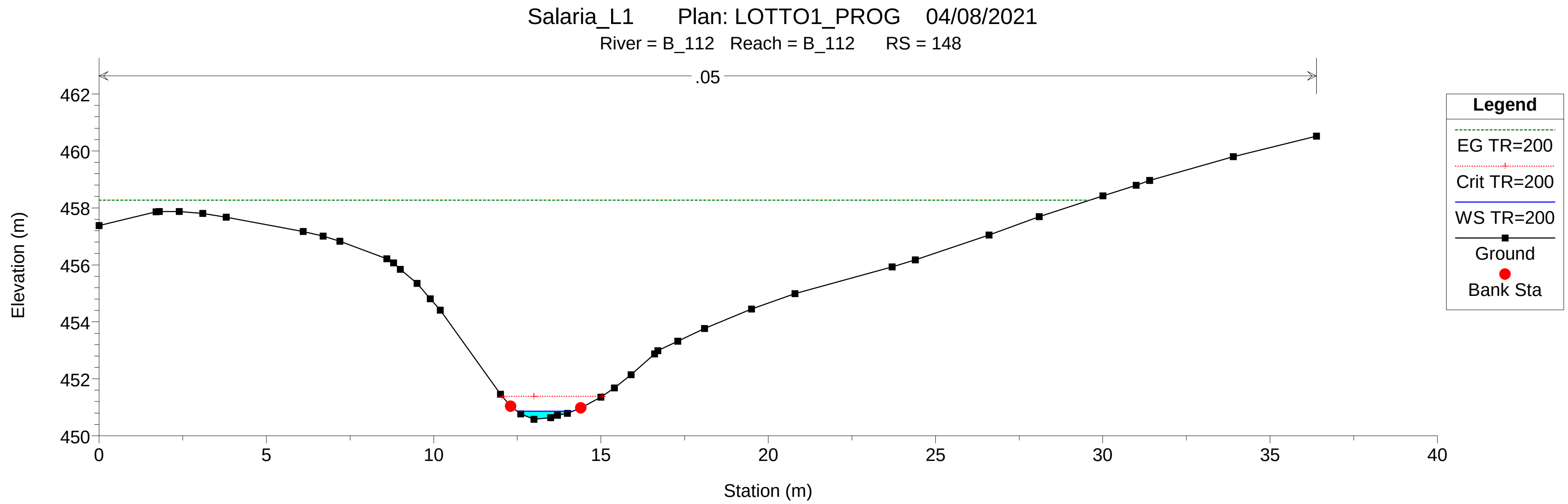
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 244
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

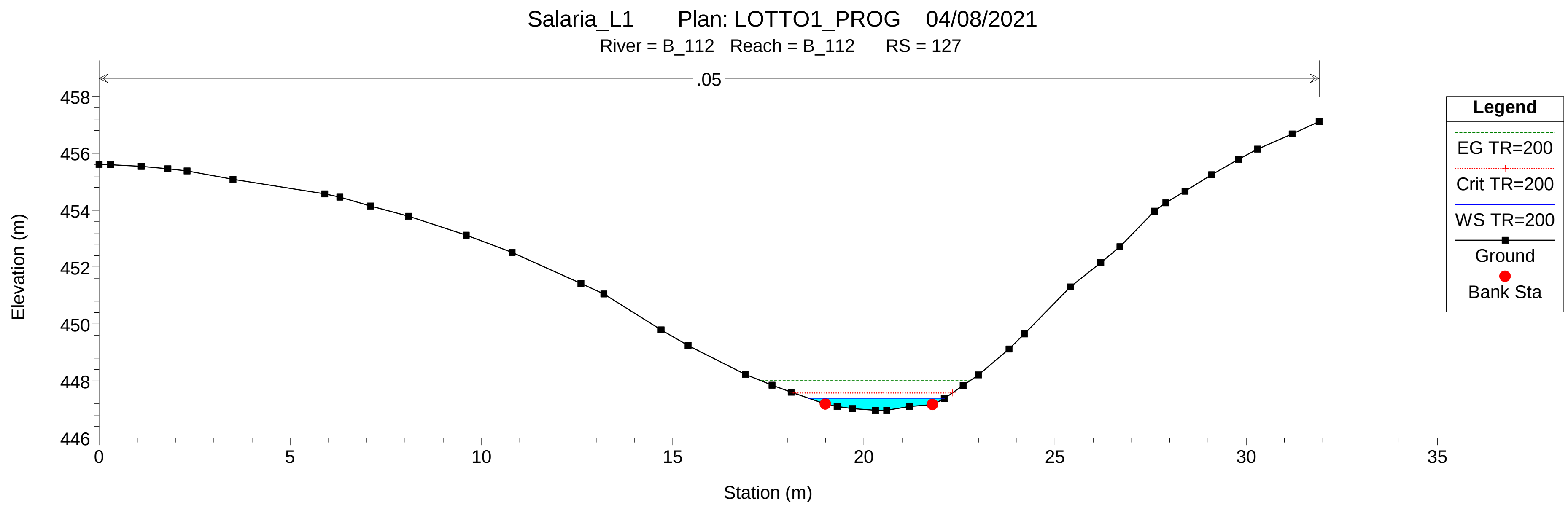


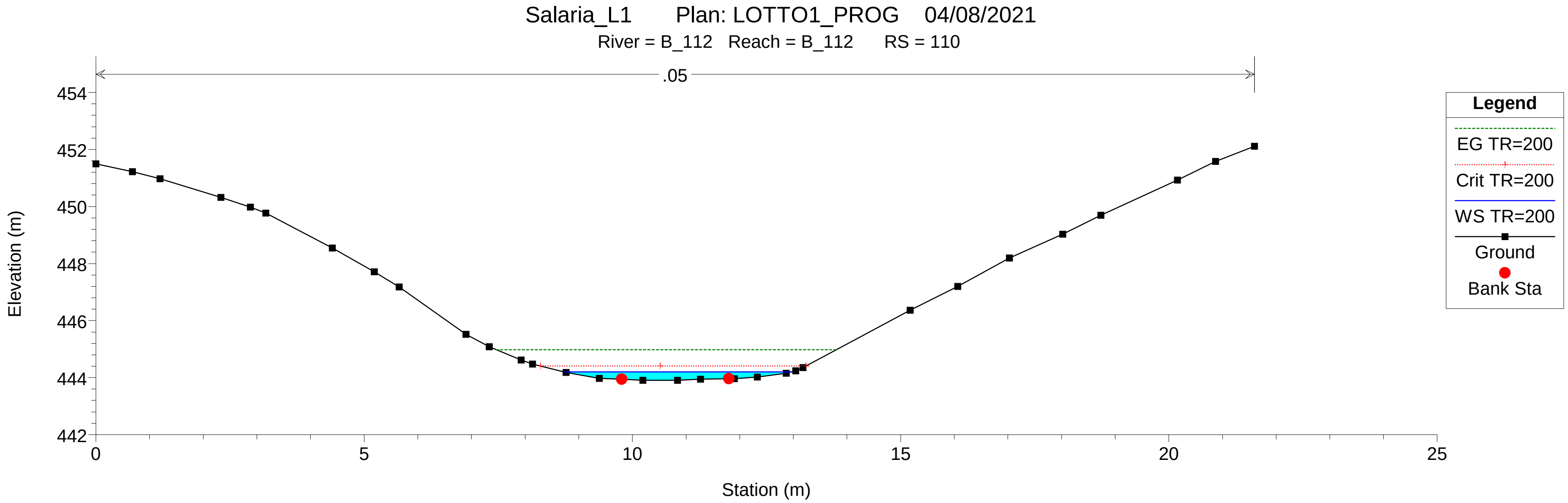
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 218
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

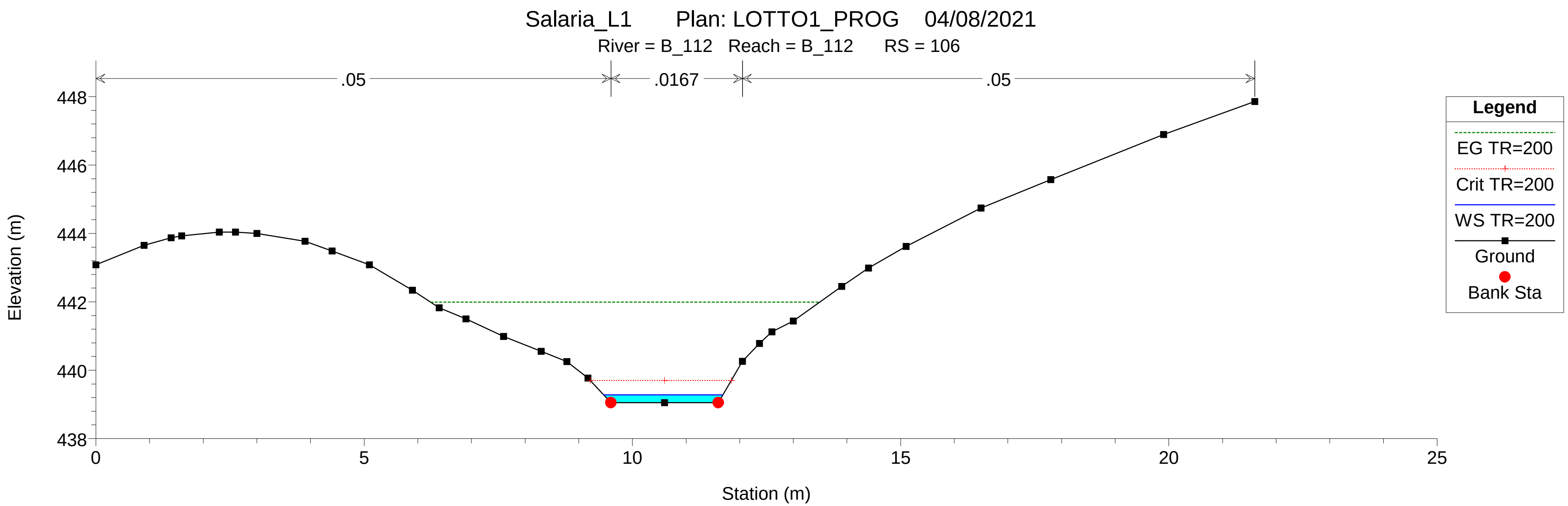

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 193
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

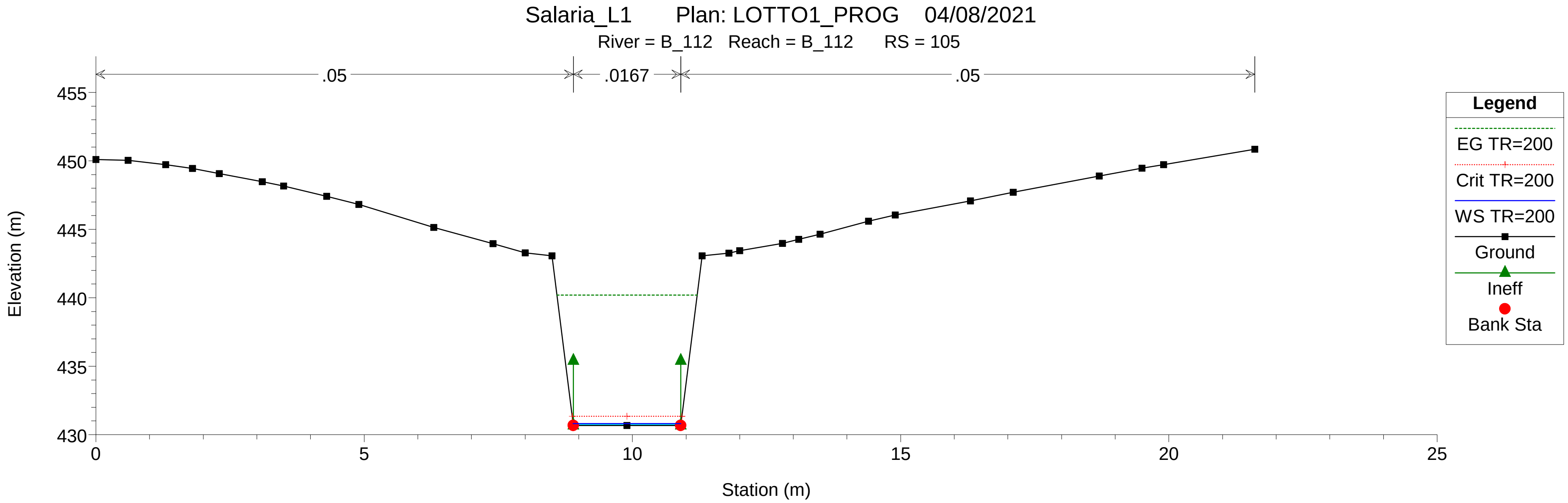

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 173
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 148
.05
Elevation (m)
462
460
458
456
454
452
450
0
5
10
15
20
25
30
35
40
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

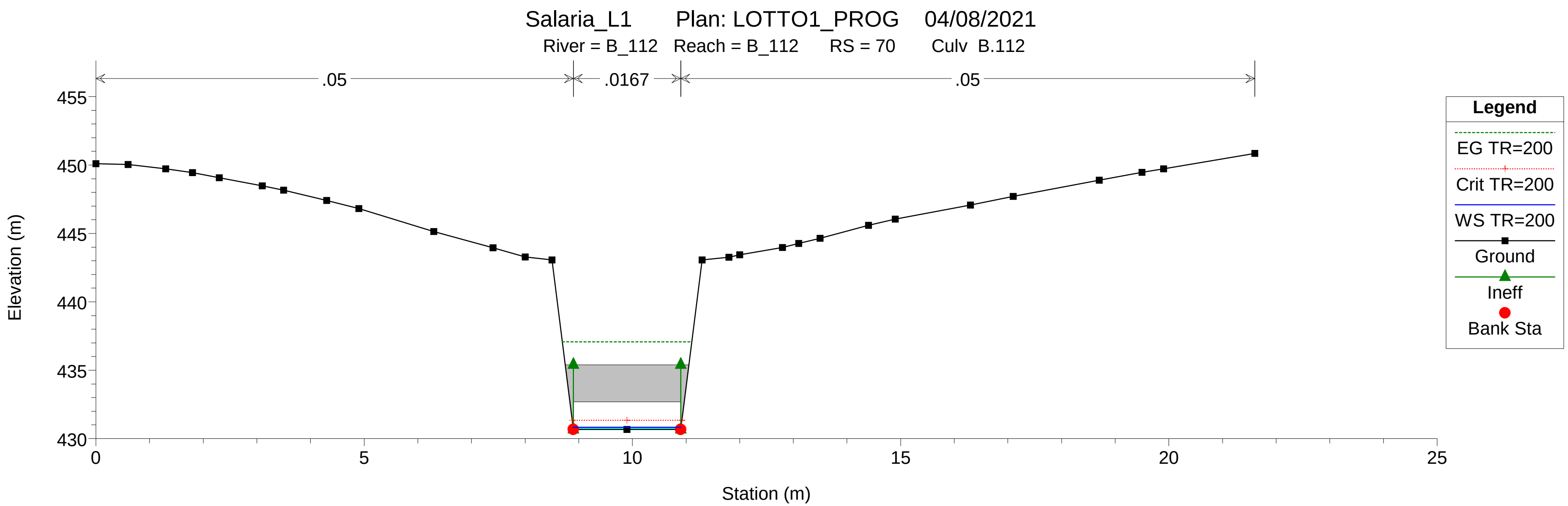

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 127
.05
Elevation (m)
458
456
454
452
450
448
446
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 110
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)

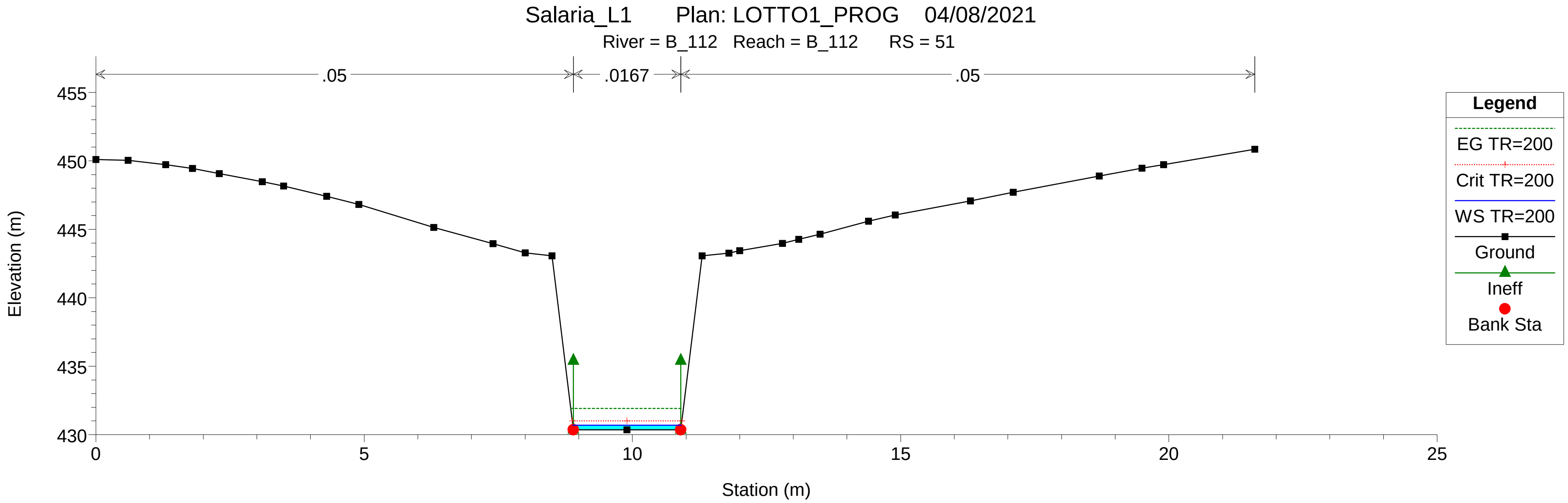

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 106
.05
.0167
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)

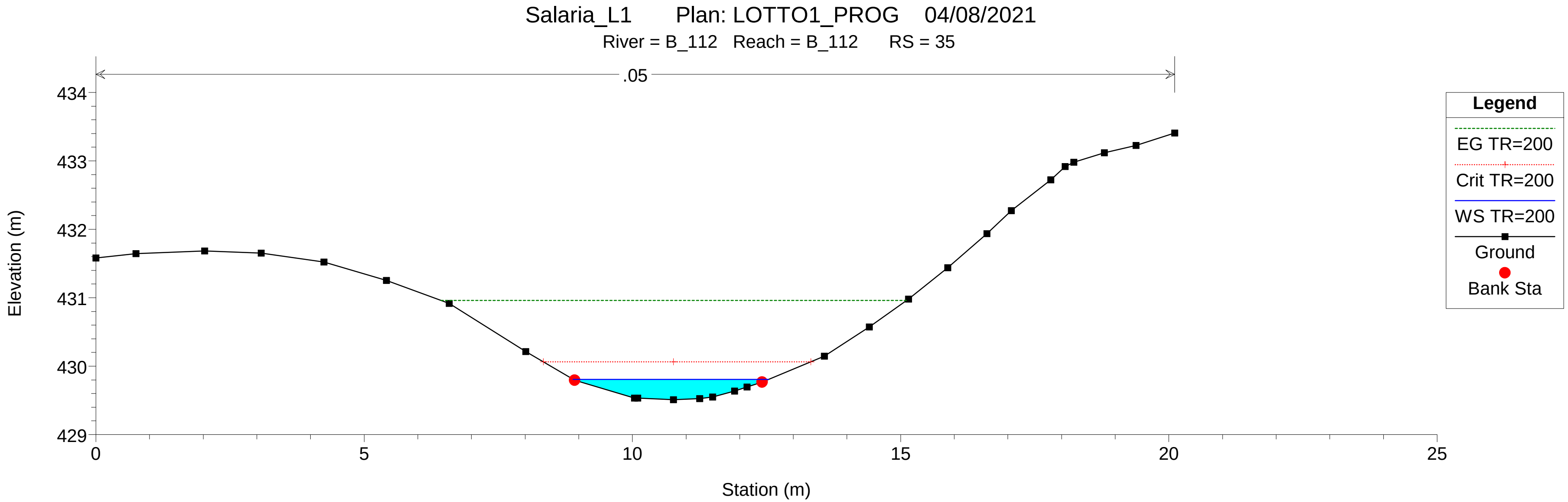


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 105
.05
.0167
.05
Elevation (m)
455
450
445
440
435
430
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta



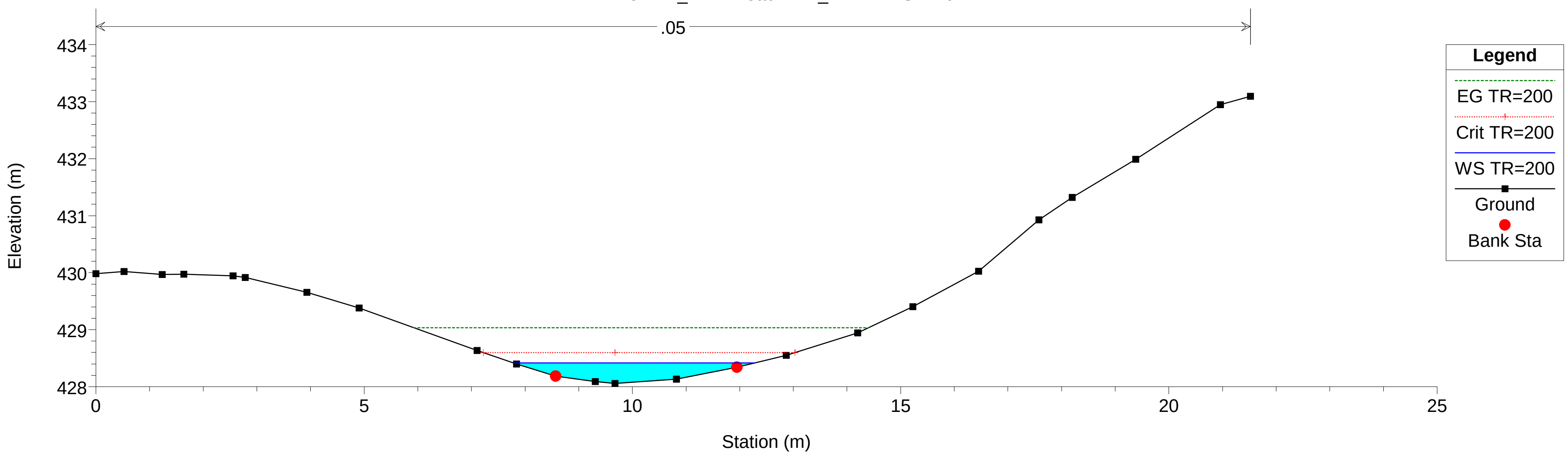
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 70 Culv B.112
.05
.0167
.05
Elevation (m)
455
450
445
440
435
430
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 51
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

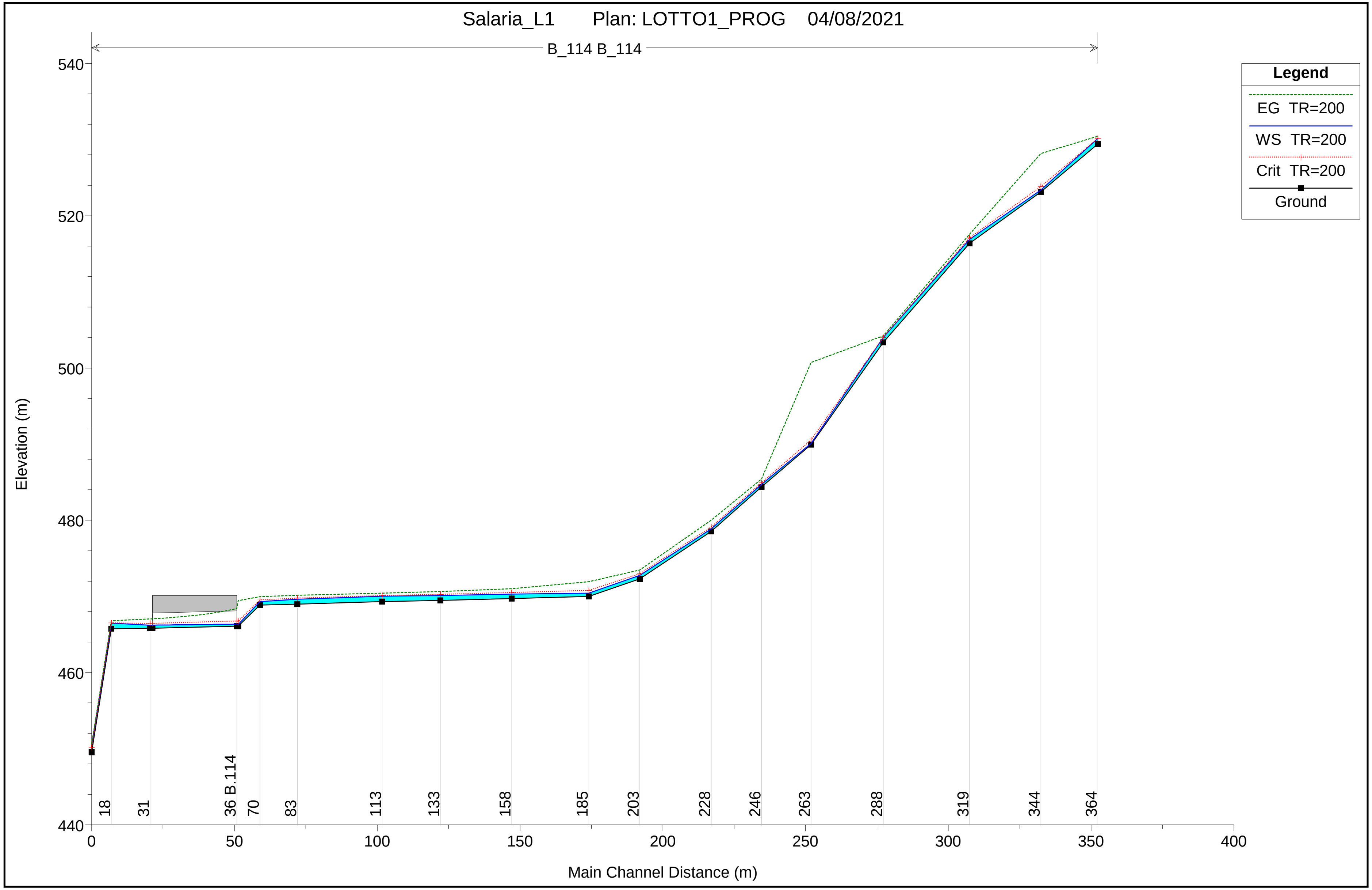

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_112 Reach = B_112 RS = 35
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

Salaria_L1   Plan: LOTTO1_PROG   04/08/2021

River = B_112   Reach = B_112   RS = 29

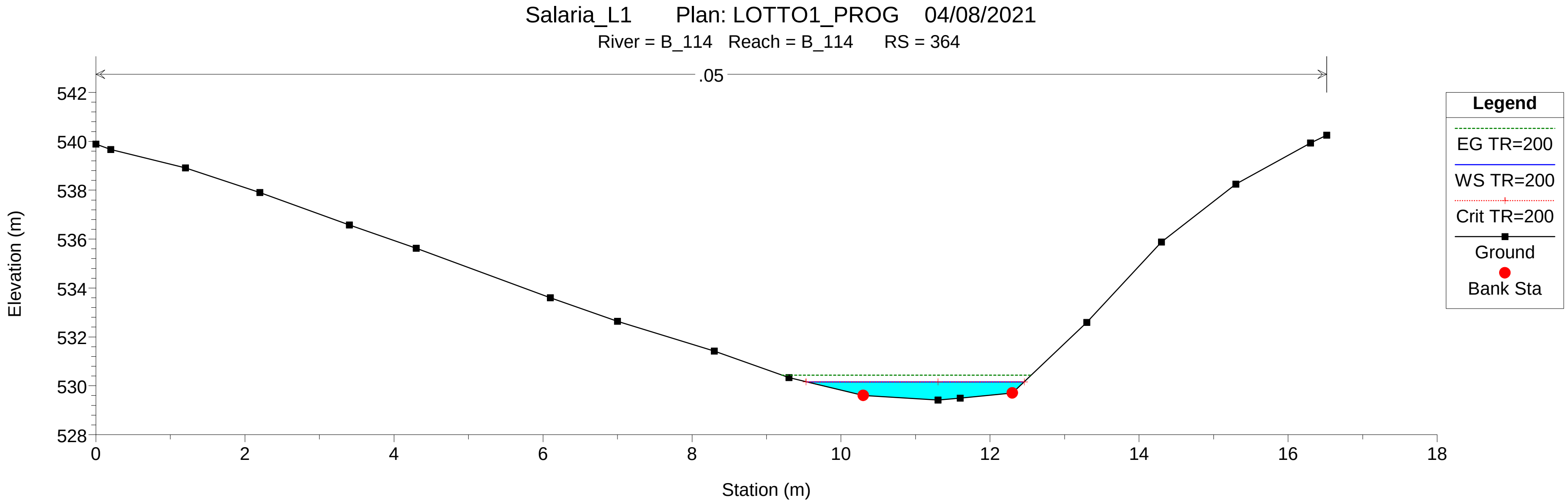


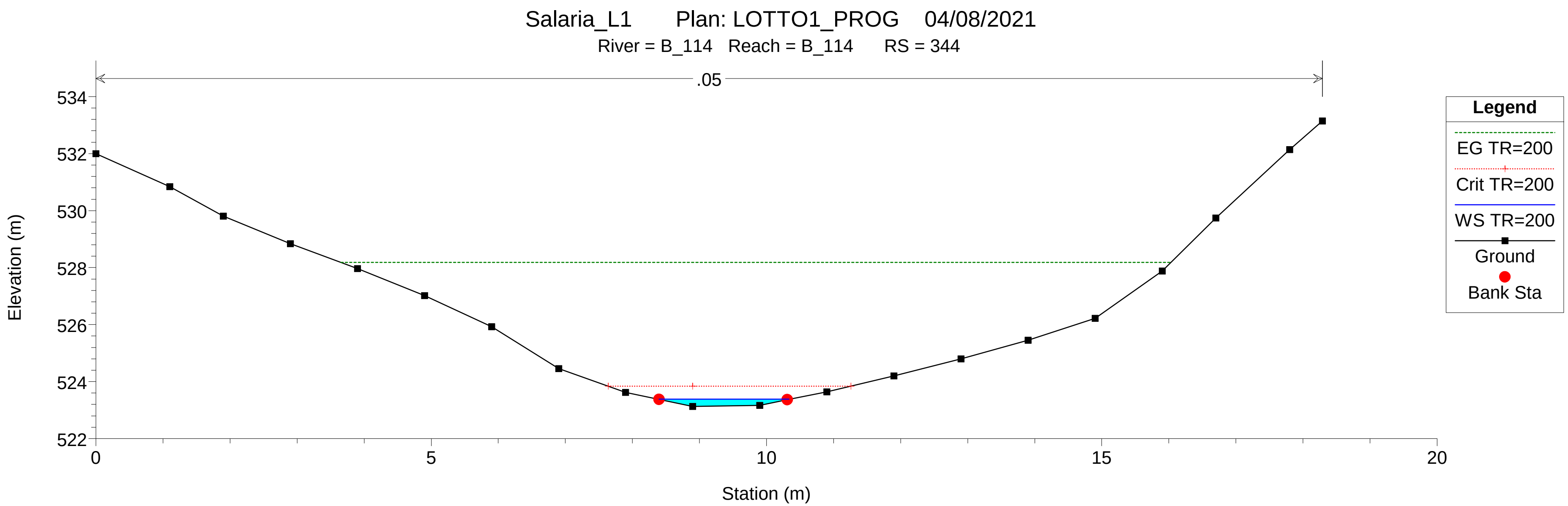
2.2.5. PROGETTO
B.114 - Progr.4+370

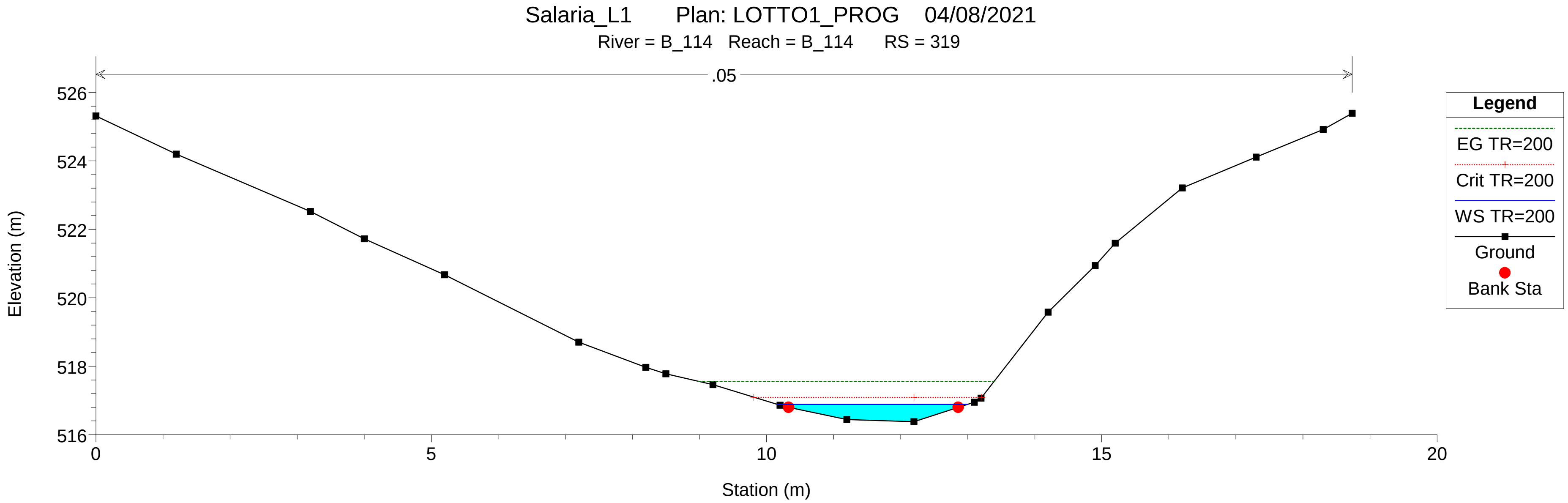

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
B_114 B_114
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Elevation (m)
540
520
500
480
460
440
18
31
36 B.114
70
83
113
133
158
185
203
228
246
263
288
319
344
364
0
50
100
150
200
250
300
350
400
Main Channel Distance (m)

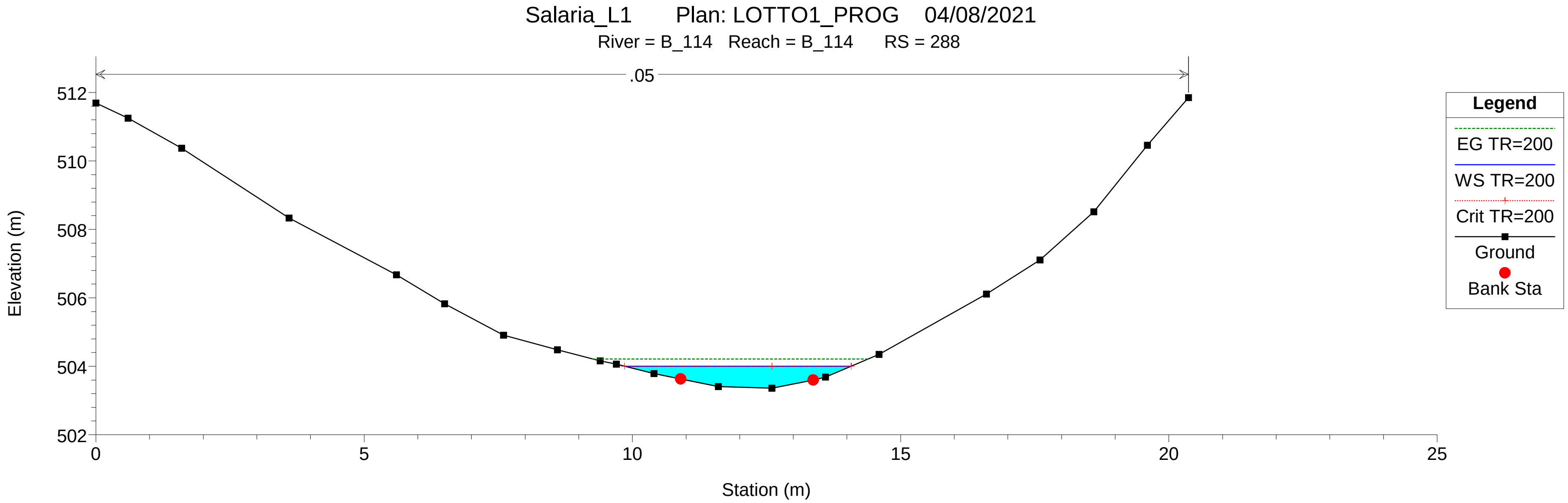
HEC-RAS Plan: L1_PROG River: B_112 Reach: B_112 Profile: TR=200

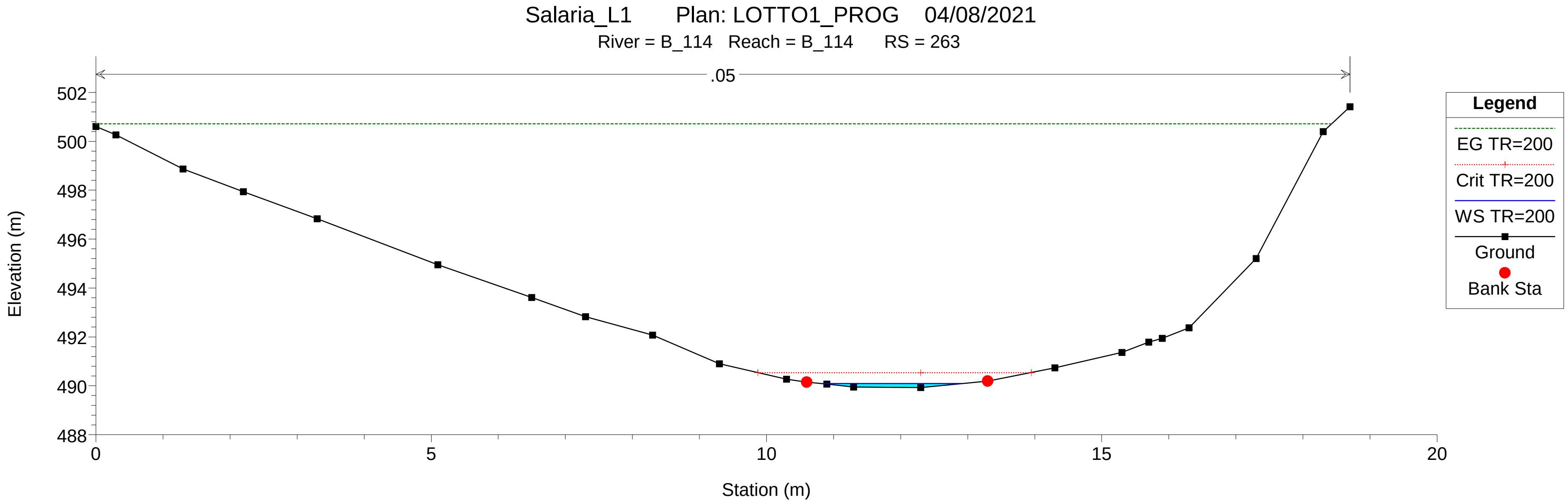
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_112	411	TR=200	3.40	515.00	0.50	515.50	515.50	0.00	0.91	515.66	1.83	1.66	0.40	110.44	0.29
B_112	381	TR=200	3.40	506.66	0.18	506.84	507.20	-0.36	9.78	512.18	10.24	10.23	0.11	5349.12	0.11
B_112	355	TR=200	3.40	499.55	0.44	499.99	500.20	-0.21	1.98	500.70	3.82	3.56	0.37	495.58	0.32
B_112	325	TR=200	3.40	492.10	0.32	492.42	492.73	-0.31	3.34	493.83	5.32	5.12	0.25	1094.61	0.22
B_112	300	TR=200	3.40	484.89	0.36	485.25	485.46	-0.21	2.36	486.00	3.85	3.85	0.26	570.82	0.27
B_112	269	TR=200	3.40	477.68	0.31	477.99	478.19	-0.20	2.50	478.73	3.91	3.68	0.25	598.25	0.21
B_112	244	TR=200	3.40	472.85	0.41	473.26	473.43	-0.17	2.02	473.82	3.34	3.28	0.27	421.74	0.25
B_112	218	TR=200	3.40	467.58	0.35	467.93	468.16	-0.23	2.53	468.77	4.06	4.03	0.25	637.28	0.25
B_112	193	TR=200	3.40	462.00	0.21	462.21	462.35	-0.14	2.27	462.70	3.11	3.08	0.19	411.96	0.18
B_112	173	TR=200	3.40	461.50	0.32	461.82	461.82	0.00	0.95	461.91	1.54	1.28	0.27	89.83	0.19
B_112	148	TR=200	3.40	450.58	0.28	450.86	451.39	-0.53	9.34	458.27	12.05	12.05	0.16	6584.21	0.17
B_112	127	TR=200	3.40	446.97	0.42	447.39	447.58	-0.19	1.93	448.00	3.50	3.35	0.33	435.47	0.29
B_112	110	TR=200	3.40	443.91	0.29	444.20	444.41	-0.21	2.61	444.98	4.28	3.75	0.27	691.00	0.21
B_112	106	TR=200	3.40	439.05	0.23	439.28	439.70	-0.42	4.89	441.99	7.33	7.02	0.23	240.12	0.22
B_112	105	TR=200	3.40	430.68	0.13	430.81	431.34	-0.53	12.24	440.19	13.57	13.57	0.13	1006.41	0.13
B_112	70		Culvert												
B_112	51	TR=200	3.40	430.35	0.35	430.70	431.01	-0.31	2.63	431.91	4.87	4.87	0.35	92.27	0.35
B_112	35	TR=200	3.40	429.51	0.30	429.81	430.06	-0.25	3.36	430.96	4.76	4.74	0.20	946.81	0.20
B_112	29	TR=200	3.40	428.06	0.36	428.42	428.60	-0.18	2.20	429.04	3.56	3.38	0.26	482.73	0.22


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 364
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

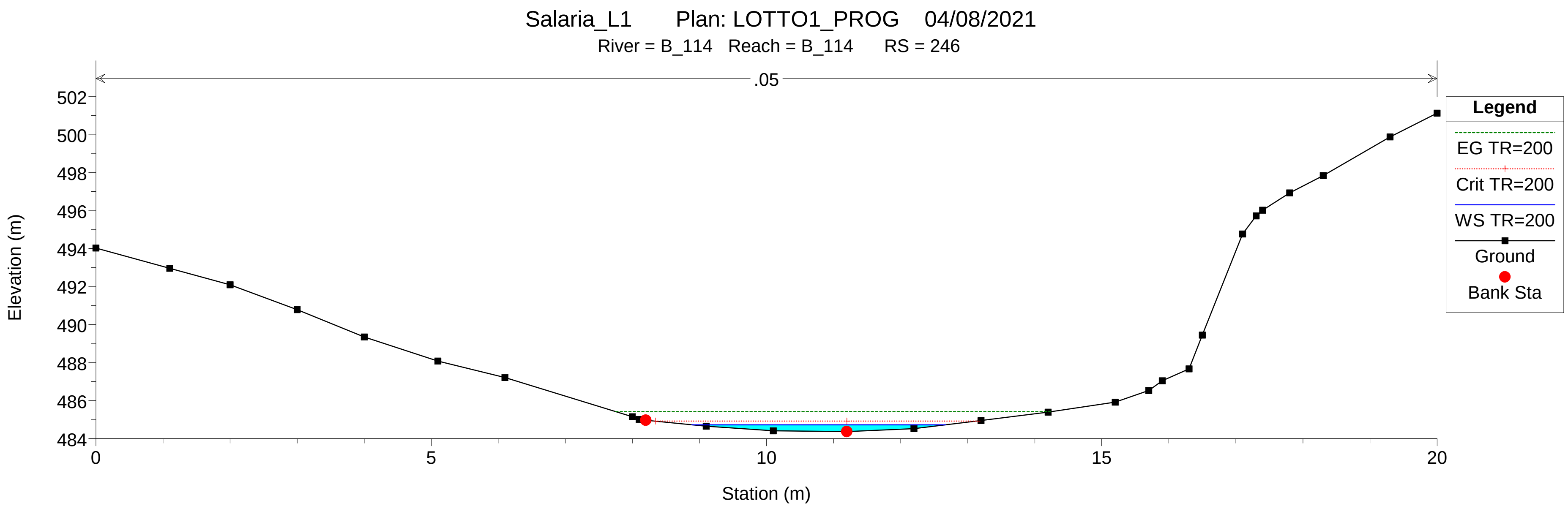

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 344
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 319
.05
Elevation (m)
526
524
522
520
518
516
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

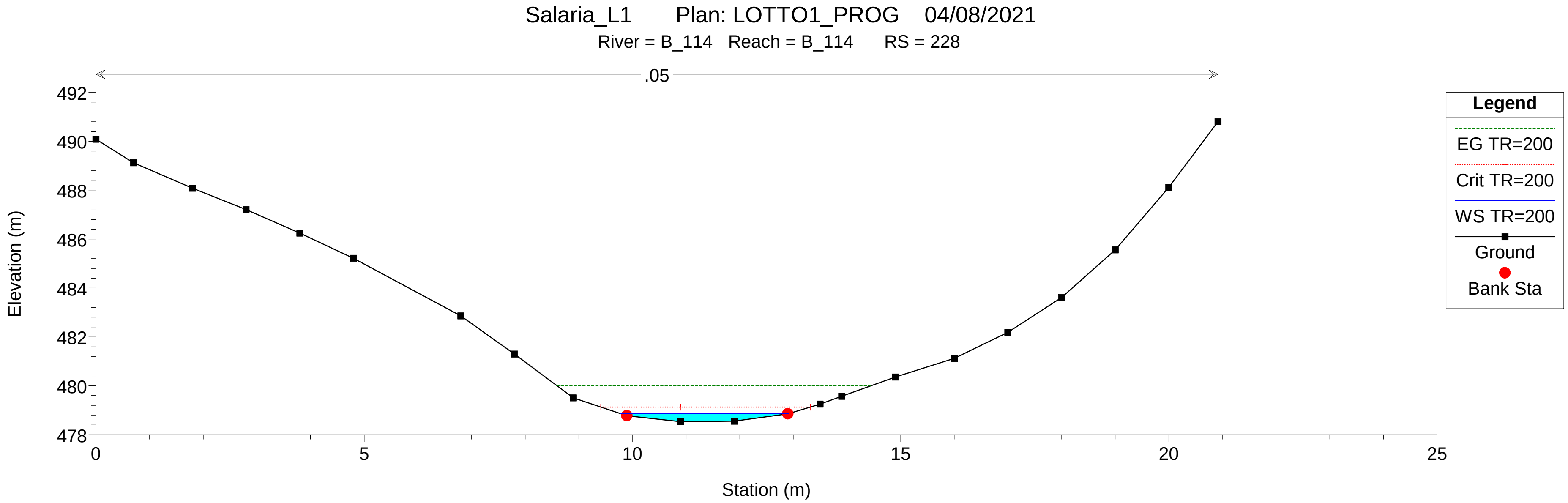

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 288
.05
Elevation (m)
512
510
508
506
504
502
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

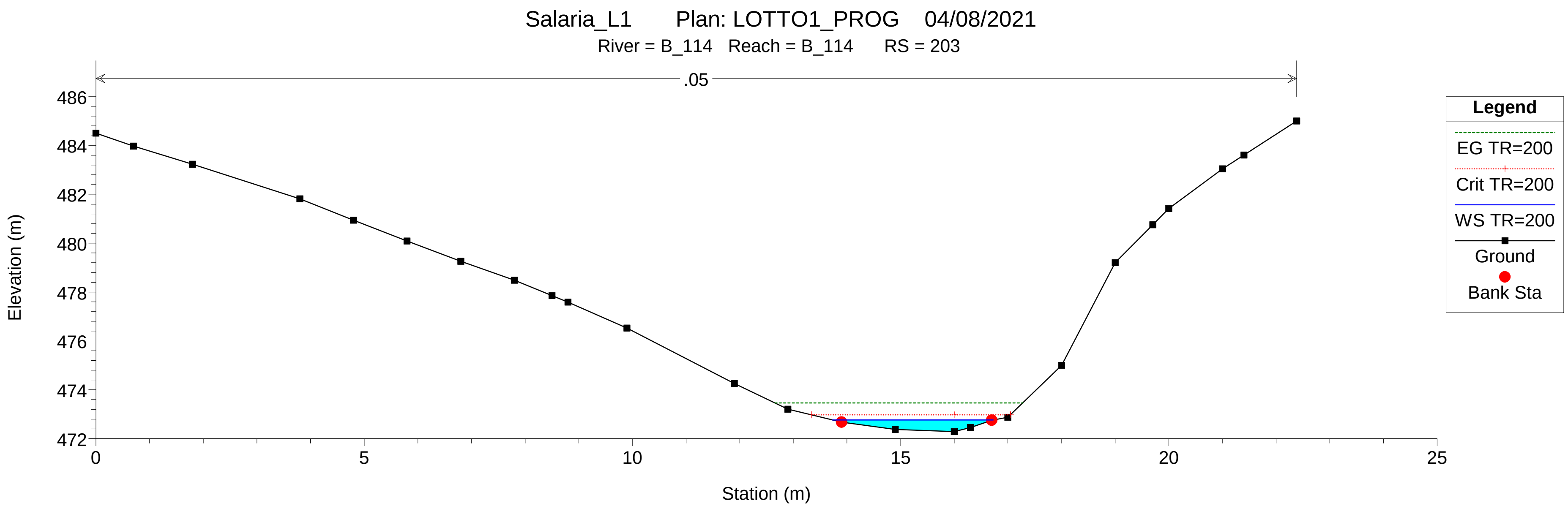


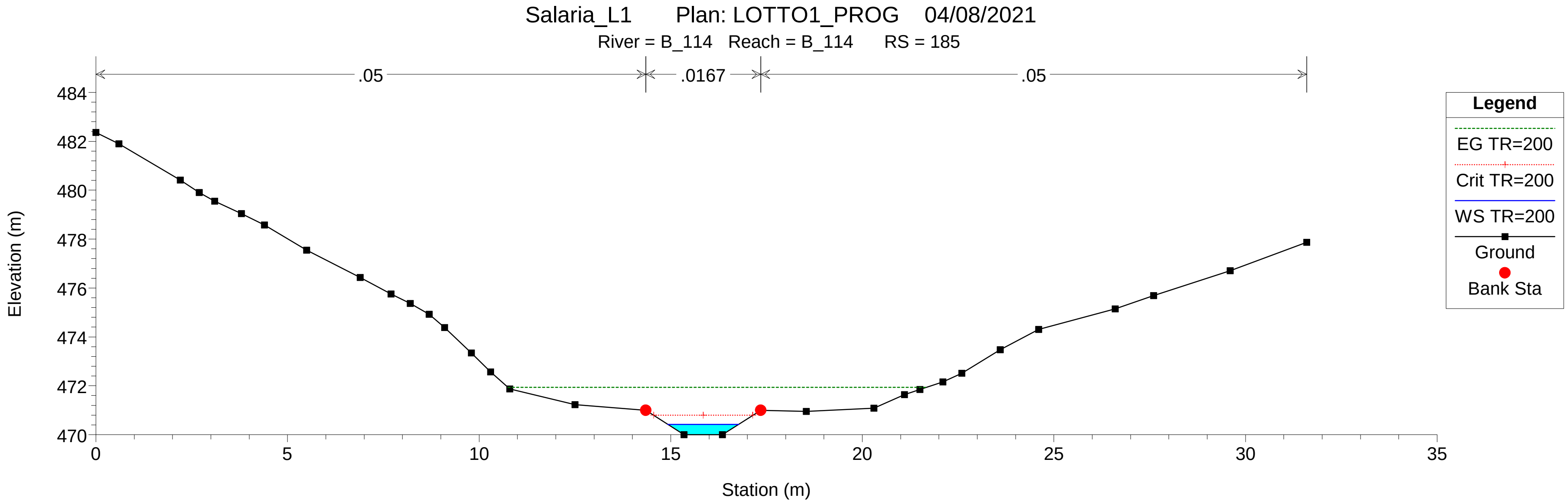
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 263
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

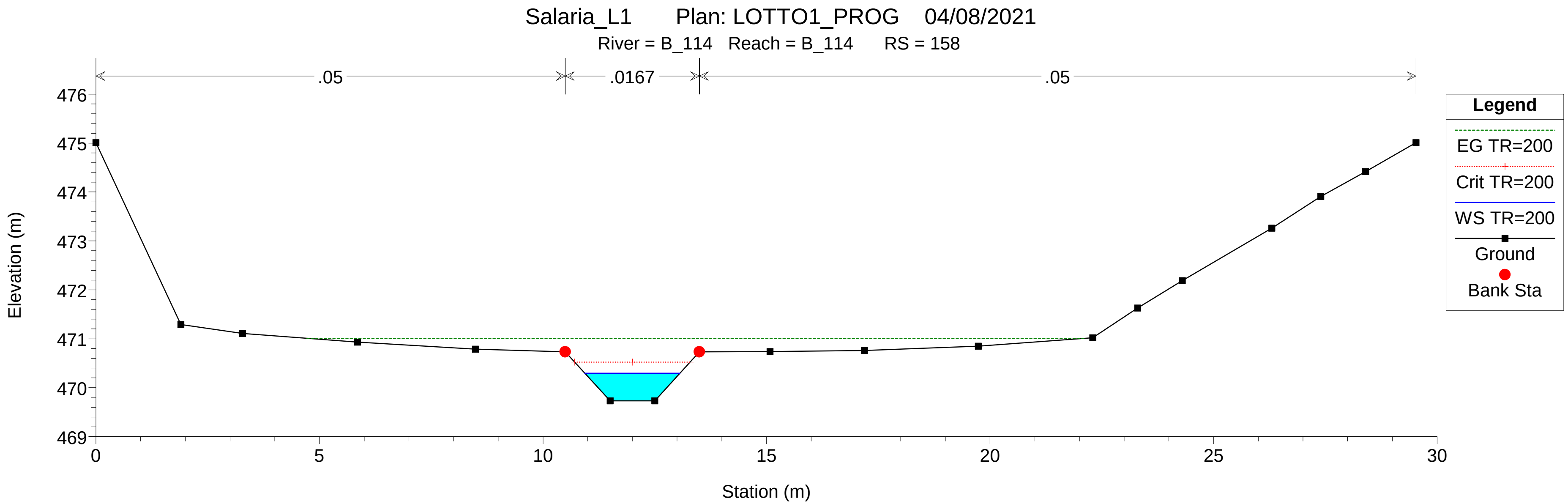


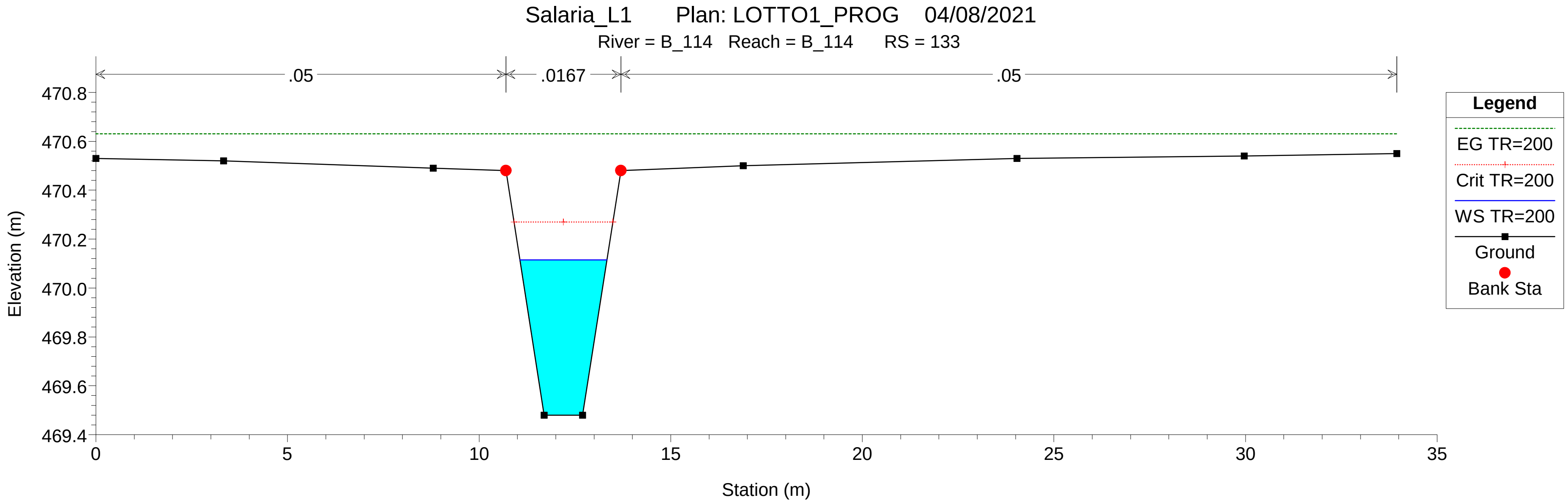
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 246
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

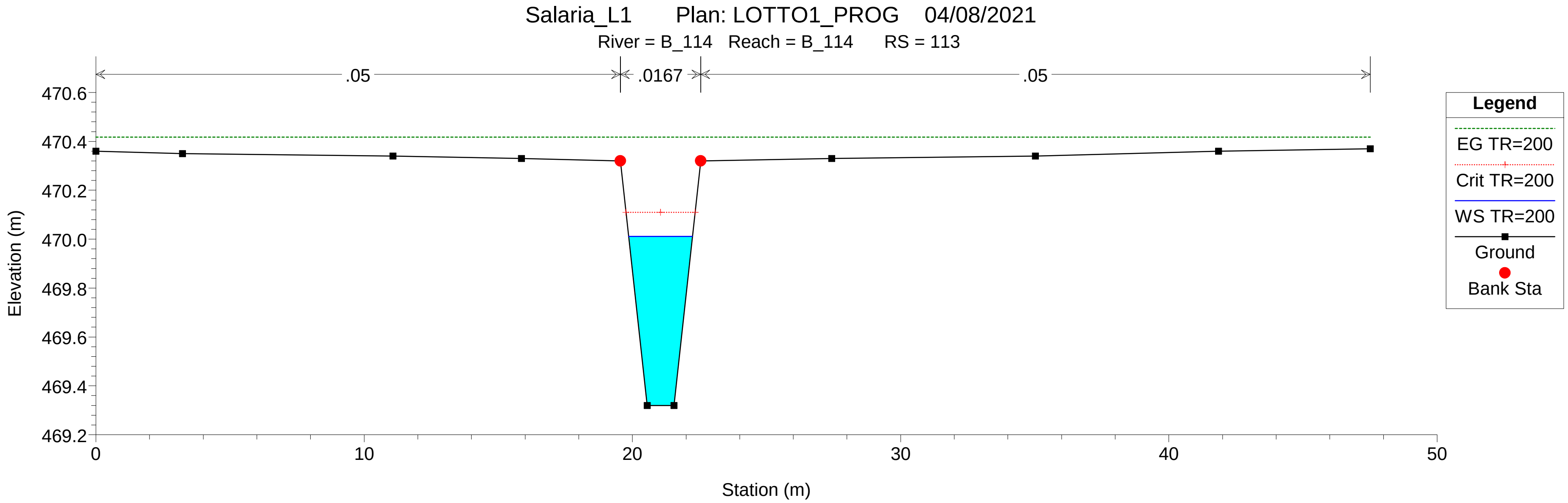

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 228
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

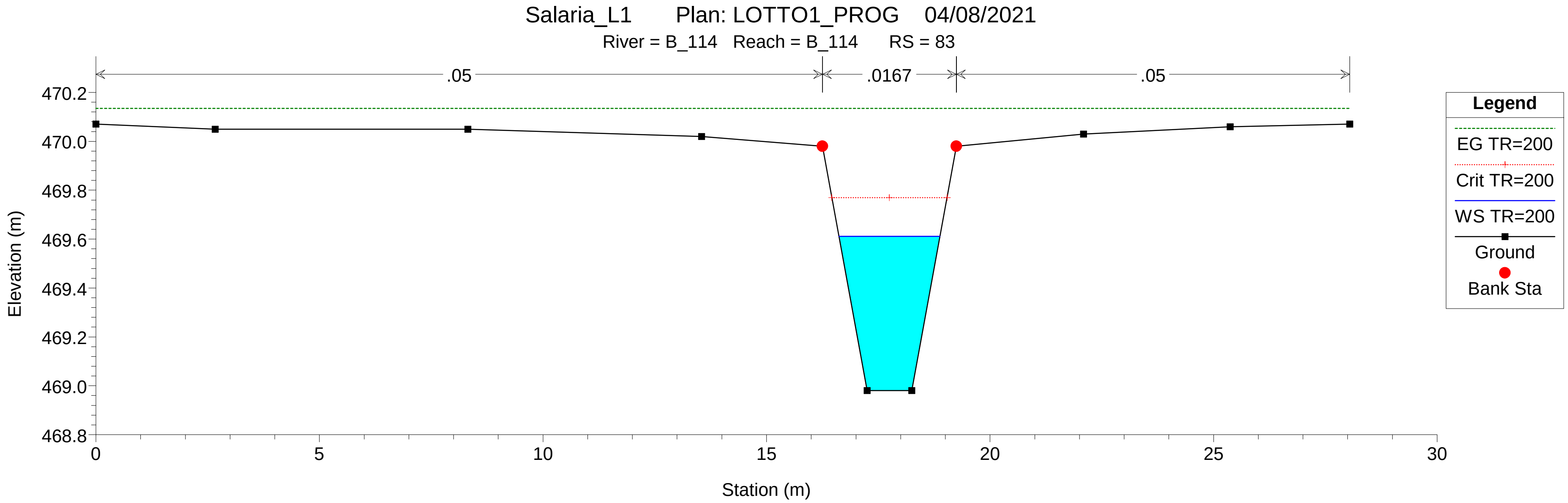

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 203
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

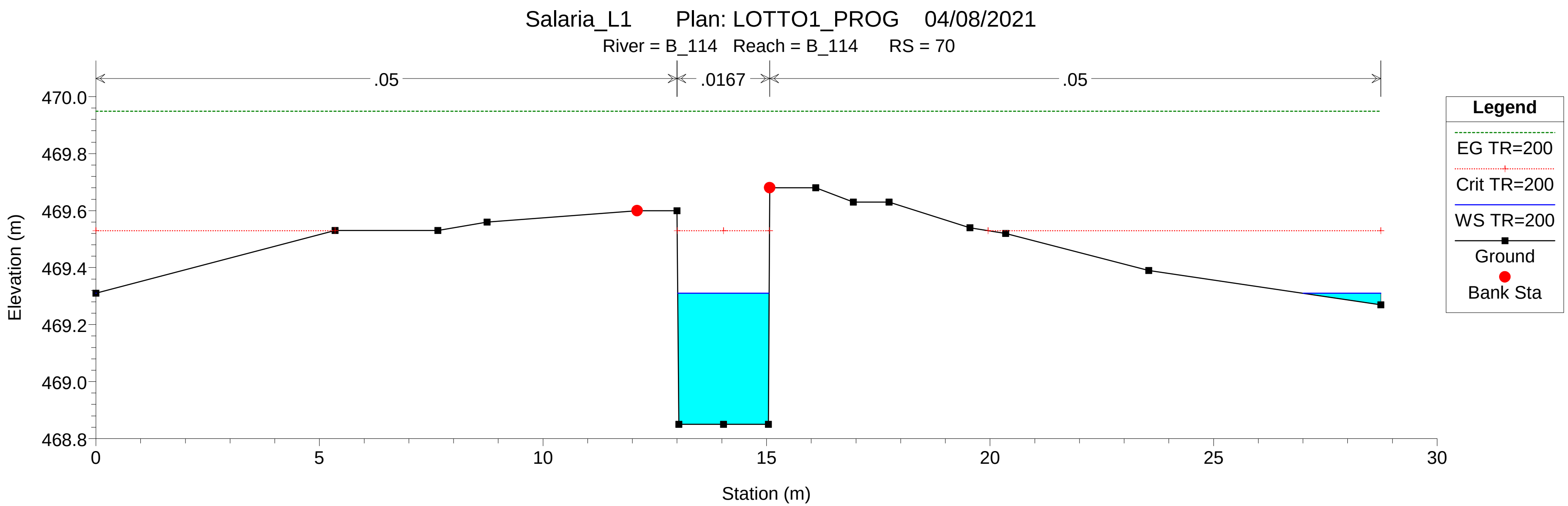

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 185
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

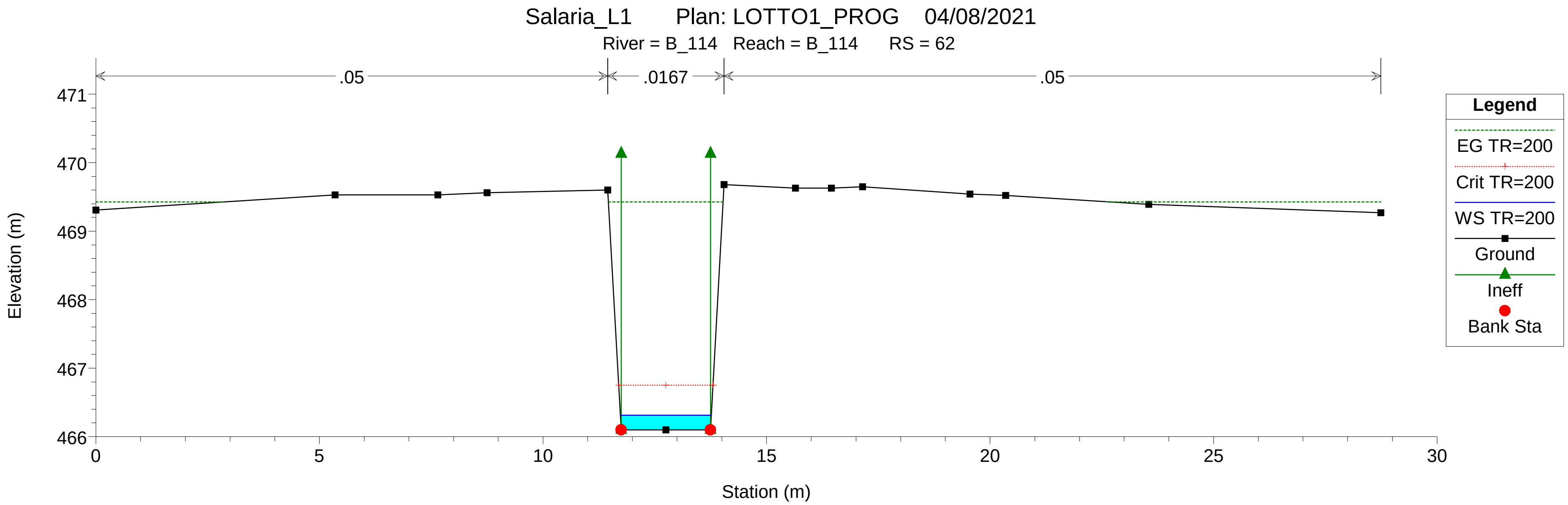

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 158
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

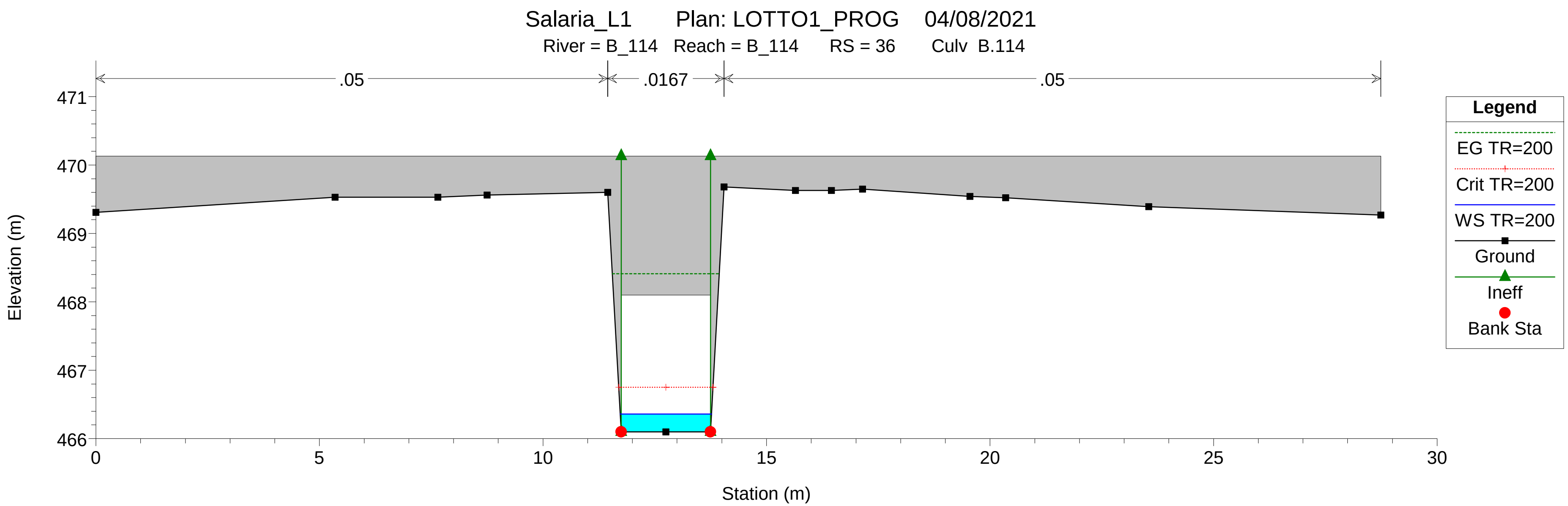

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 133
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

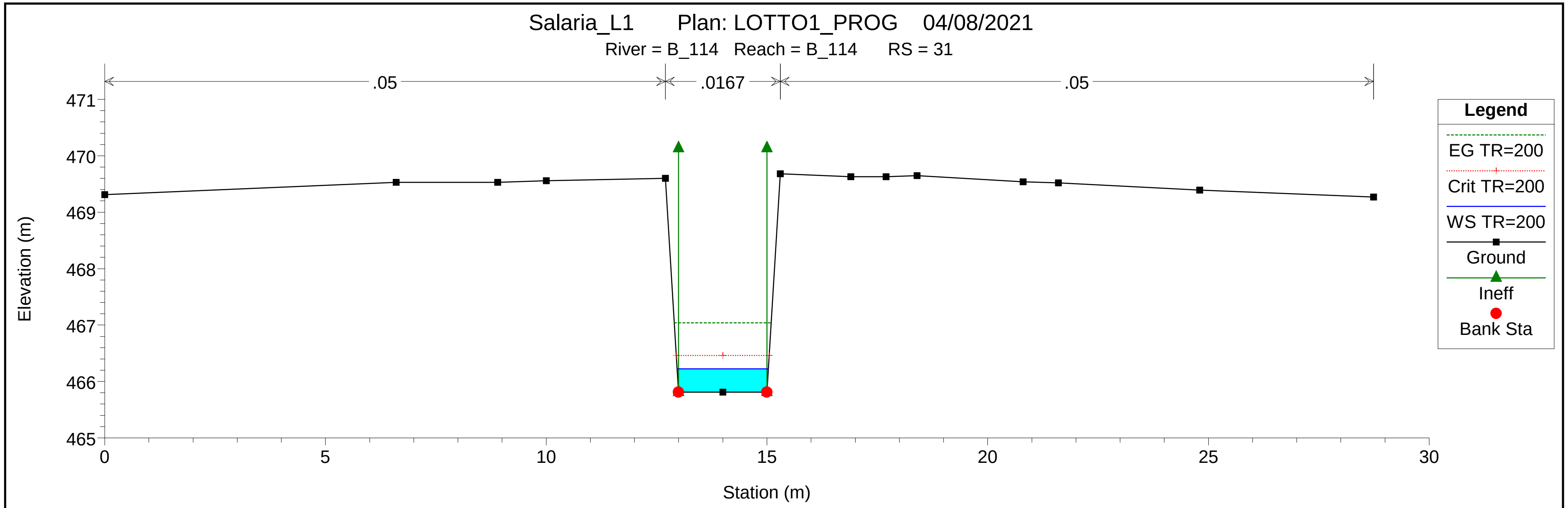

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 113
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

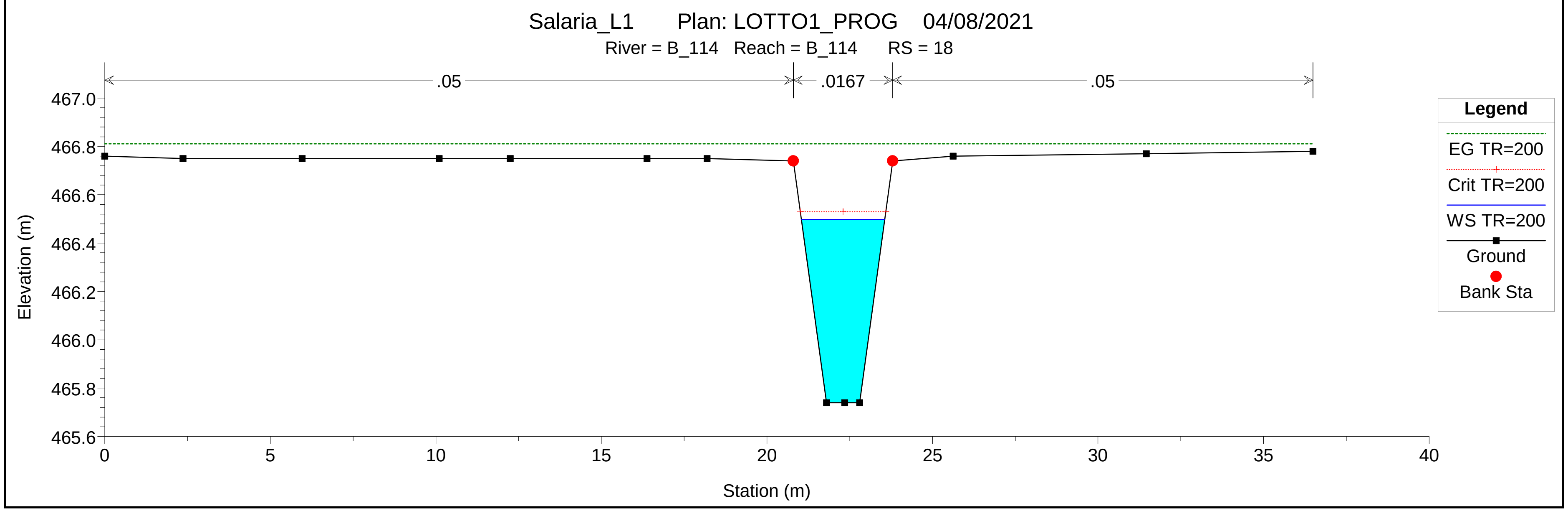

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 83
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

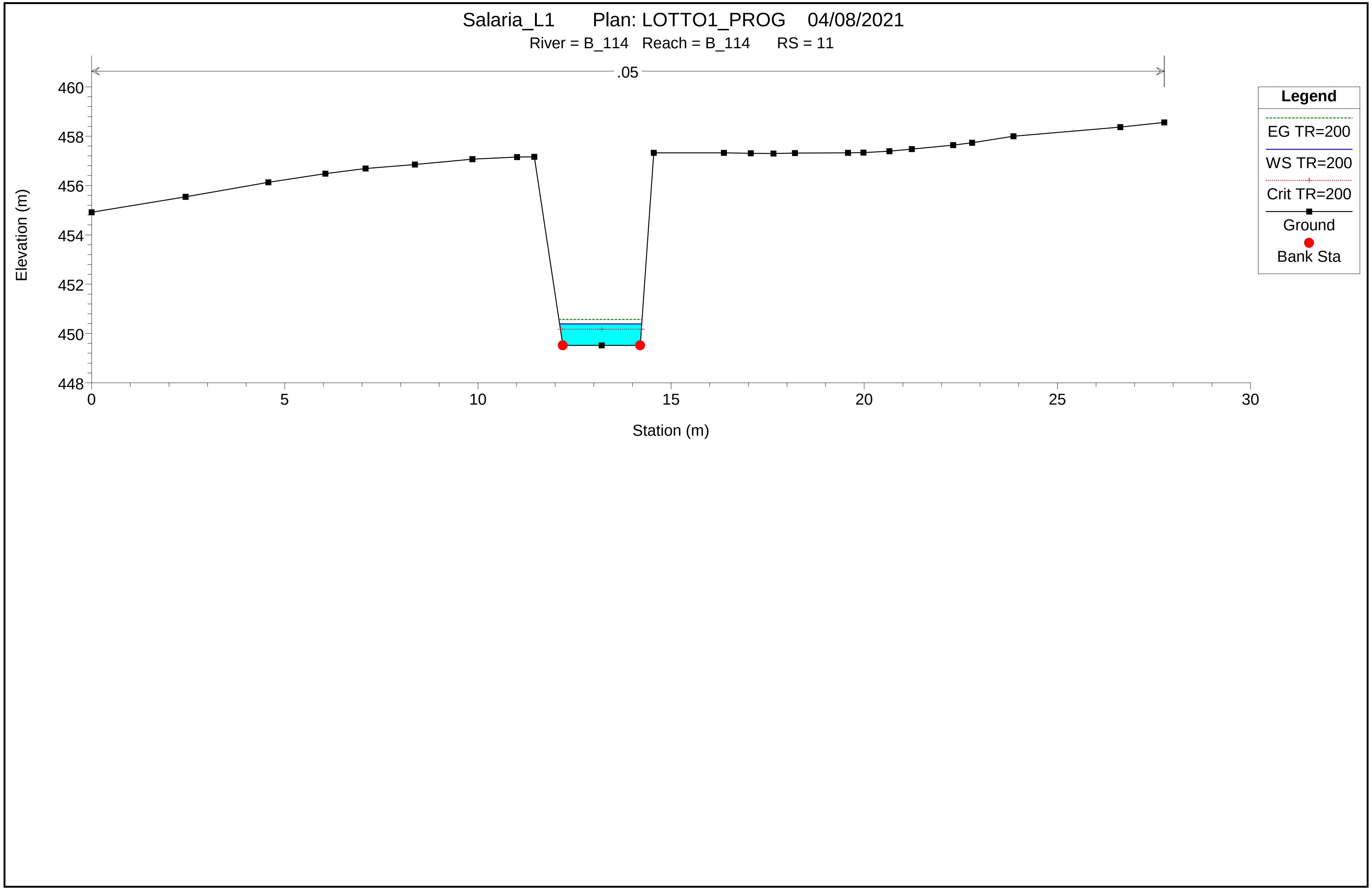

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 70
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 62
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 36 Culv B.114
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

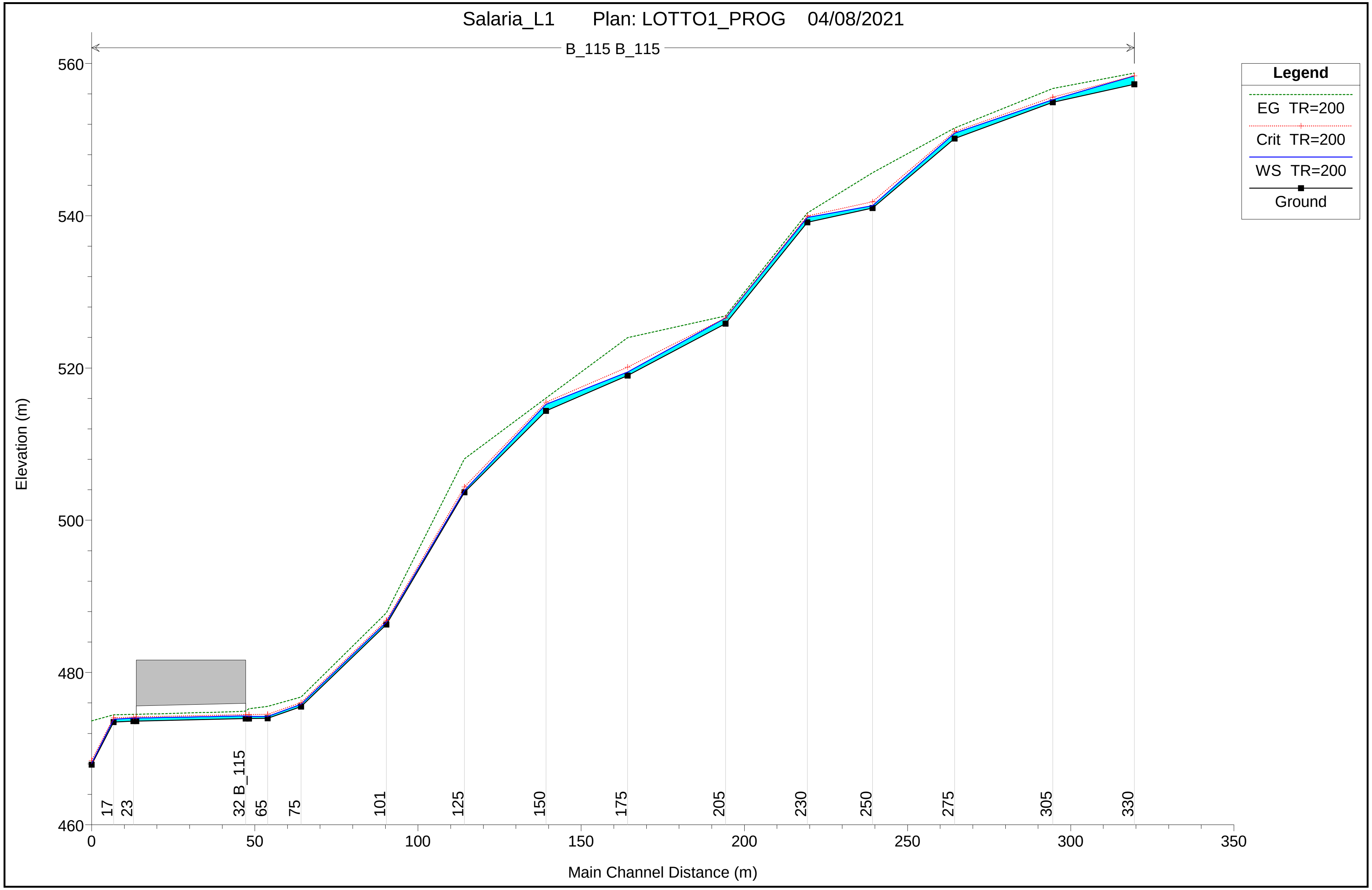

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 31
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 18
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_114 Reach = B_114 RS = 11
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
460
458
456
454
452
450
448
0
5
10
15
20
25
30

2.2.6. PROGETTO

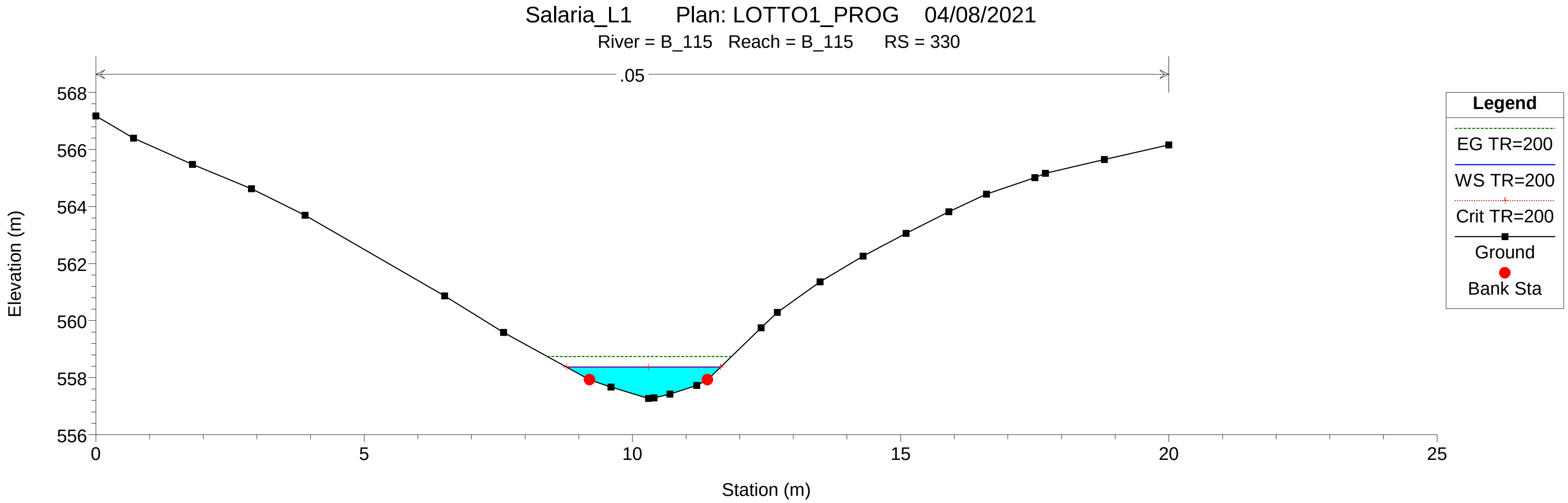
B.115 - Progr.4+625

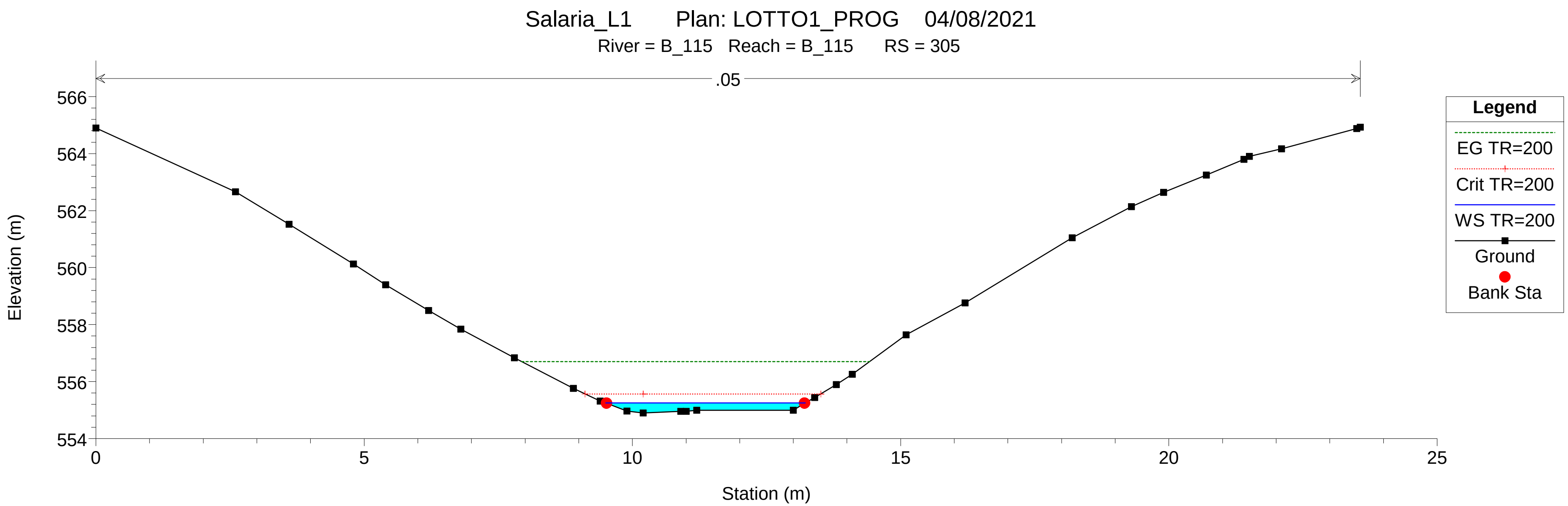


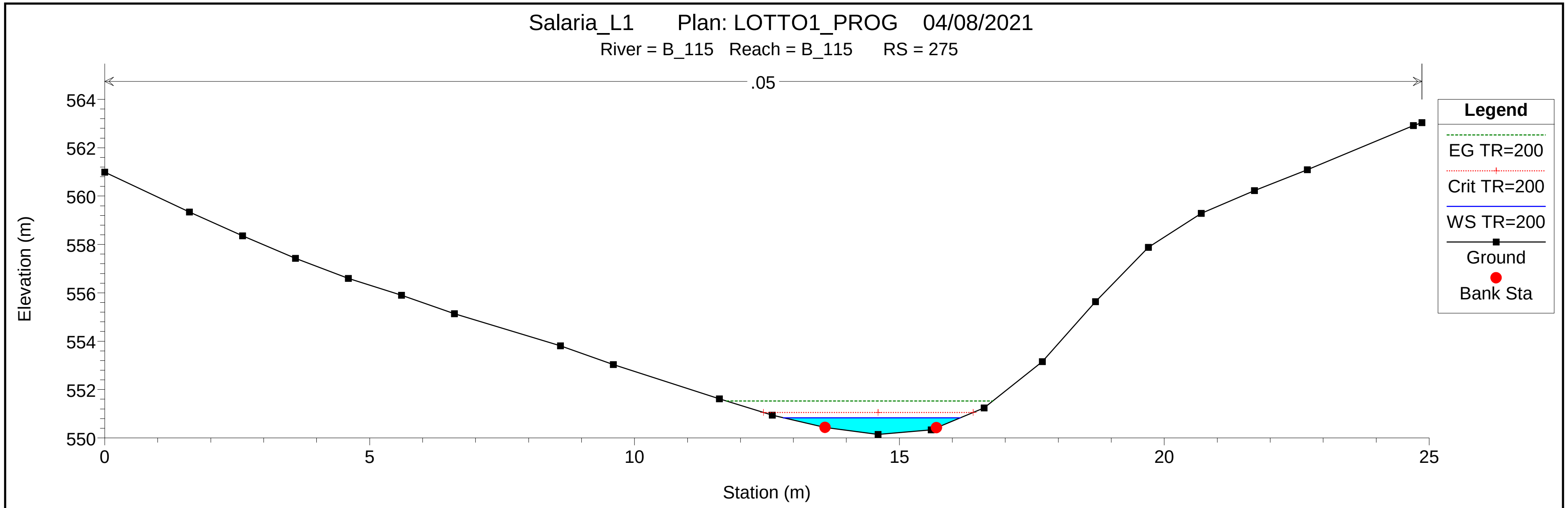
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
B_115 B_115
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
560
540
520
500
480
460
17
23
32 B_115
65
75
101
125
150
175
205
230
250
275
305
330
0
50
100
150
200
250
300
350
Main Channel Distance (m)

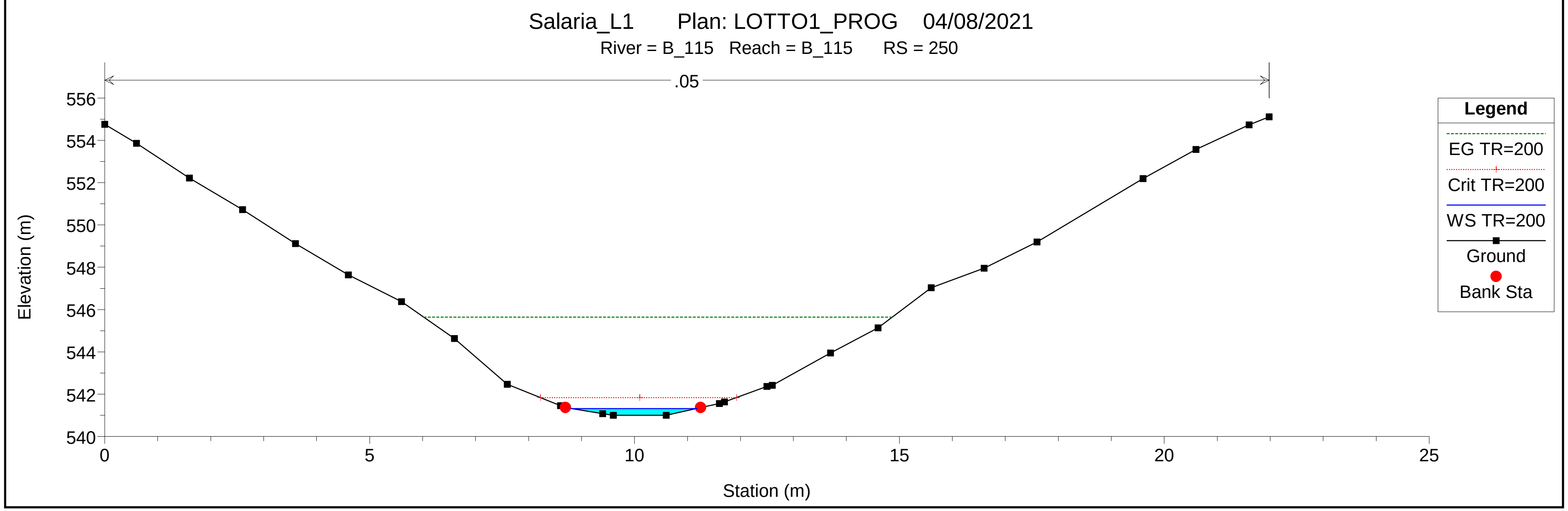
HEC-RAS Plan: L1_PROG River: B_115 Reach: B_115 Profile: TR=200

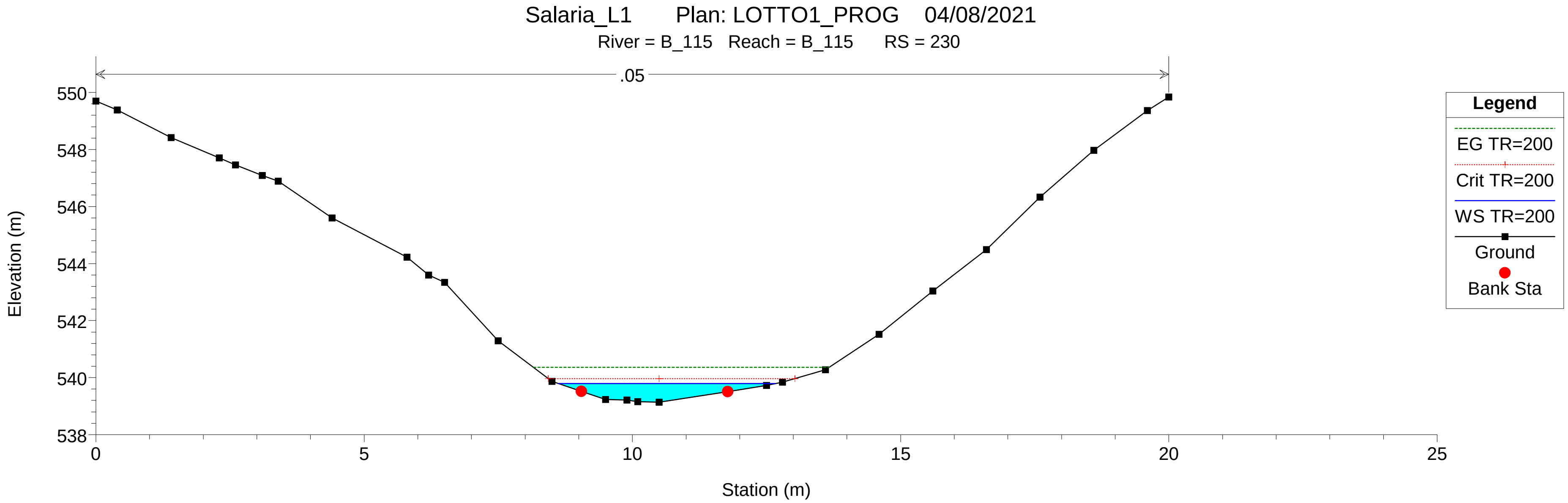
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_115	330	TR=200	5.00	557.27	1.10	558.37	558.37	0.00	0.96	558.74	2.72	2.58	0.69	205.26	0.67
B_115	305	TR=200	5.00	554.90	0.35	555.25	555.57	-0.32	3.38	556.70	5.34	5.34	0.24	1124.39	0.25
B_115	275	TR=200	5.00	550.14	0.69	550.83	551.05	-0.22	1.62	551.53	3.82	3.46	0.54	439.24	0.43
B_115	250	TR=200	5.00	541.00	0.32	541.32	541.83	-0.51	6.15	545.64	9.20	9.20	0.21	3464.81	0.23
B_115	230	TR=200	5.00	539.14	0.65	539.79	539.96	-0.17	1.53	540.36	3.41	3.18	0.48	363.58	0.39
B_115	205	TR=200	5.00	525.83	0.72	526.55	526.55	0.00	0.96	526.83	2.38	2.23	0.61	163.40	0.52
B_115	175	TR=200	5.00	519.01	0.45	519.46	520.12	-0.66	5.09	523.97	9.44	9.27	0.30	3266.36	0.33
B_115	150	TR=200	5.00	514.35	0.88	515.23	515.50	-0.27	1.75	516.06	4.06	3.97	0.45	528.28	0.48
B_115	125	TR=200	5.00	503.66	0.26	503.92	504.37	-0.45	6.61	508.06	9.03	8.97	0.19	3493.40	0.18
B_115	101	TR=200	5.00	486.31	0.29	486.60	486.87	-0.27	3.34	487.86	5.04	4.82	0.23	1013.07	0.20
B_115	75	TR=200	5.00	475.51	0.32	475.83	476.05	-0.22	3.07	476.77	4.30	4.28	0.20	775.70	0.19
B_115	65	TR=200	5.00	473.98	0.25	474.23	474.52	-0.29	3.27	475.54	5.07	5.07	0.22	116.60	0.25
B_115	55	TR=200	5.00	473.94	0.28	474.22	474.48	-0.26	2.68	475.23	4.45	4.45	0.28	82.59	0.28
B_115	32		Culvert												
B_115	23	TR=200	5.00	473.61	0.40	474.01	474.15	-0.14	1.57	474.51	3.11	3.11	0.40	35.86	0.40
B_115	17	TR=200	5.00	473.49	0.37	473.86	474.03	-0.17	1.76	474.44	3.36	3.31	0.37	42.91	0.37
B_115	10	TR=200	5.00	467.90	0.19	468.09	468.44	-0.35	10.19	473.65	10.44	10.44	0.11	5636.89	0.11

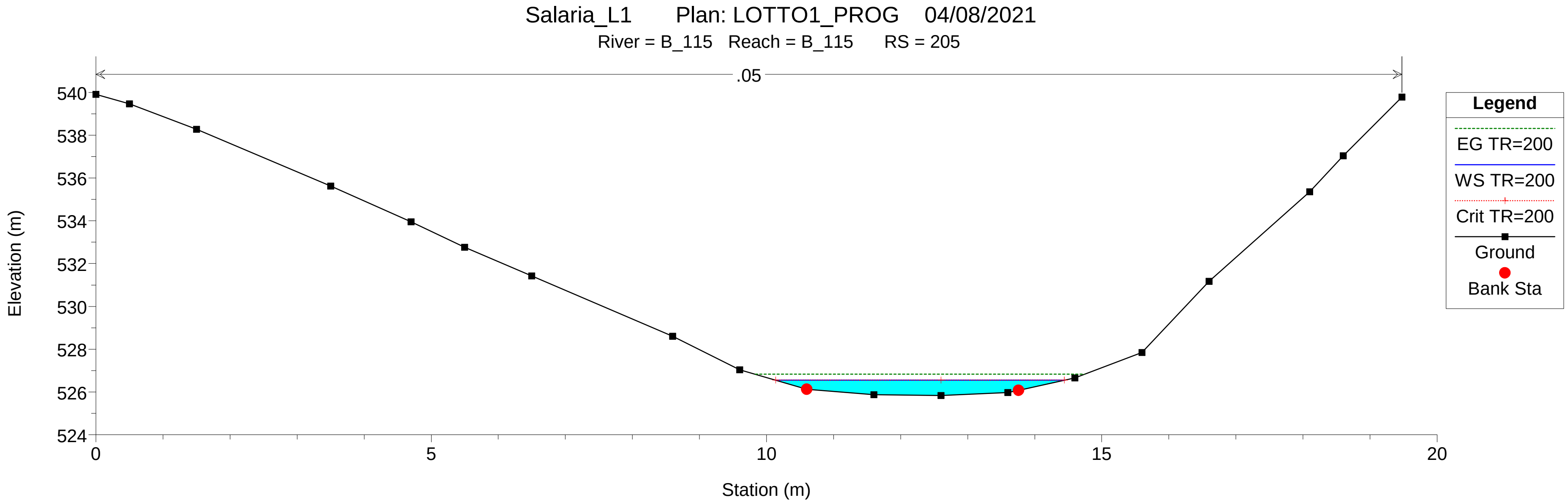

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 330
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

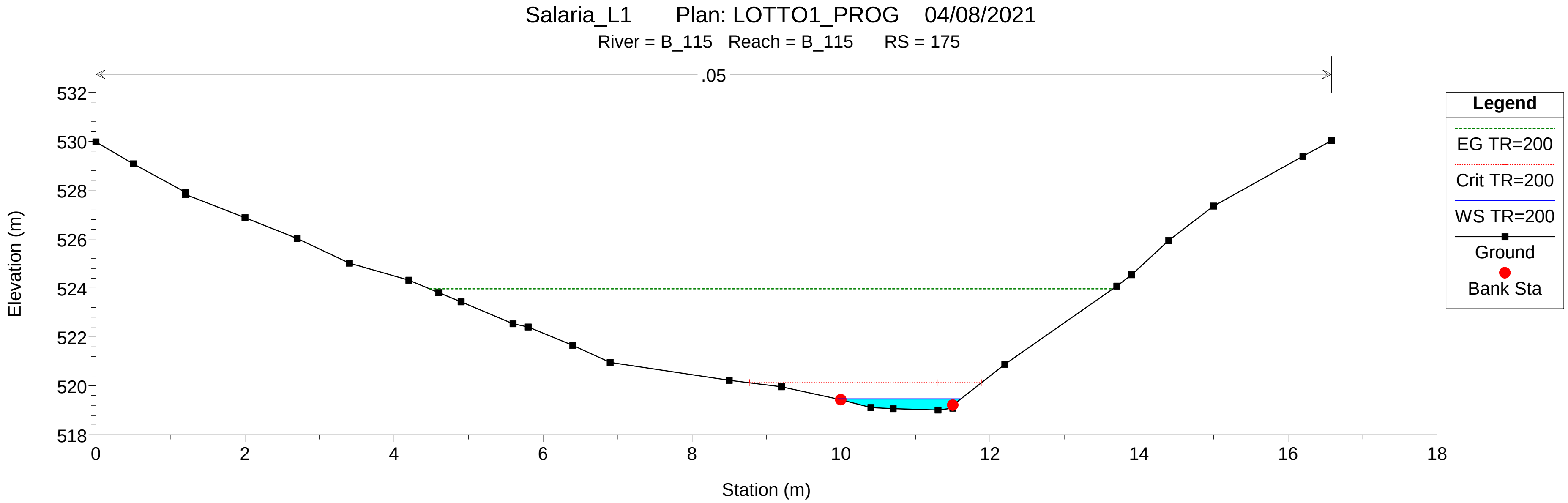

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 305
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

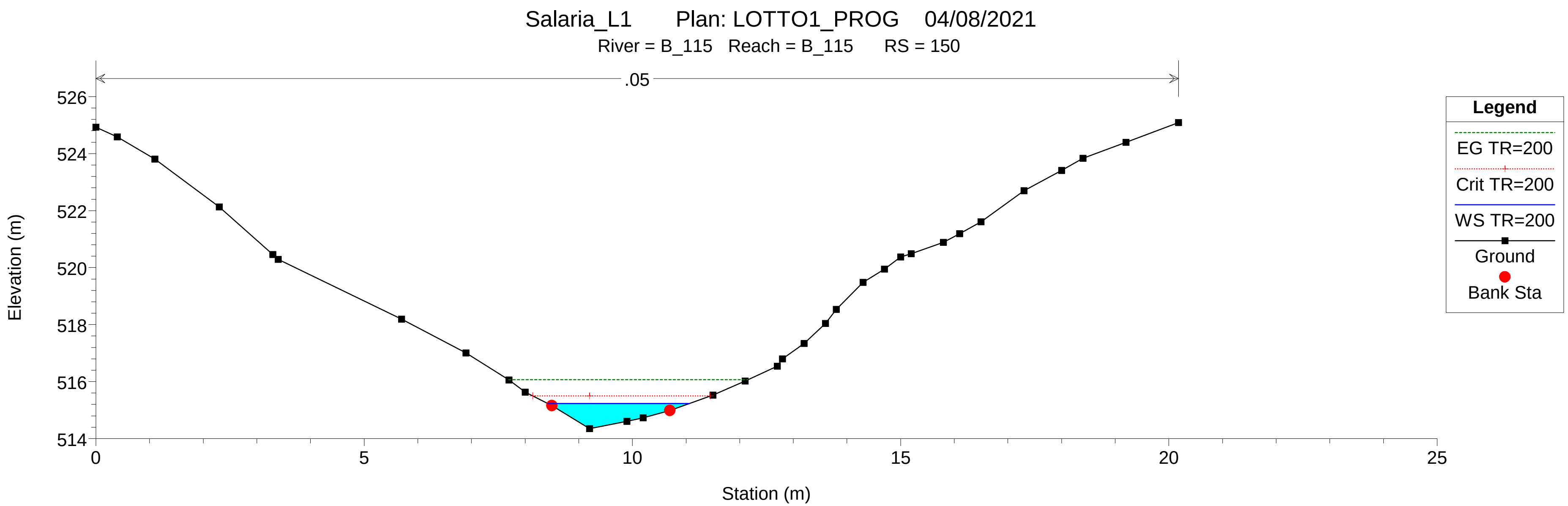

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 275
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

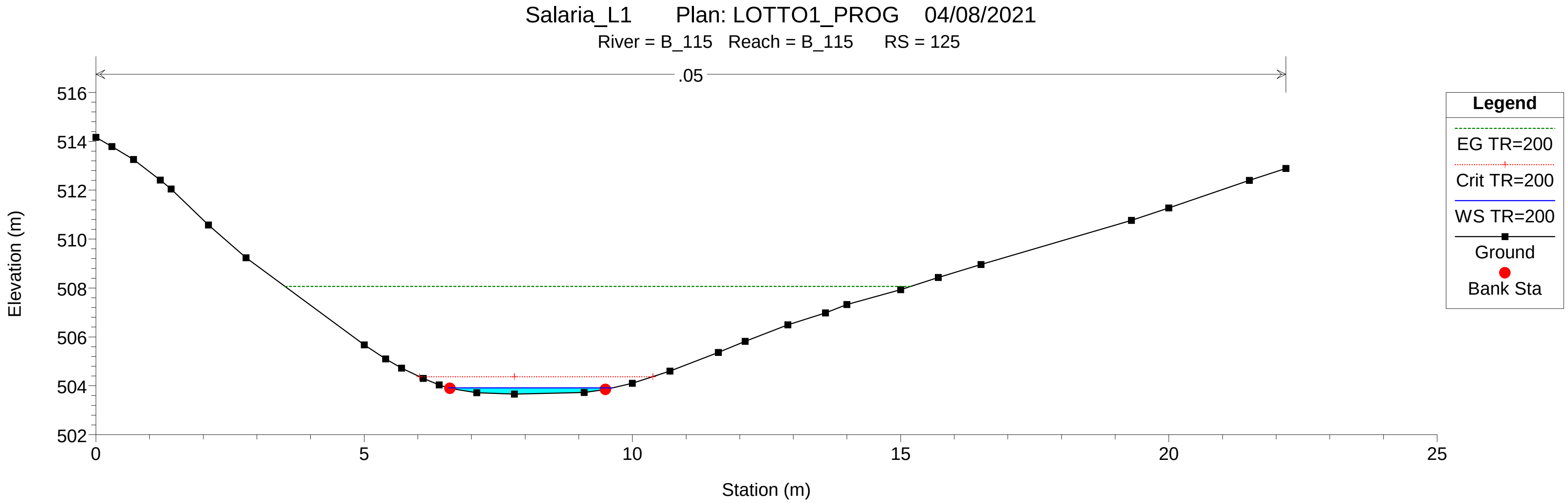

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 250
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

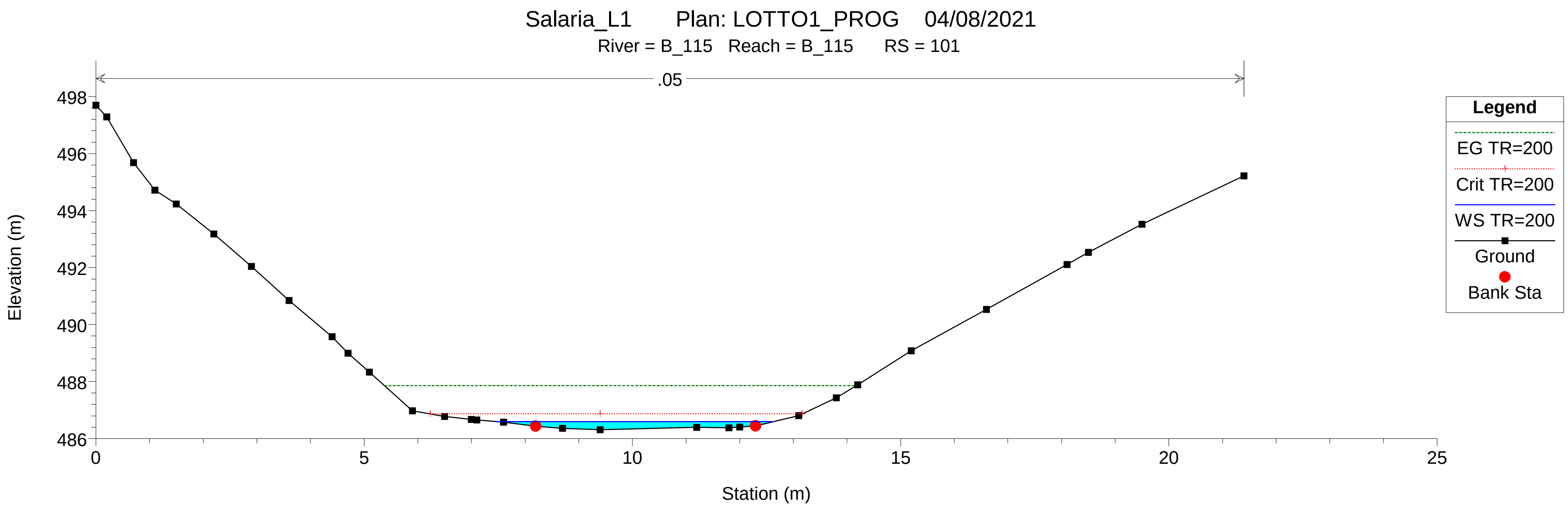

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 230
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

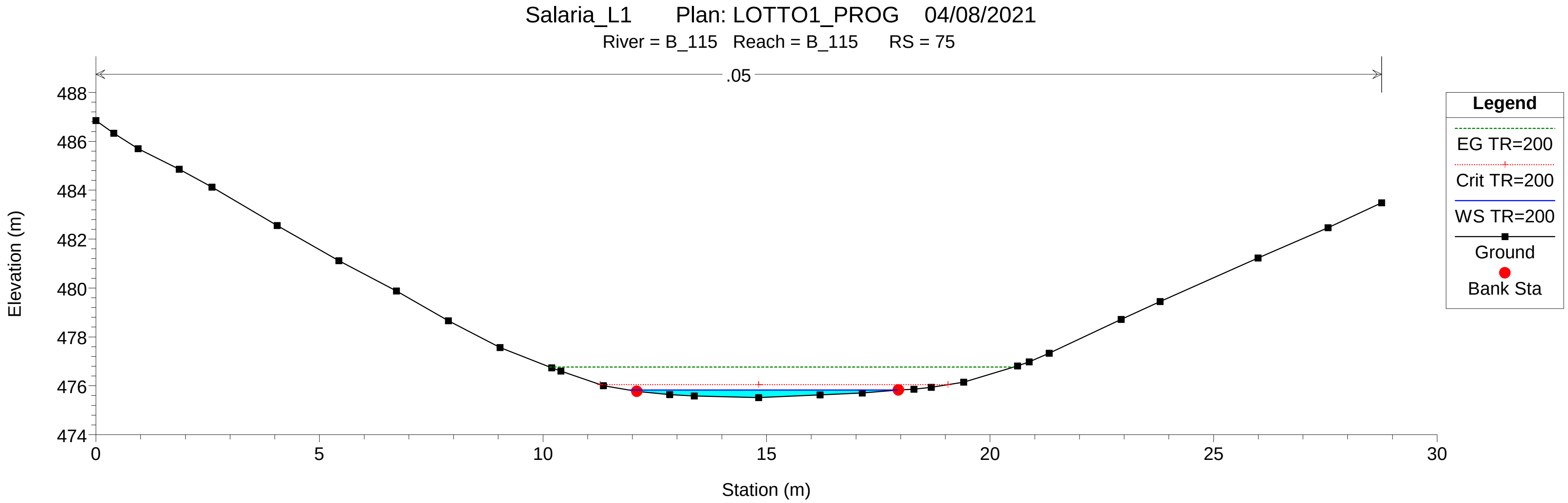

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 205
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 175
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

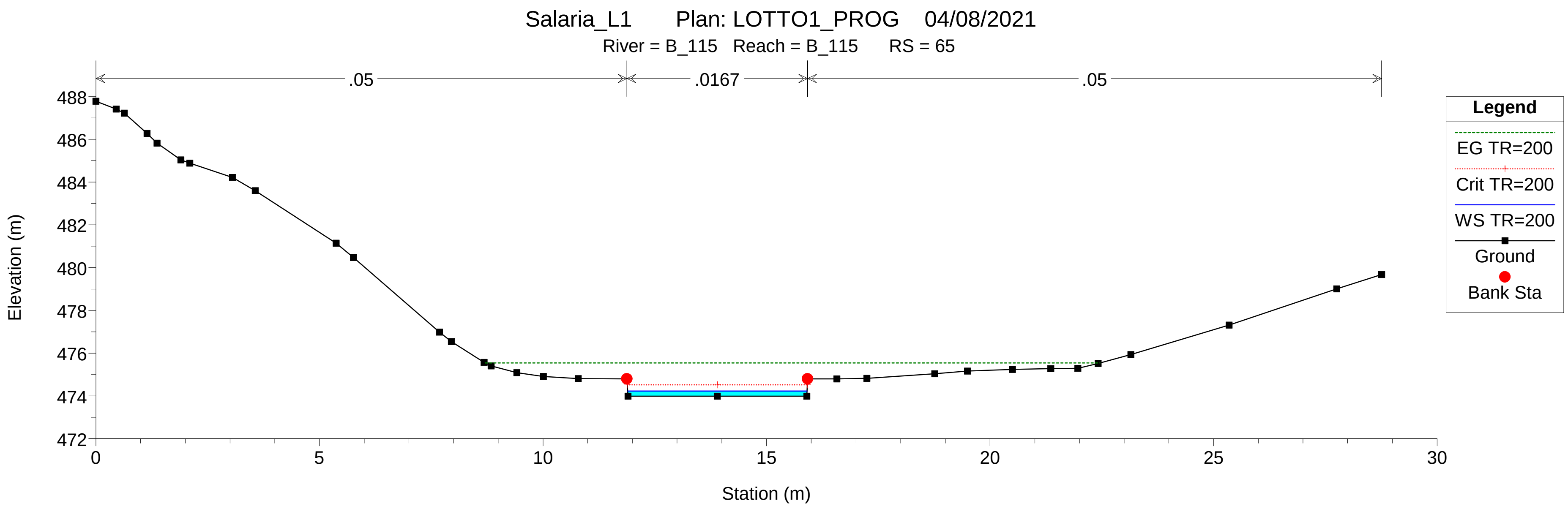

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 150
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 125
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

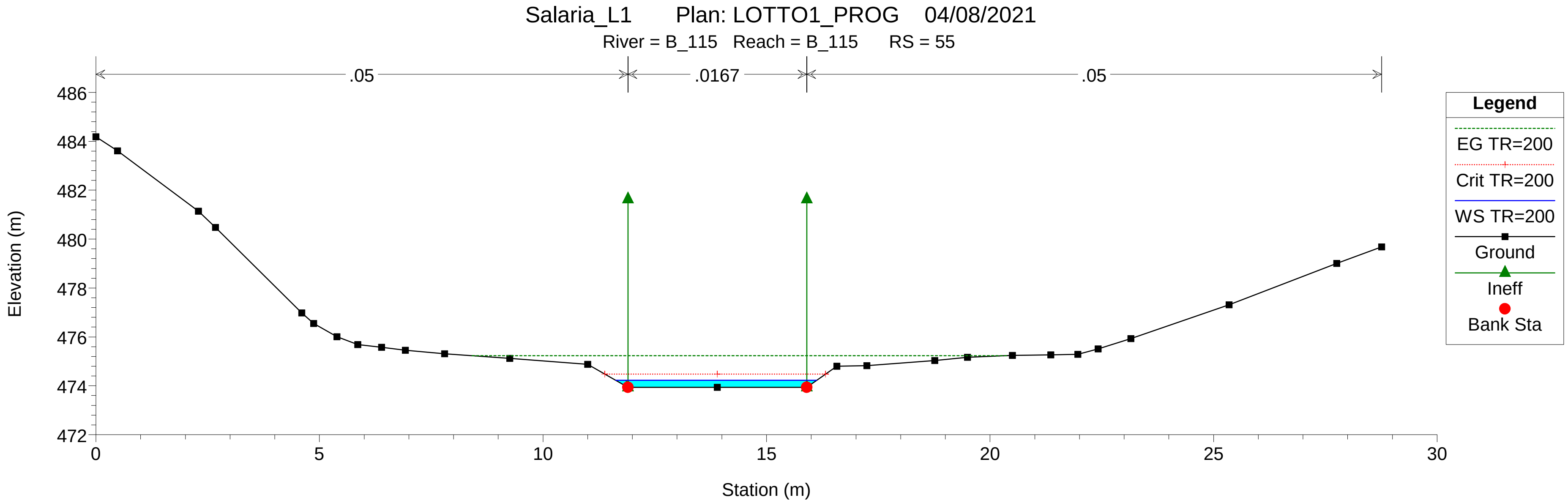

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 101
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

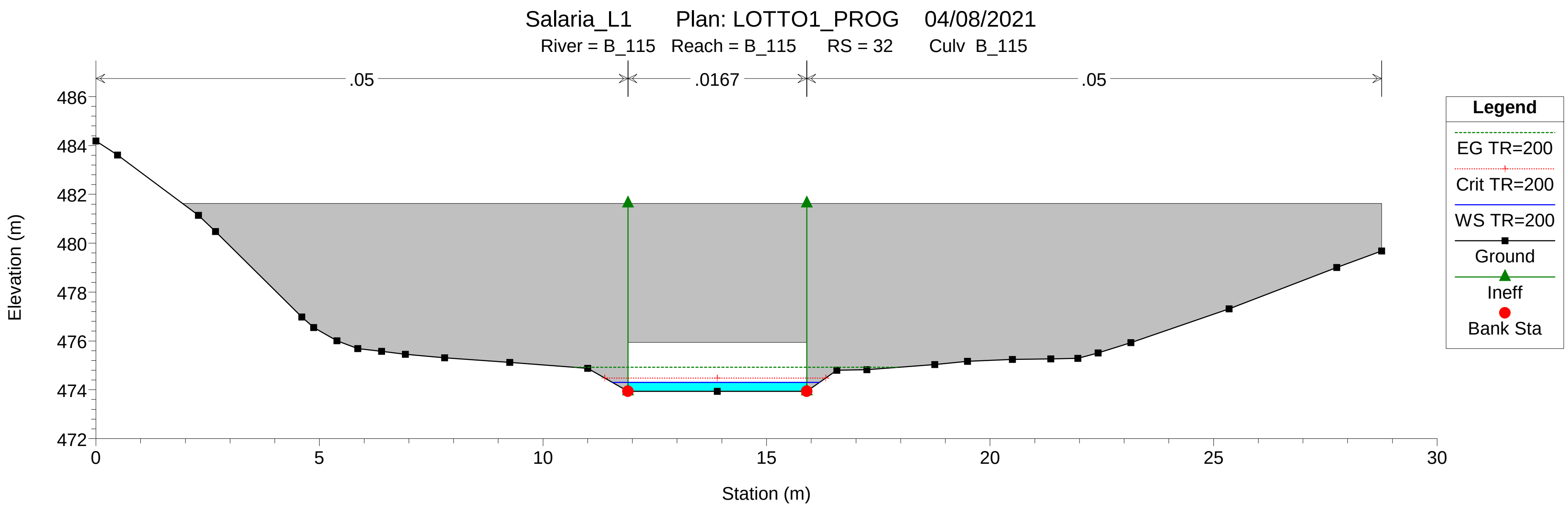


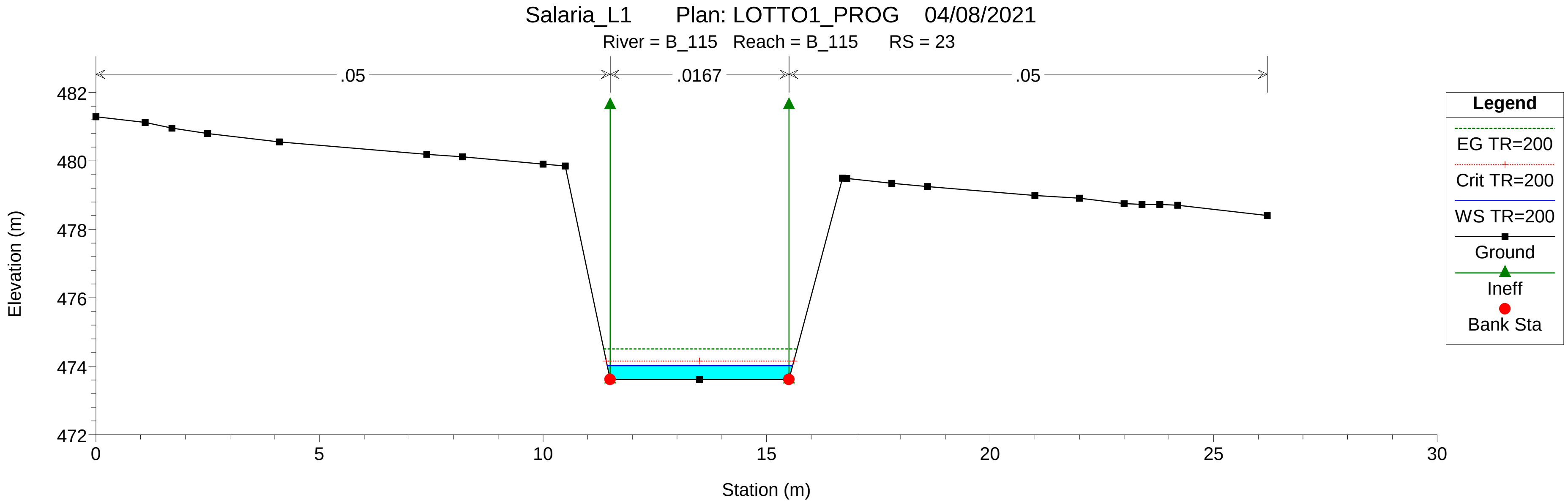
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 75
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

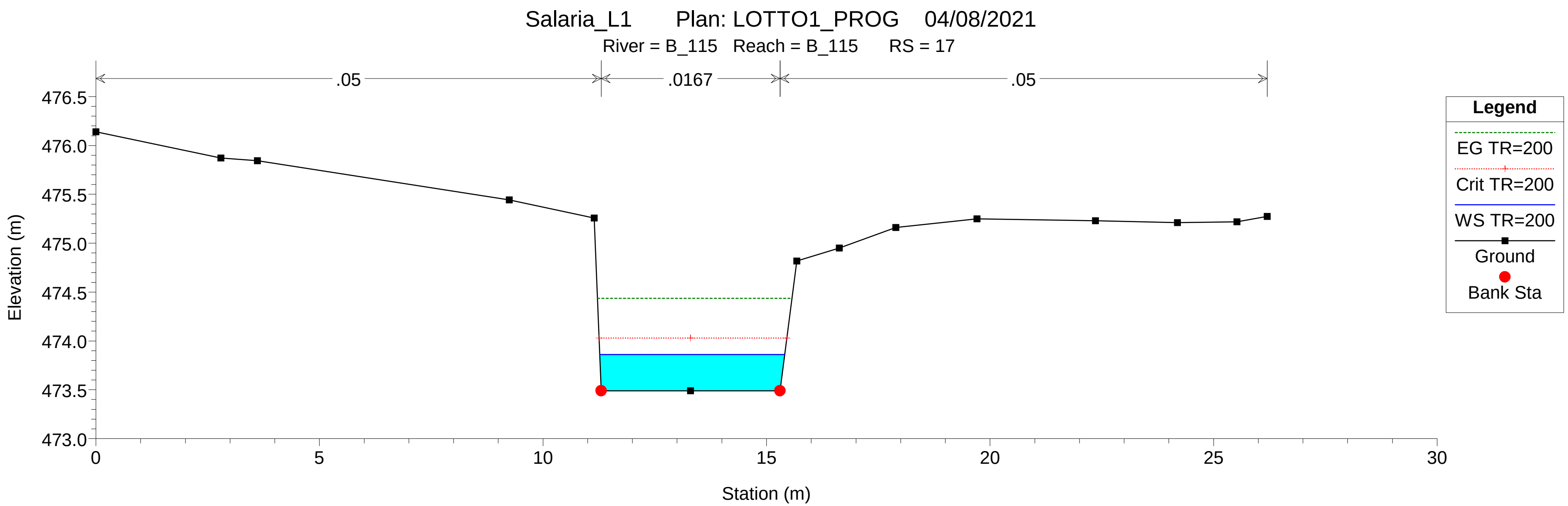


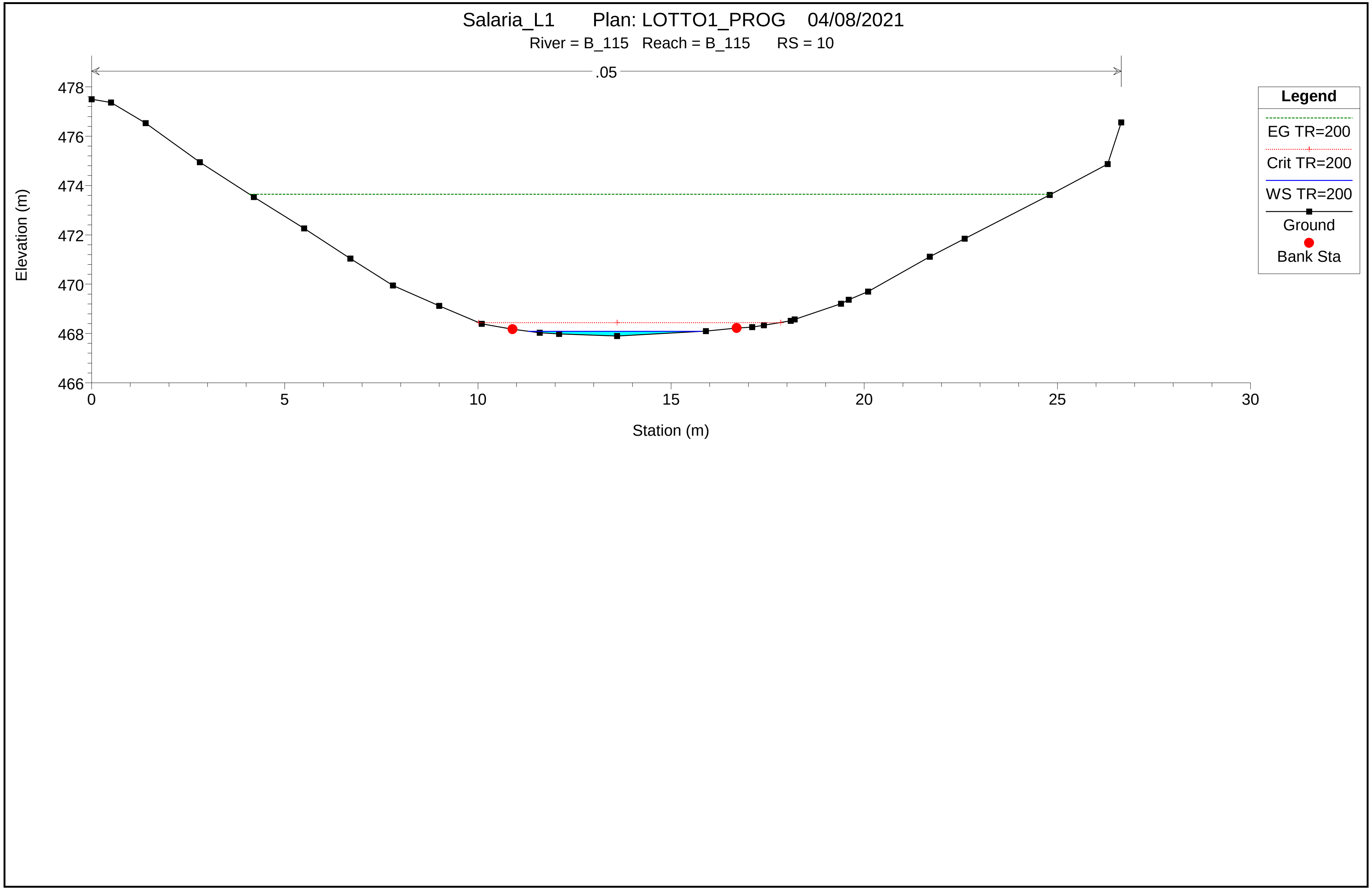
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 65
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 55
.05
.0167
.05
Elevation (m)
486
484
482
480
478
476
474
472
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 32 Culv B_115
.05
.0167
.05
Elevation (m)
486
484
482
480
478
476
474
472
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

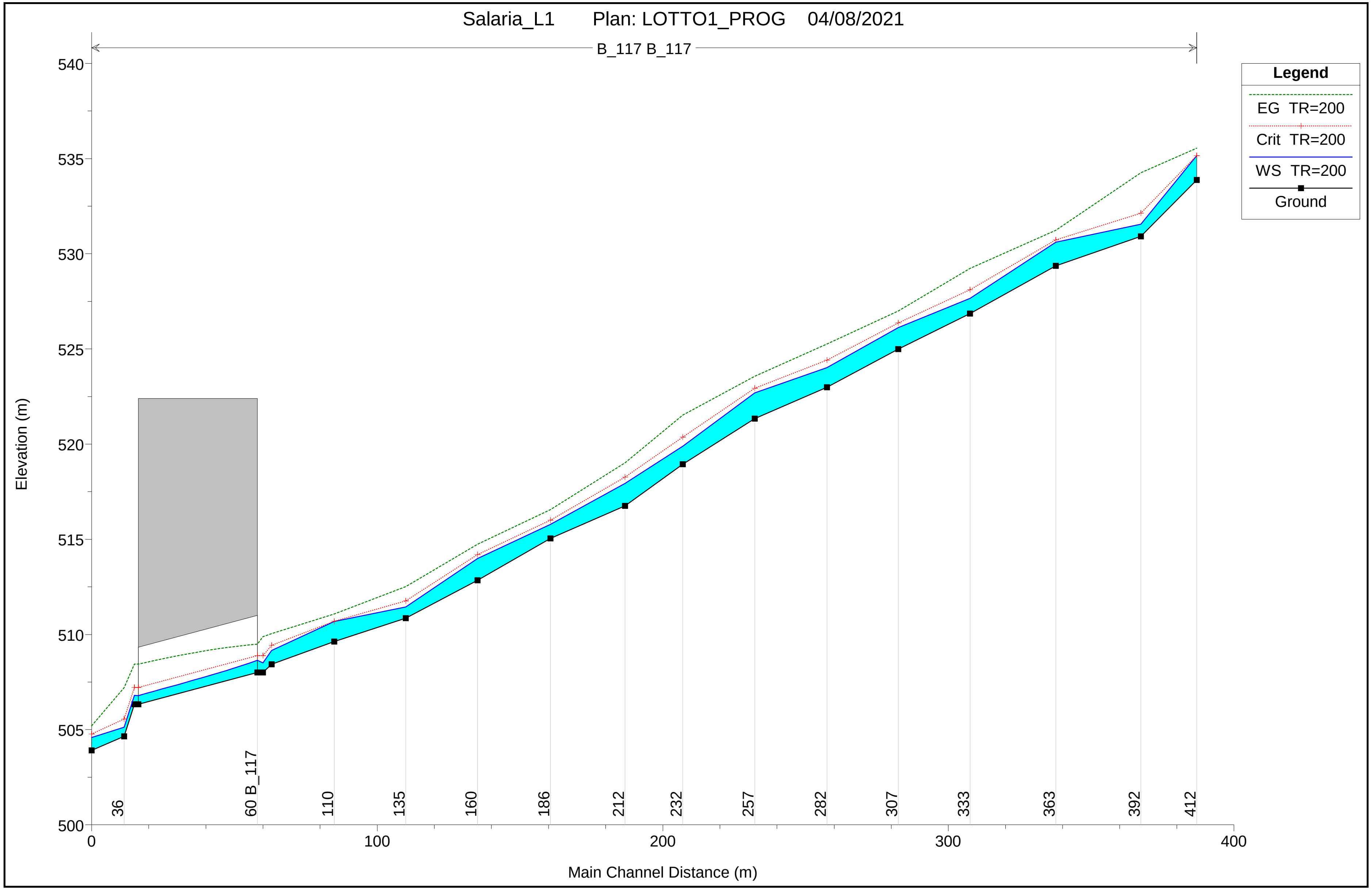

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 23
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 17
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_115 Reach = B_115 RS = 10
.05
Elevation (m)
478
476
474
472
470
468
466
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

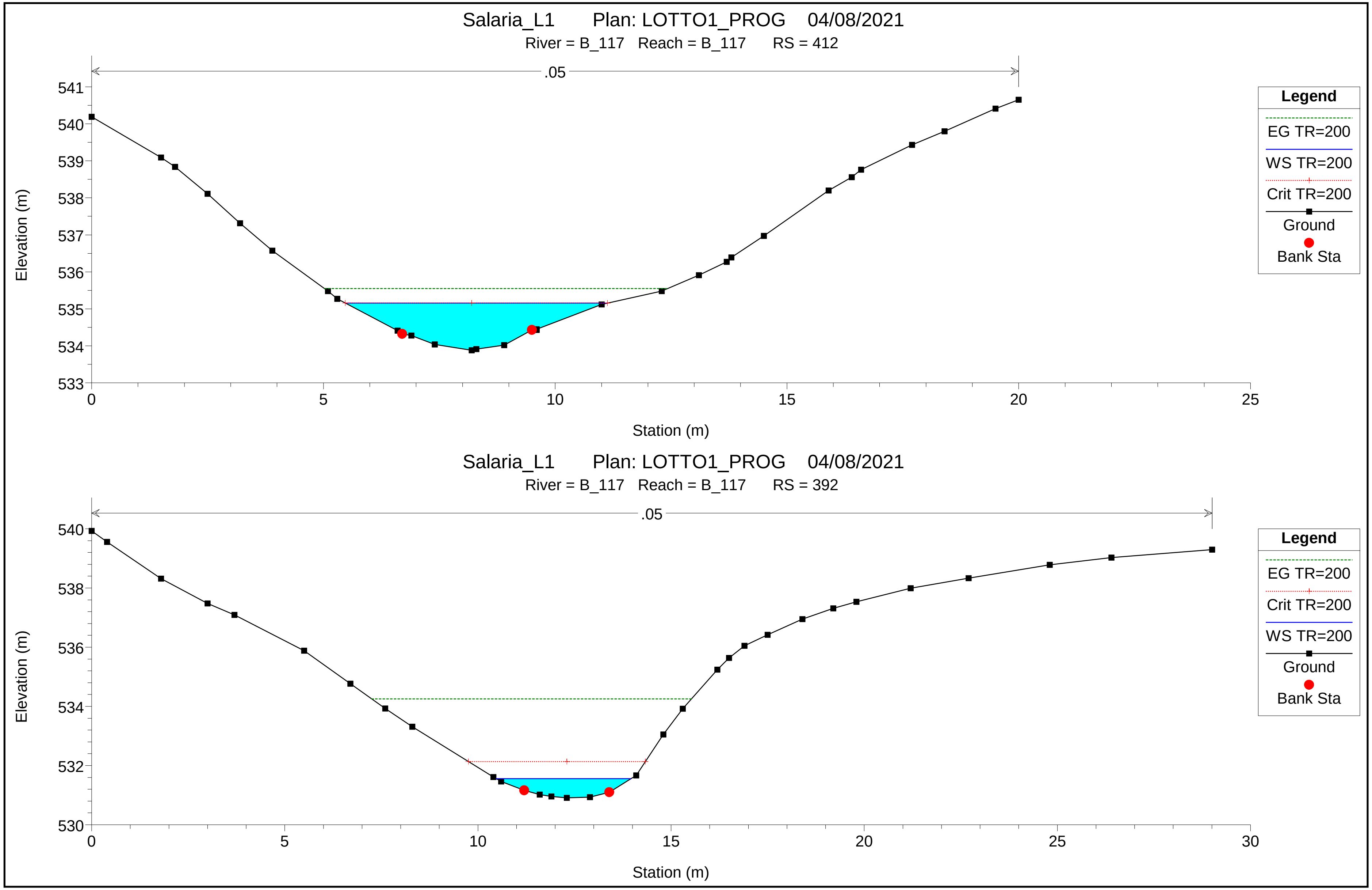
2.2.7. PROGETTO
B.117 - Progr.5+525

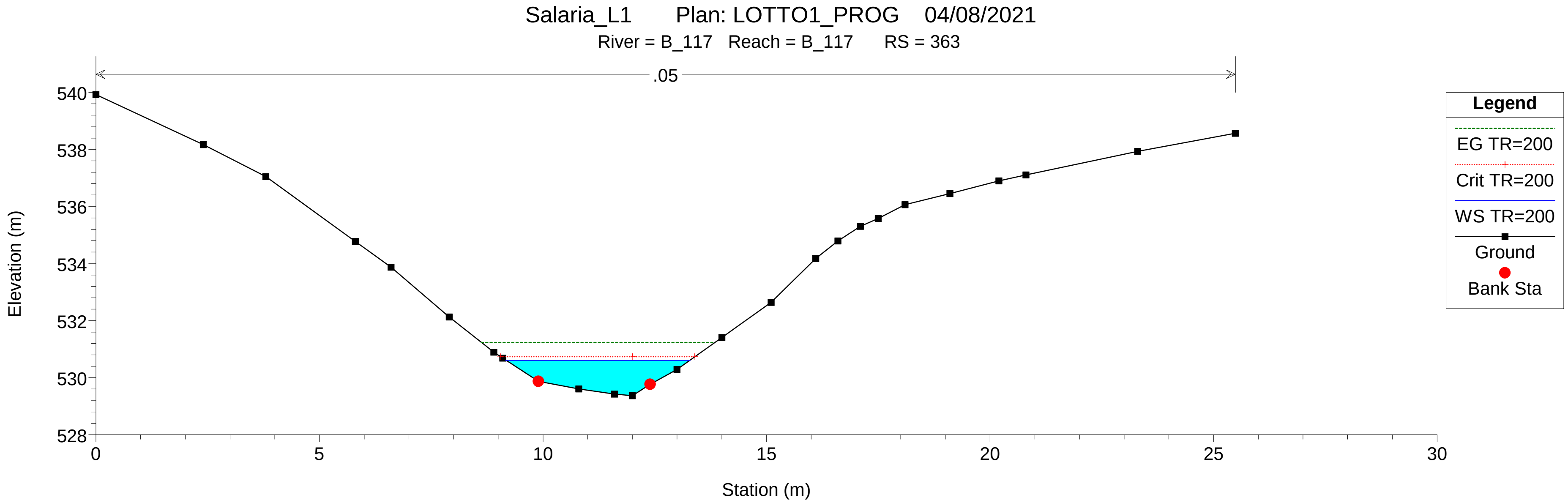


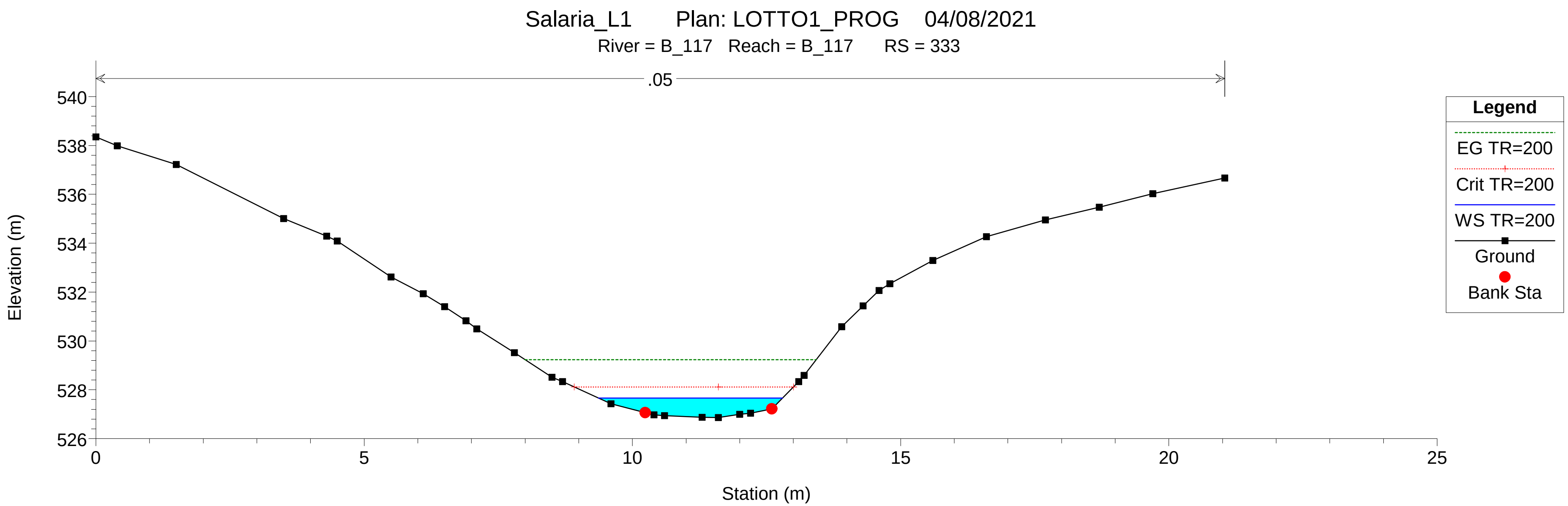
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
B_117 B_117
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
Main Channel Distance (m)
540
535
530
525
520
515
510
505
500
0
100
200
300
400
36
60 B_117
110
135
160
186
212
232
257
282
307
333
363
392
412

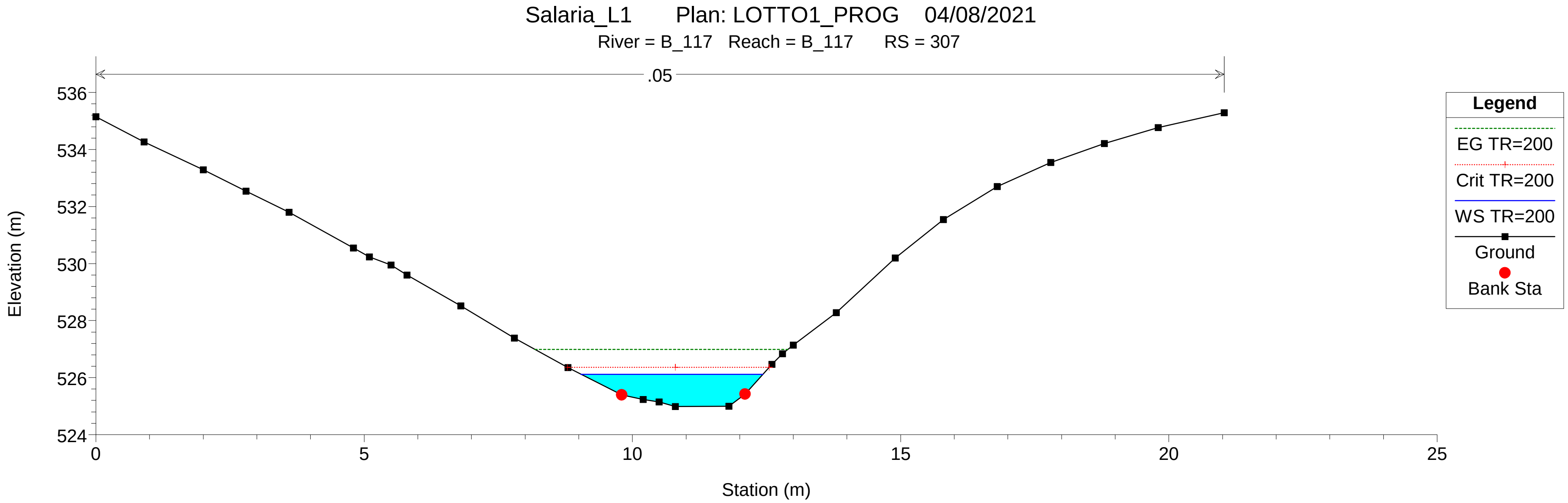
HEC-RAS Plan: L1_PROG River: B_117 Reach: B_117 Profile: TR=200

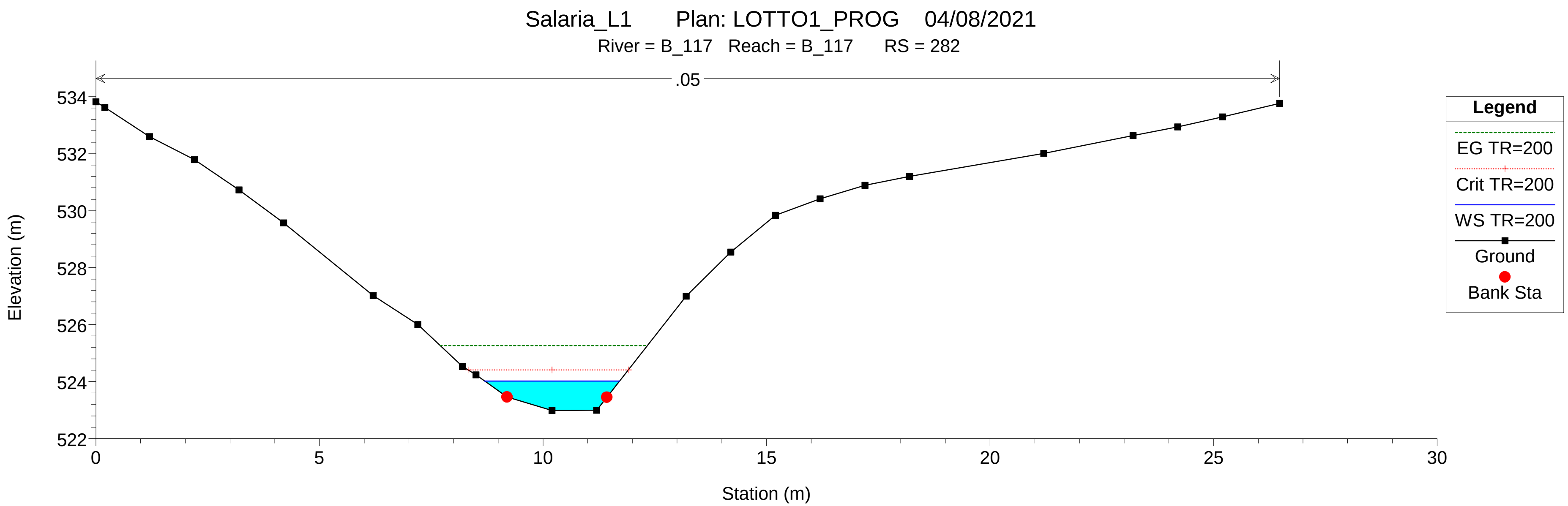
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_117	412	TR=200	10.50	533.88	1.28	535.16	535.16	0.00	0.91	535.55	2.96	2.55	1.00	214.31	0.73
B_117	392	TR=200	10.50	530.91	0.65	531.56	532.13	-0.57	3.20	534.26	7.56	6.84	0.56	1706.15	0.44
B_117	363	TR=200	10.50	529.37	1.24	530.61	530.74	-0.13	1.15	531.23	3.65	3.24	0.94	332.65	0.79
B_117	333	TR=200	10.50	526.86	0.80	527.66	528.12	-0.46	2.19	529.23	5.75	5.27	0.67	924.17	0.58
B_117	307	TR=200	10.50	524.99	1.13	526.12	526.36	-0.24	1.35	526.99	4.25	3.88	0.89	460.00	0.80
B_117	282	TR=200	10.50	522.99	1.03	524.02	524.41	-0.39	1.69	525.27	5.02	4.70	0.77	674.67	0.74
B_117	257	TR=200	10.50	521.34	1.35	522.69	522.93	-0.24	1.30	523.57	4.46	3.74	1.05	479.45	0.86
B_117	232	TR=200	10.50	518.94	0.95	519.89	520.37	-0.48	2.15	521.53	5.70	5.56	0.62	934.50	0.64
B_117	212	TR=200	10.50	516.75	1.19	517.94	518.26	-0.32	1.57	519.01	4.61	4.54	0.67	595.42	0.78
B_117	186	TR=200	10.50	515.04	0.74	515.78	516.01	-0.23	1.67	516.56	3.91	3.89	0.52	464.30	0.54
B_117	160	TR=200	10.50	512.84	1.15	513.99	514.19	-0.20	1.33	514.74	3.84	3.75	0.73	403.21	0.73
B_117	135	TR=200	10.50	510.85	0.60	511.45	511.76	-0.31	2.12	512.51	4.57	4.56	0.45	668.87	0.47
B_117	110	TR=200	10.50	509.63	1.05	510.68	510.69	-0.01	0.99	511.08	2.86	2.65	0.84	212.03	0.71
B_117	88	TR=200	10.50	508.43	0.72	509.15	509.43	-0.28	1.76	510.04	4.21	4.05	0.56	526.08	0.49
B_117	85	TR=200	10.50	508.00	0.51	508.51	508.89	-0.38	2.33	509.88	5.19	5.19	0.51	92.59	0.51
B_117	60		Culvert												
B_117	40	TR=200	10.50	506.33	0.46	506.79	507.22	-0.43	2.67	508.44	5.68	5.68	0.46	1024.43	0.46
B_117	36	TR=200	10.50	504.65	0.50	505.13	505.55	-0.42	3.66	507.20	6.11	6.35	0.28	1401.36	0.30
B_117	25	TR=200	10.50	503.91	0.68	504.59	504.76	-0.17	1.46	505.20	3.51	3.36	0.58	362.26	0.51

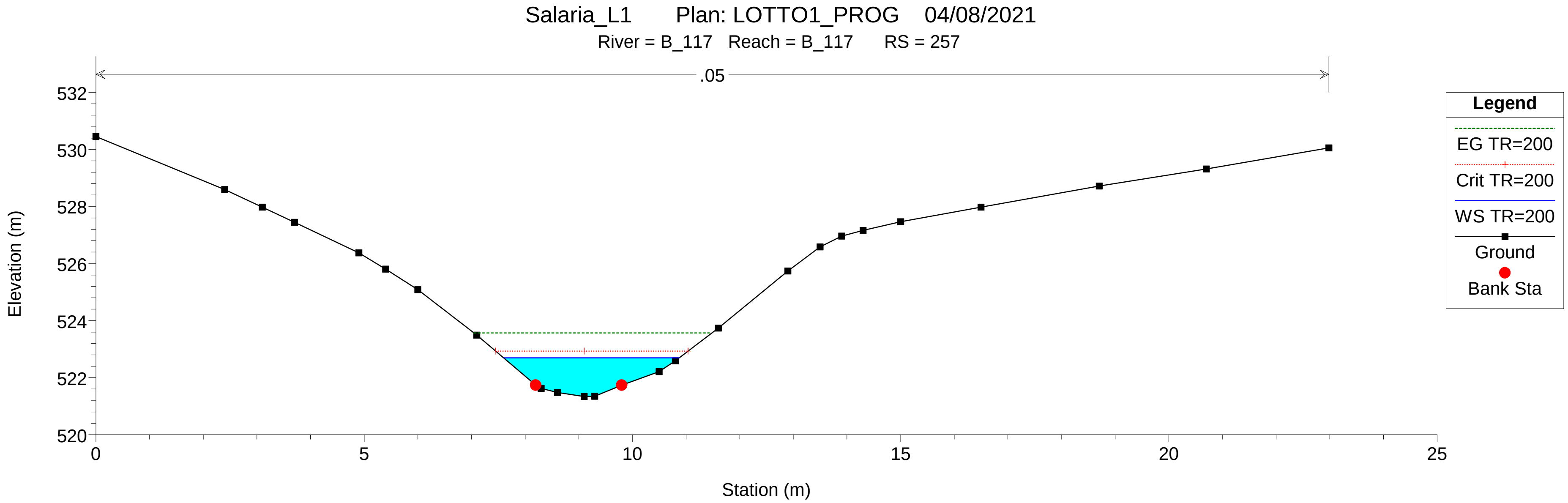

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 412
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 392
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

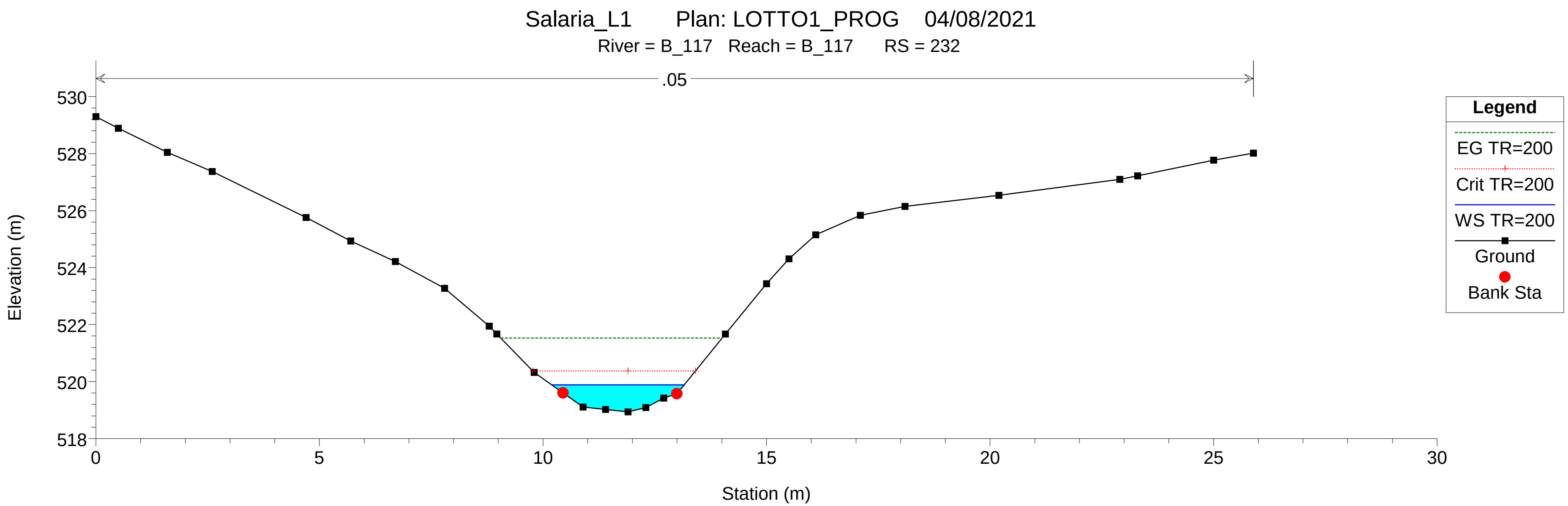

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 363
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

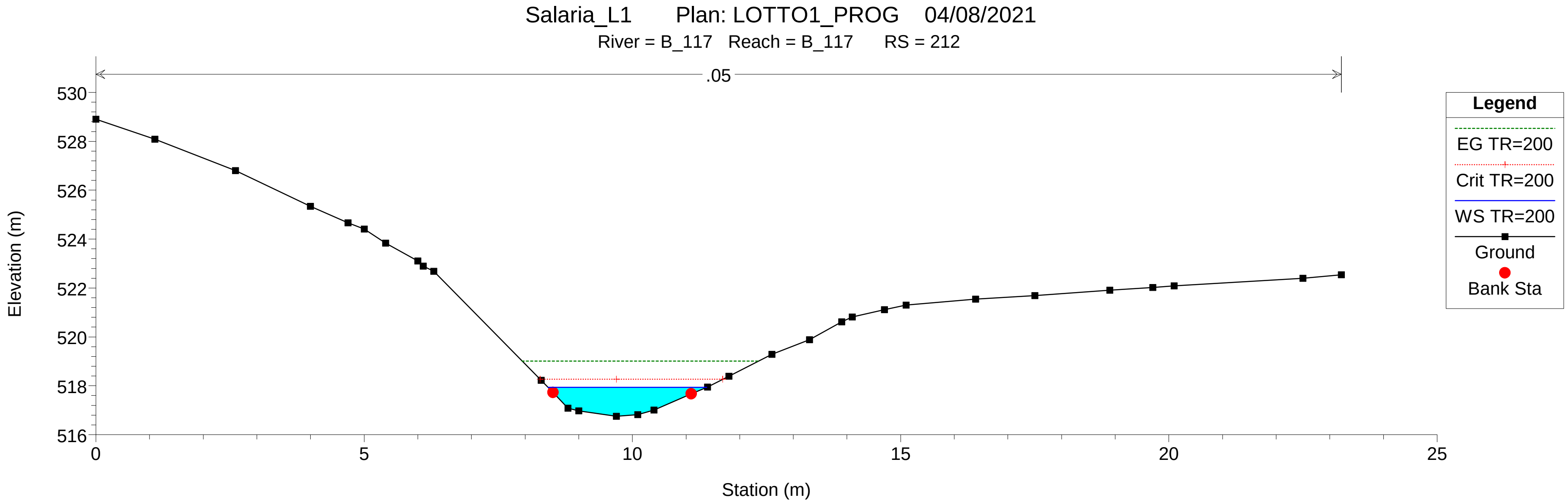

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 333
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 307
.05
Elevation (m)
536
534
532
530
528
526
524
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

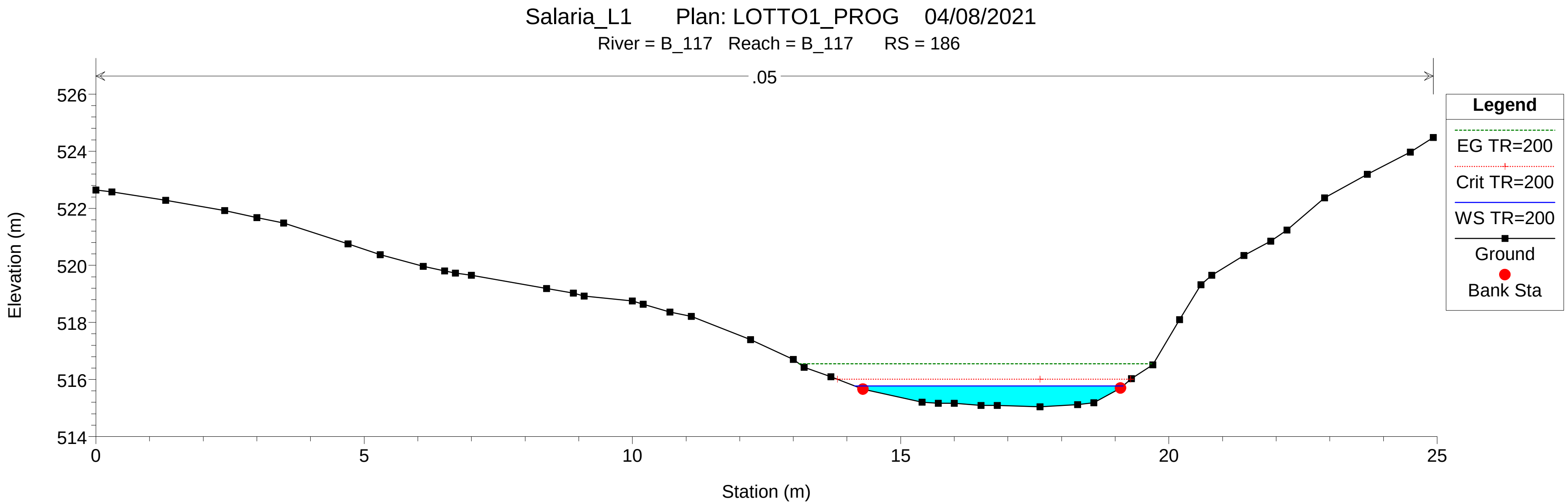

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 282
.05
Elevation (m)
534
532
530
528
526
524
522
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 257
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

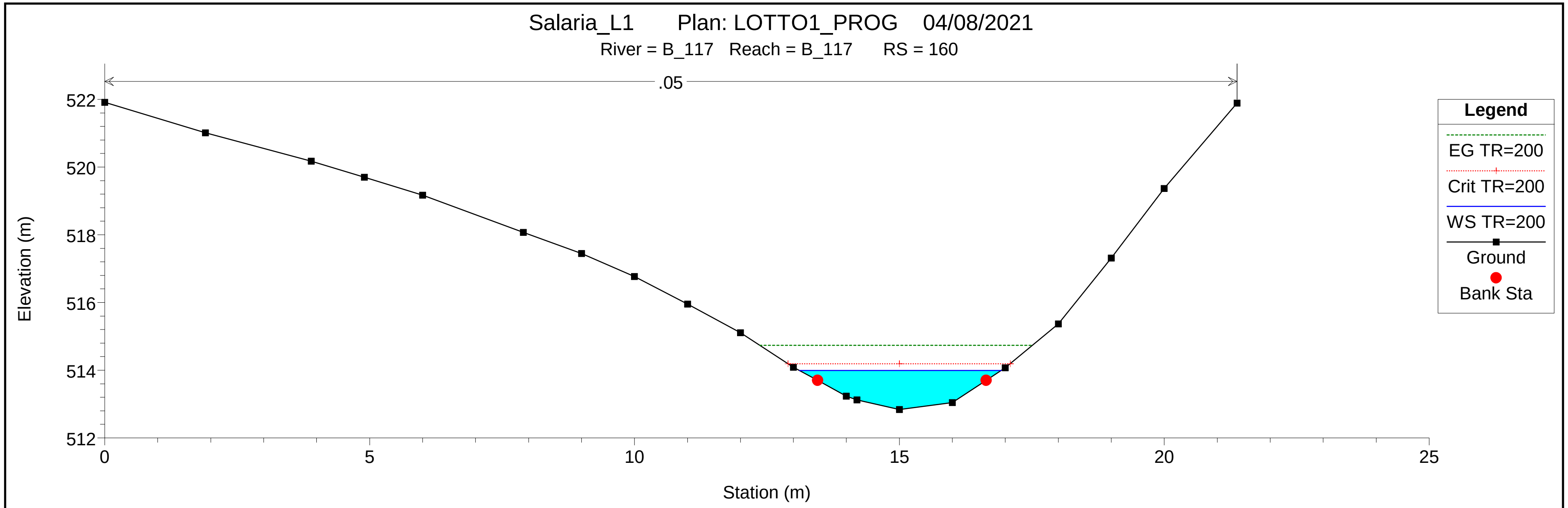

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 232
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

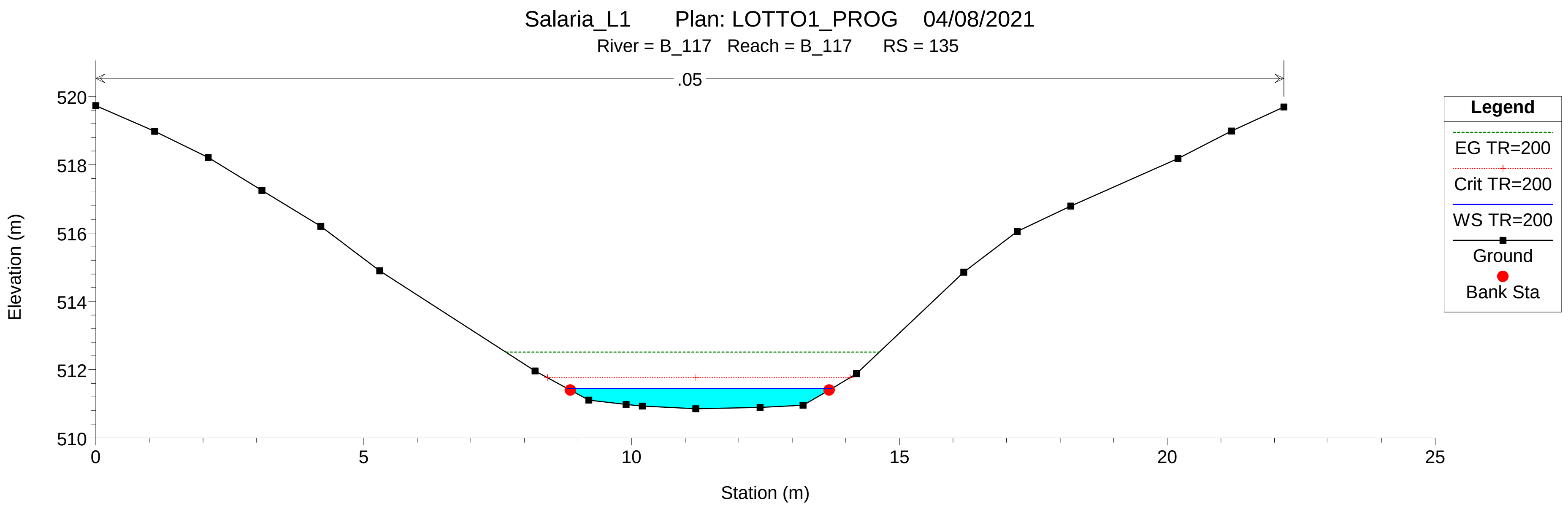


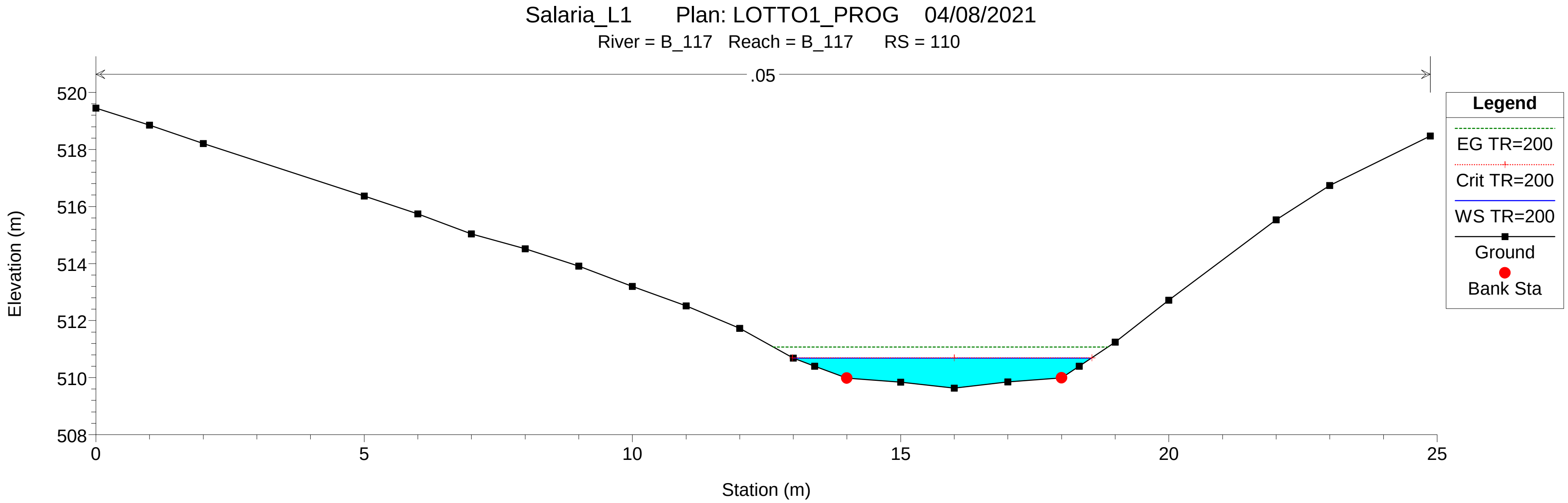
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 212
.05
Elevation (m)
530
528
526
524
522
520
518
516
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

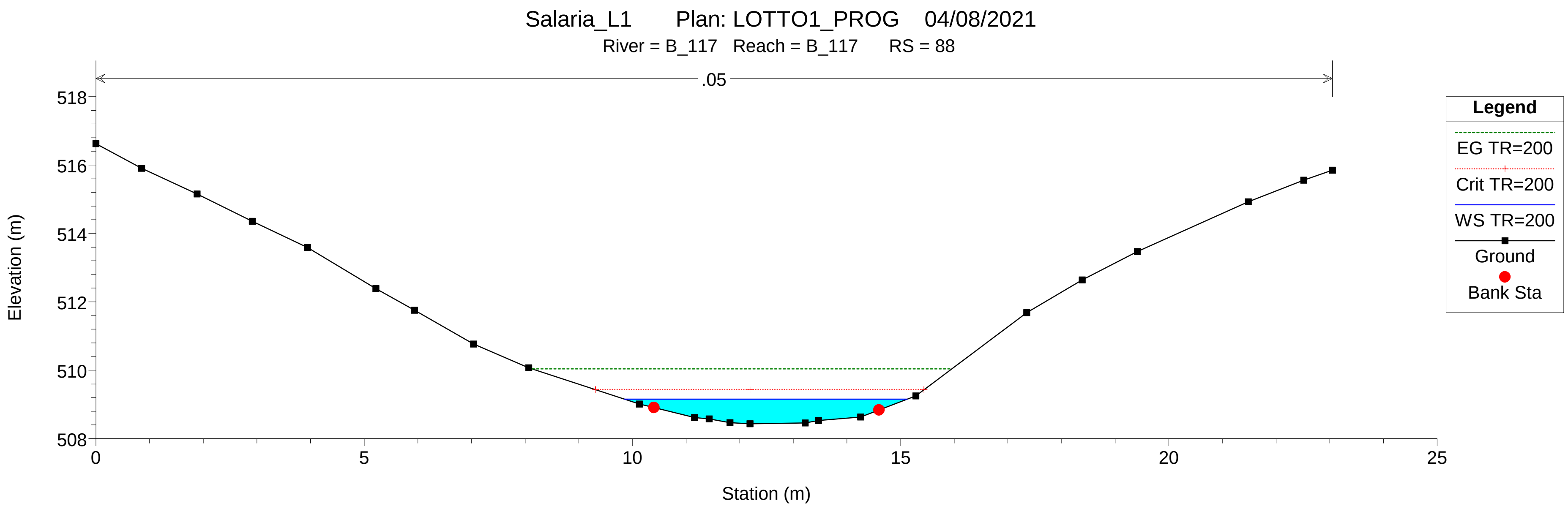


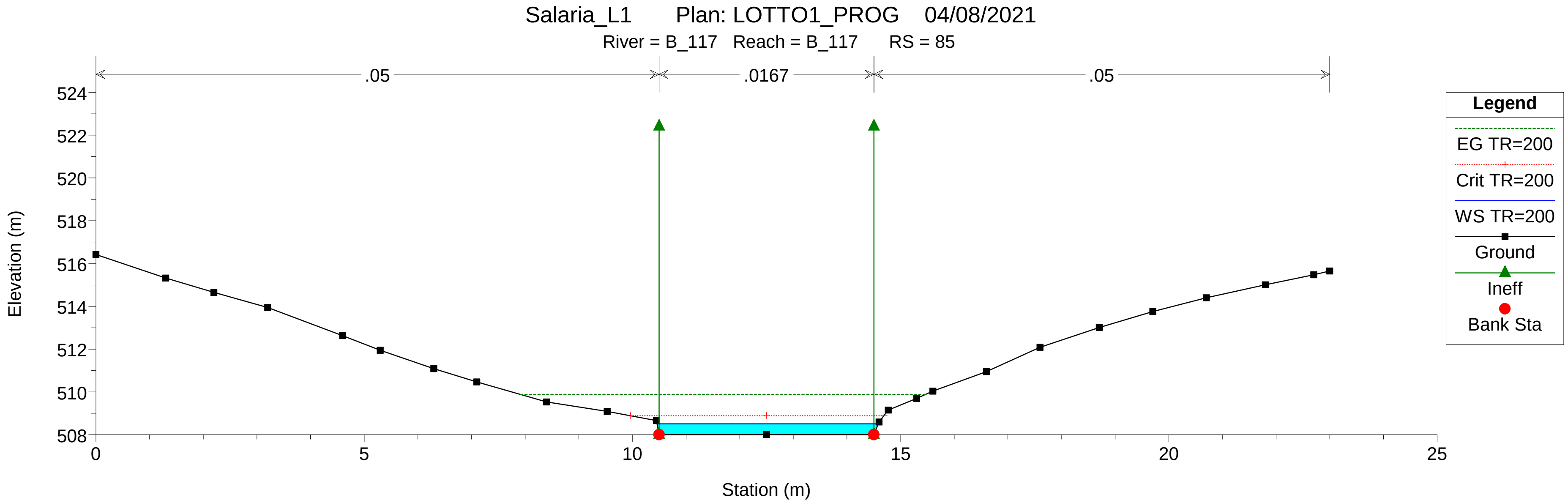
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 186
.05
Elevation (m)
526
524
522
520
518
516
514
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 160
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

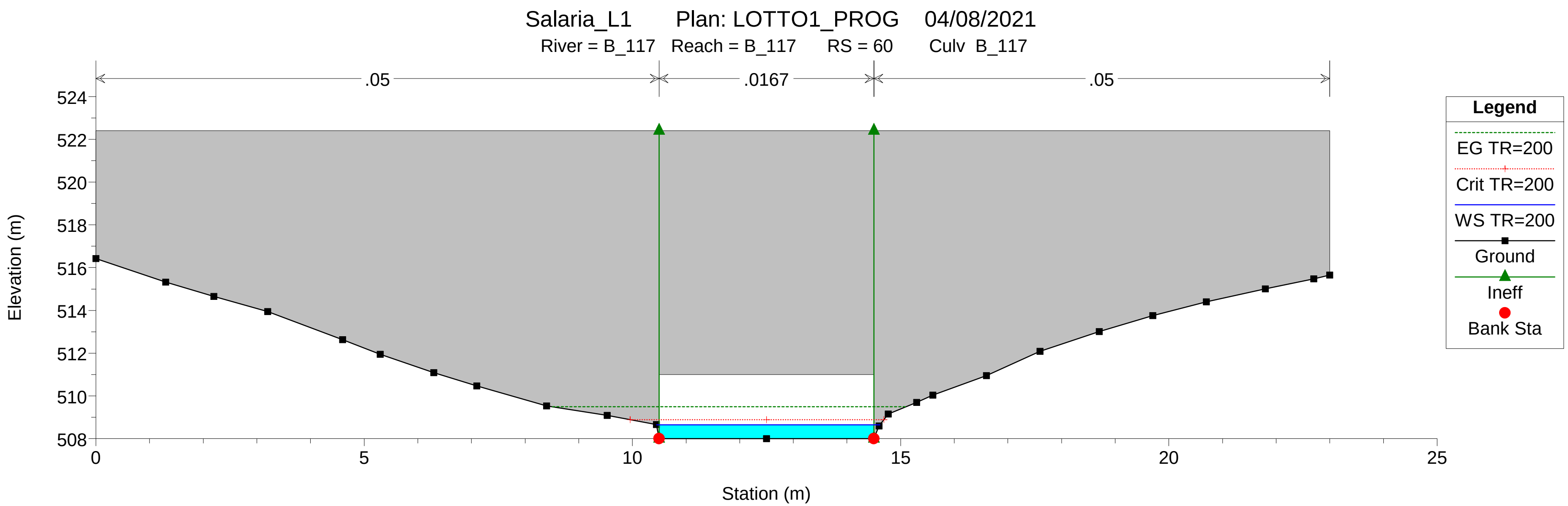

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 135
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 110
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

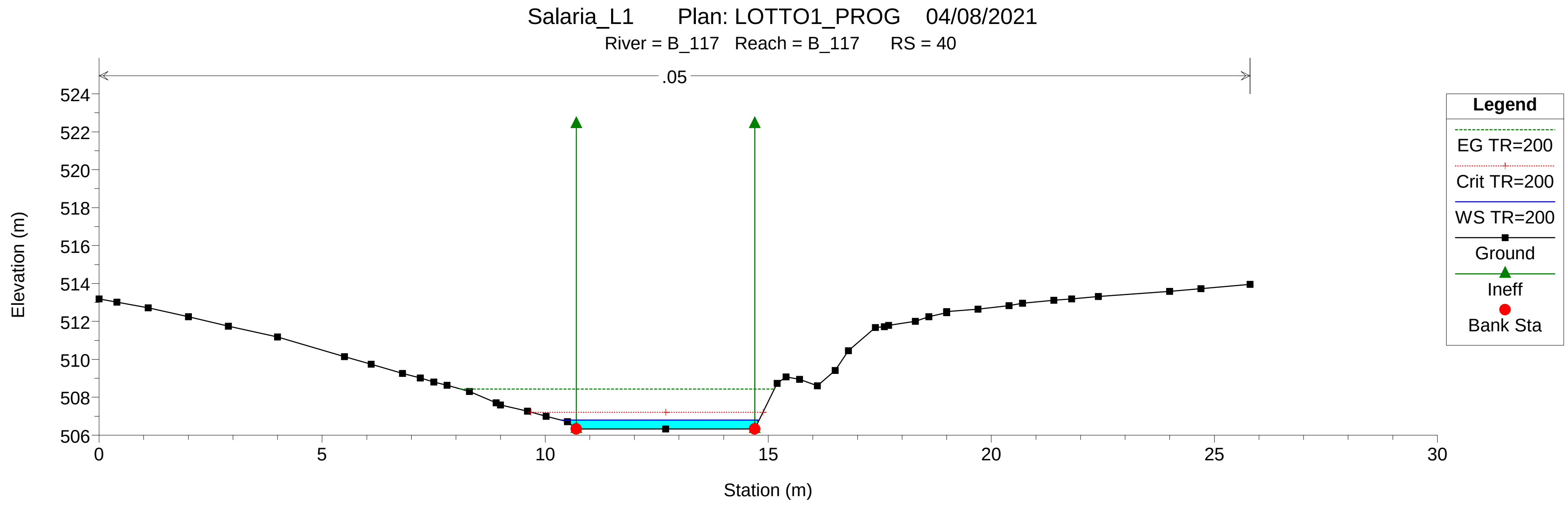

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 88
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

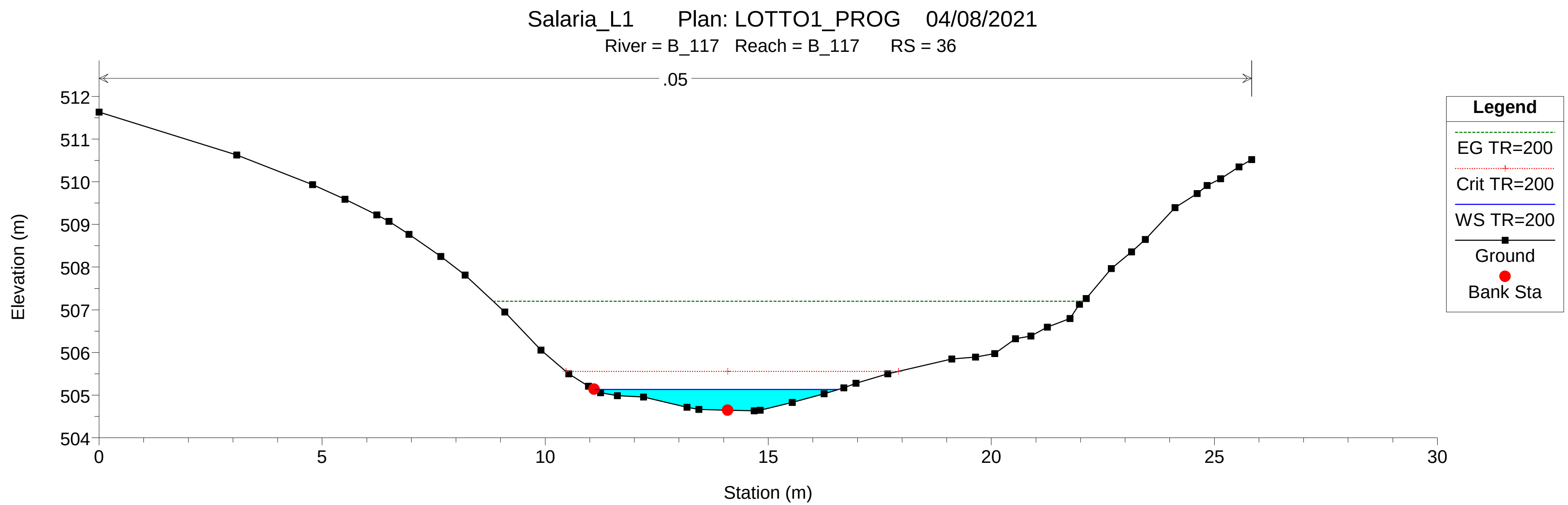


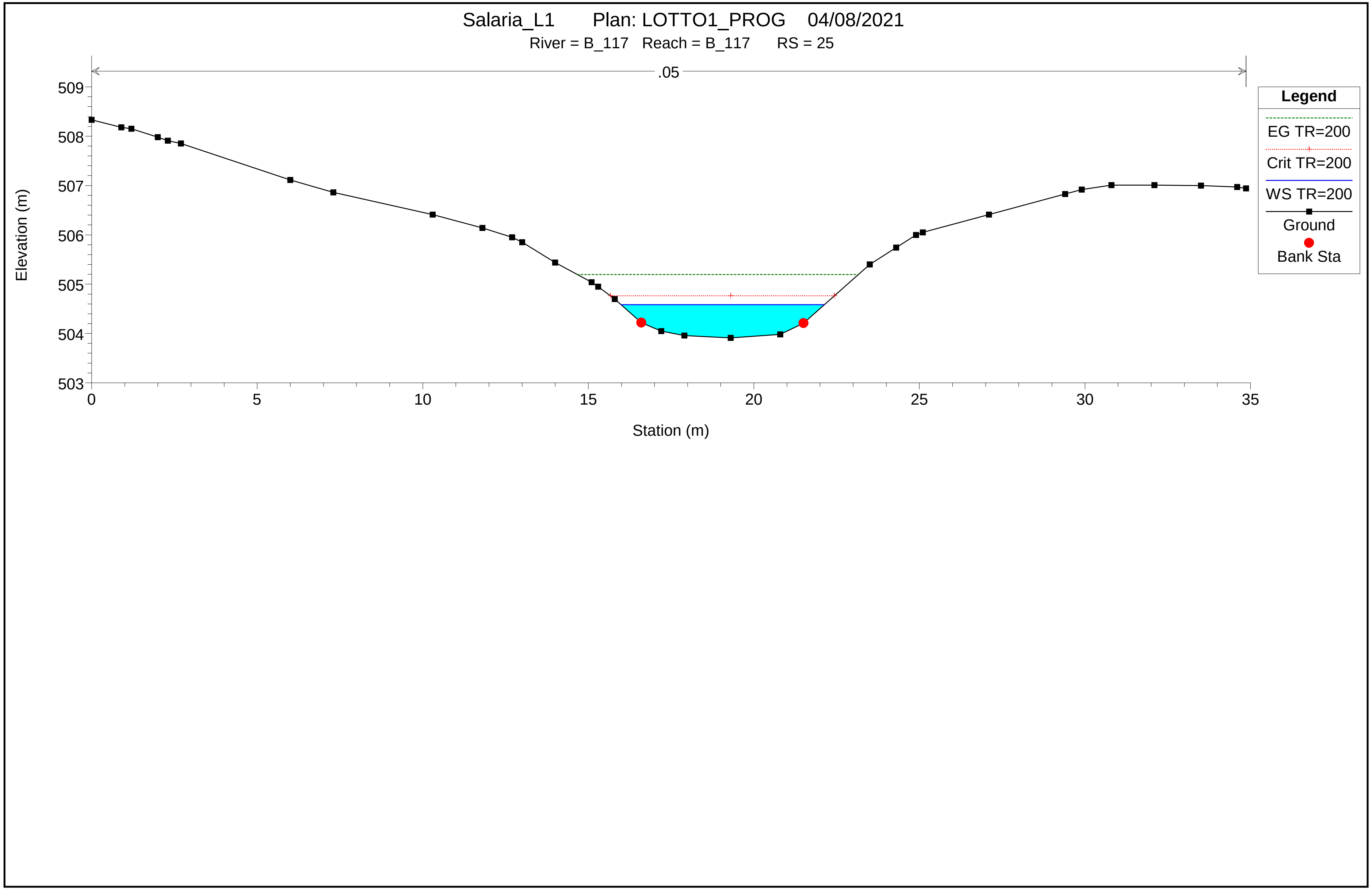
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 85
.05
.0167
.05
Elevation (m)
524
522
520
518
516
514
512
510
508
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta



Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 60 Culv B_117
.05
.0167
.05
Elevation (m)
524
522
520
518
516
514
512
510
508
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 40
.05
Elevation (m)
524
522
520
518
516
514
512
510
508
506
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

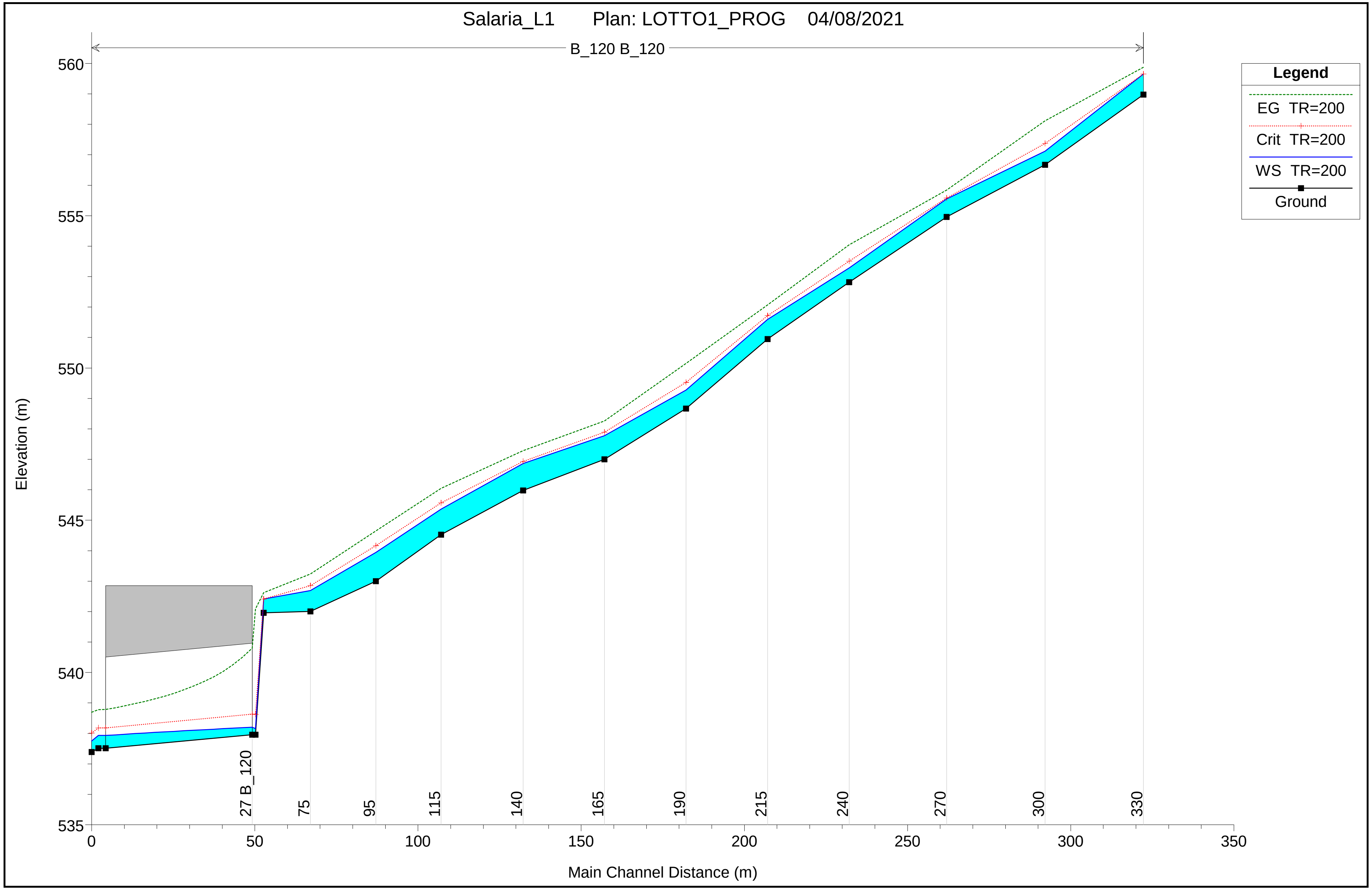

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 36
.05
Elevation (m)
512
511
510
509
508
507
506
505
504
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_117 Reach = B_117 RS = 25
.05
Elevation (m)
509
508
507
506
505
504
503
0
5
10
15
20
25
30
35
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

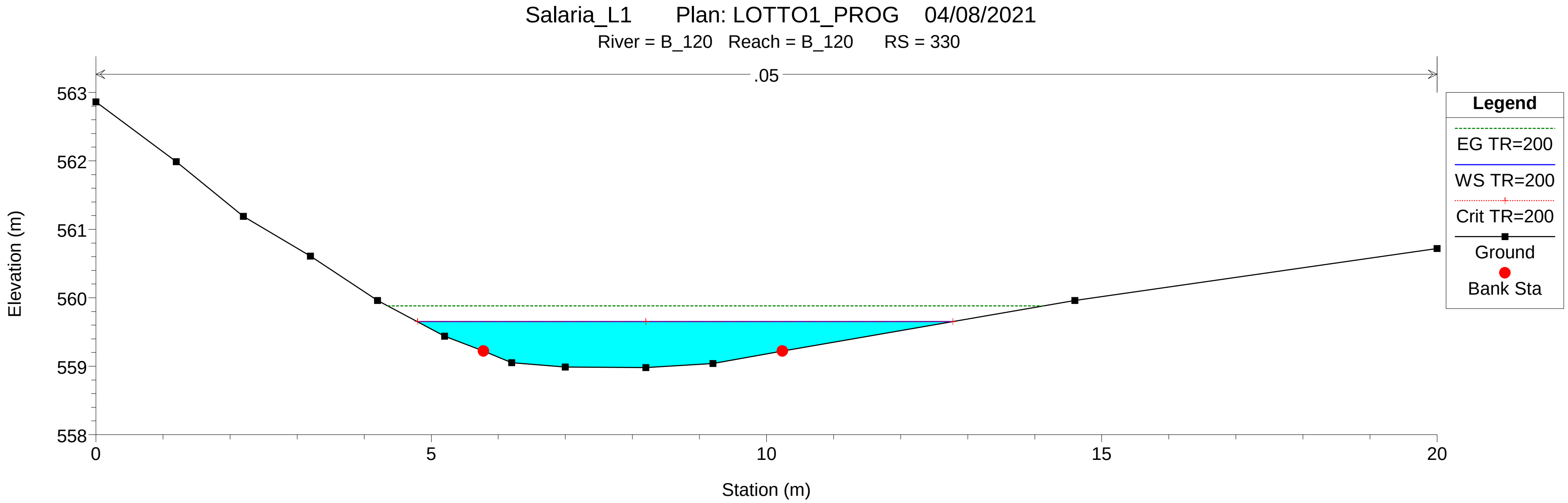
2.2.8. PROGETTO

B.120 - Progr.6+125

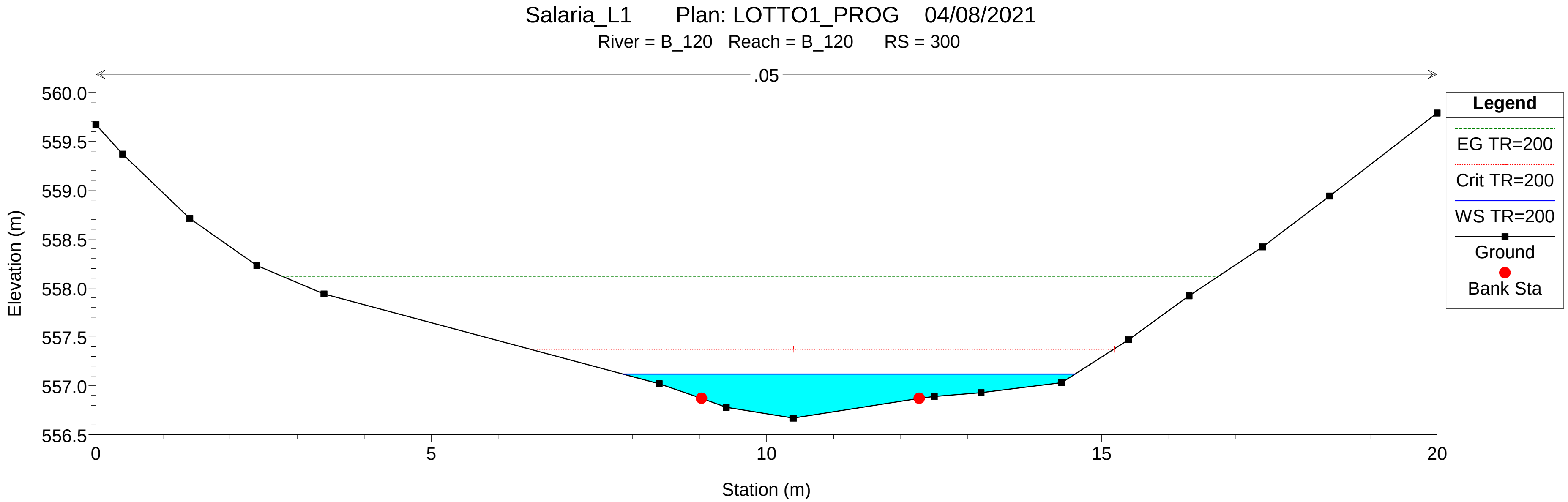

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
B_120 B_120
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Elevation (m)
560
555
550
545
540
535
27 B_120
75
95
115
140
165
190
215
240
270
300
330
0
50
100
150
200
250
300
350
Main Channel Distance (m)

HEC-RAS Plan: L1_PROG River: B_120 Reach: B_120 Profile: TR=200

Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_120	330	TR=200	6.90	558.98	0.67	559.65	559.65	0.00	0.92	559.88	2.23	1.98	0.60	144.91	0.44
B_120	300	TR=200	6.90	556.67	0.45	557.12	557.37	-0.25	2.54	558.12	4.76	4.12	0.35	785.36	0.25
B_120	270	TR=200	6.90	554.96	0.59	555.55	555.58	-0.03	1.05	555.84	2.46	2.30	0.56	179.38	0.48
B_120	240	TR=200	6.90	552.82	0.46	553.28	553.51	-0.23	2.00	554.04	3.97	3.71	0.40	523.75	0.33
B_120	215	TR=200	6.90	550.95	0.65	551.60	551.72	-0.12	1.28	552.07	3.13	2.90	0.60	284.84	0.50
B_120	190	TR=200	6.90	548.67	0.60	549.27	549.53	-0.26	2.01	550.15	4.27	4.01	0.45	583.58	0.39
B_120	165	TR=200	6.90	547.00	0.78	547.78	547.89	-0.11	1.23	548.26	3.15	2.95	0.65	281.31	0.55
B_120	140	TR=200	6.90	545.98	0.88	546.86	546.93	-0.07	1.09	547.29	2.94	2.74	0.71	237.20	0.60
B_120	115	TR=200	6.90	544.53	0.83	545.36	545.57	-0.21	1.54	546.05	3.72	3.53	0.57	410.18	0.50
B_120	95	TR=200	6.90	543.00	0.94	543.94	544.16	-0.22	1.47	544.65	3.96	3.44	0.68	438.18	0.52
B_120	75	TR=200	6.90	542.01	0.68	542.69	542.85	-0.16	1.47	543.24	3.30	3.19	0.50	336.46	0.43
B_120	61	TR=200	6.90	541.96	0.45	542.41	542.41	0.00	0.99	542.62	2.05	1.96	0.44	135.73	0.40
B_120	58	TR=200	6.90	537.96	0.20	538.16	538.63	-0.47	6.33	542.09	8.79	8.79	0.20	363.39	0.20
B_120	27		Culvert												
B_120	10	TR=200	6.90	537.51	0.42	537.93	538.18	-0.25	2.01	538.78	4.09	4.09	0.42	60.84	0.42
B_120	8	TR=200	6.90	537.39	0.36	537.75	538.01	-0.26	2.36	538.69	4.42	4.17	0.36	674.88	0.32

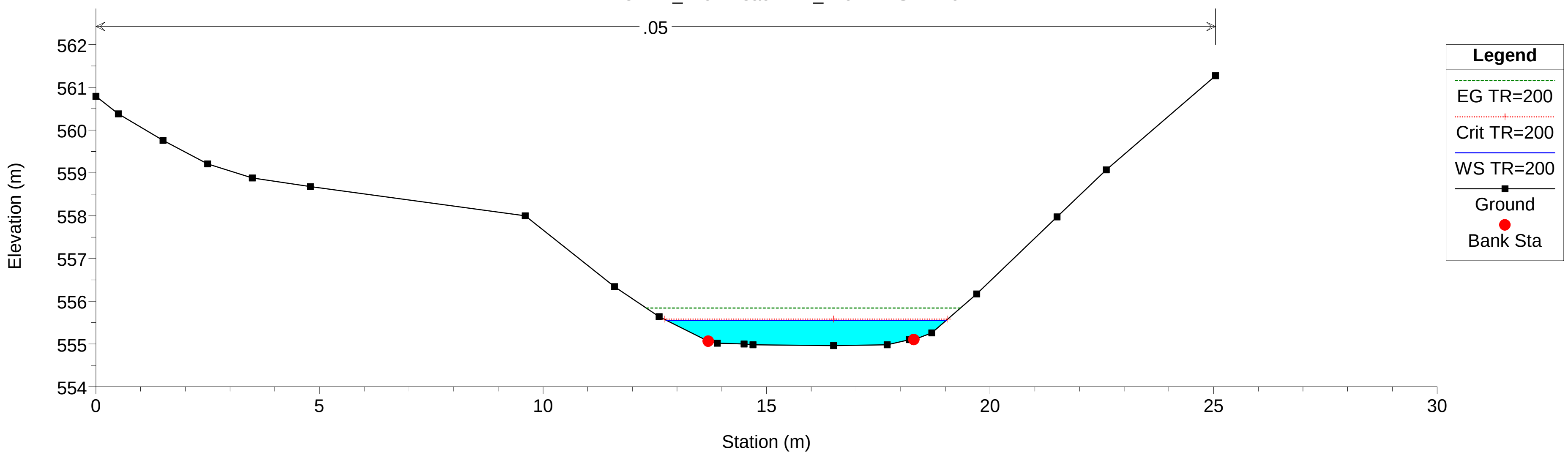


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 330
.05
Elevation (m)
563
562
561
560
559
558
0
5
10
15
20
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

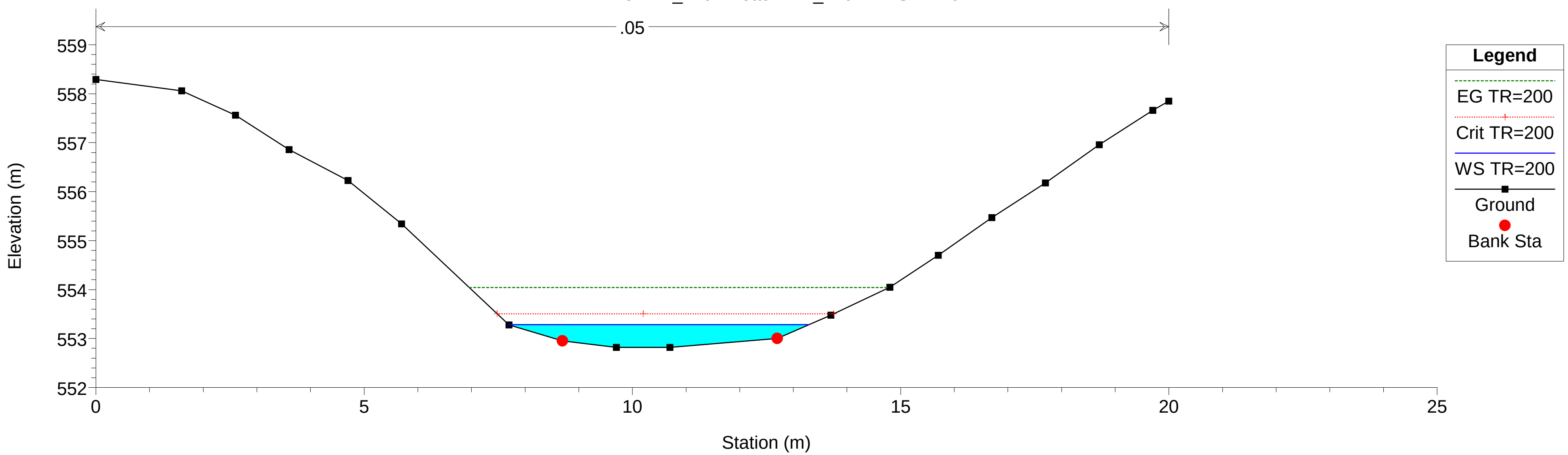


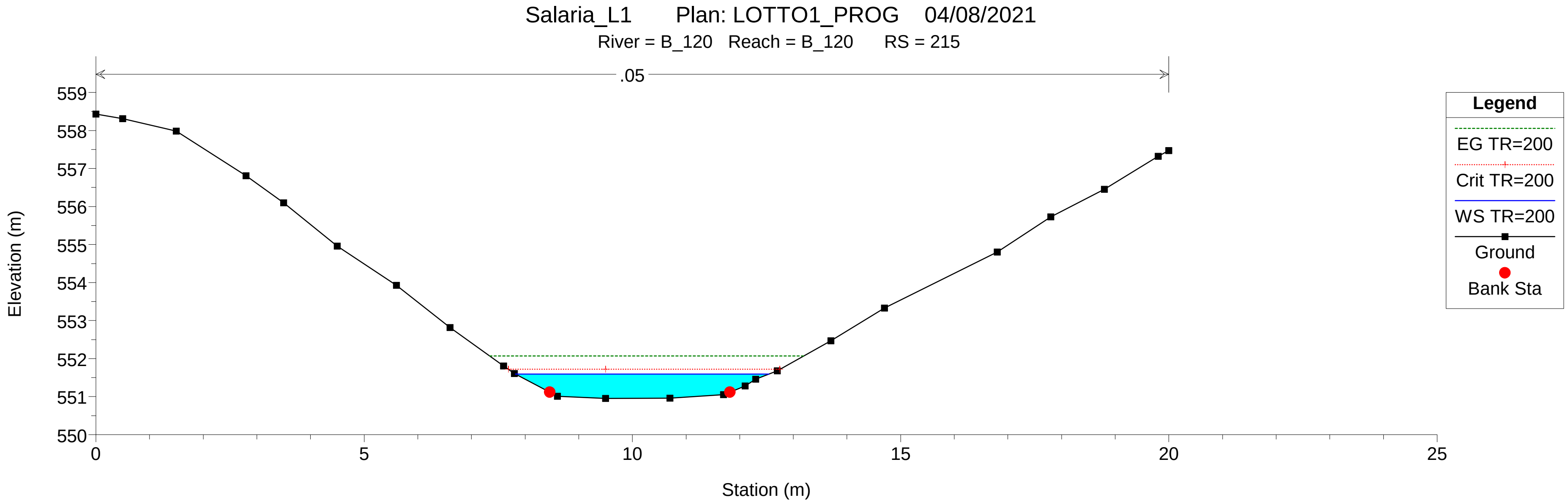
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 300
.05
Elevation (m)
560.0
559.5
559.0
558.5
558.0
557.5
557.0
556.5
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 270

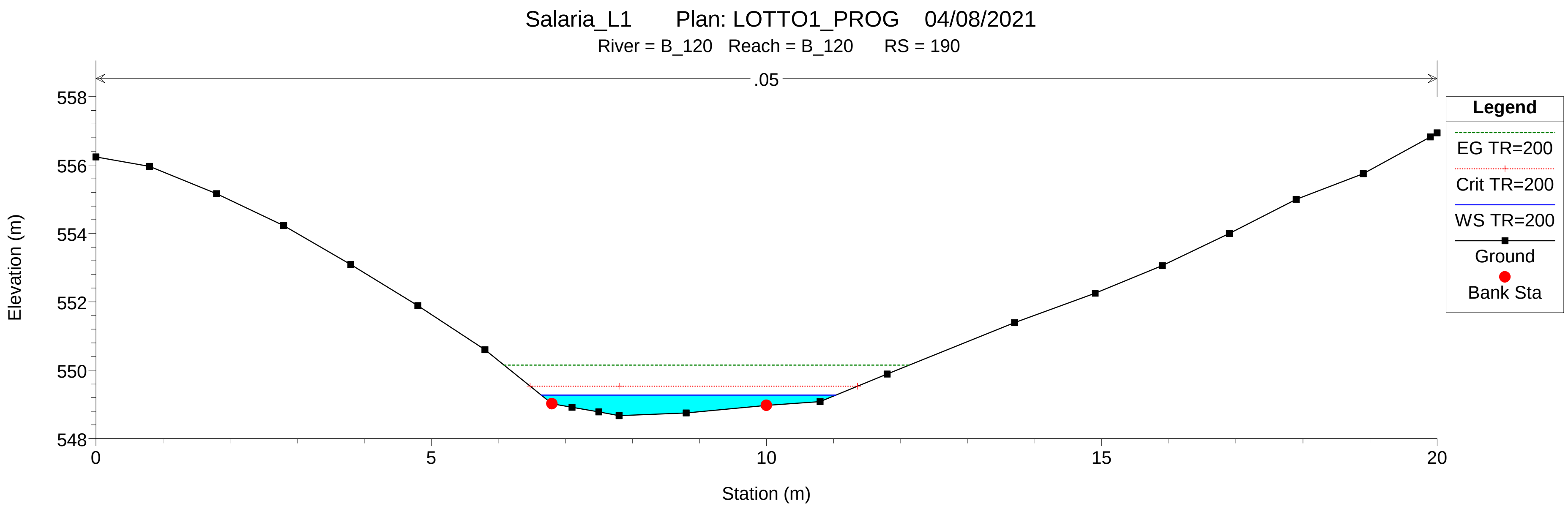


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 240

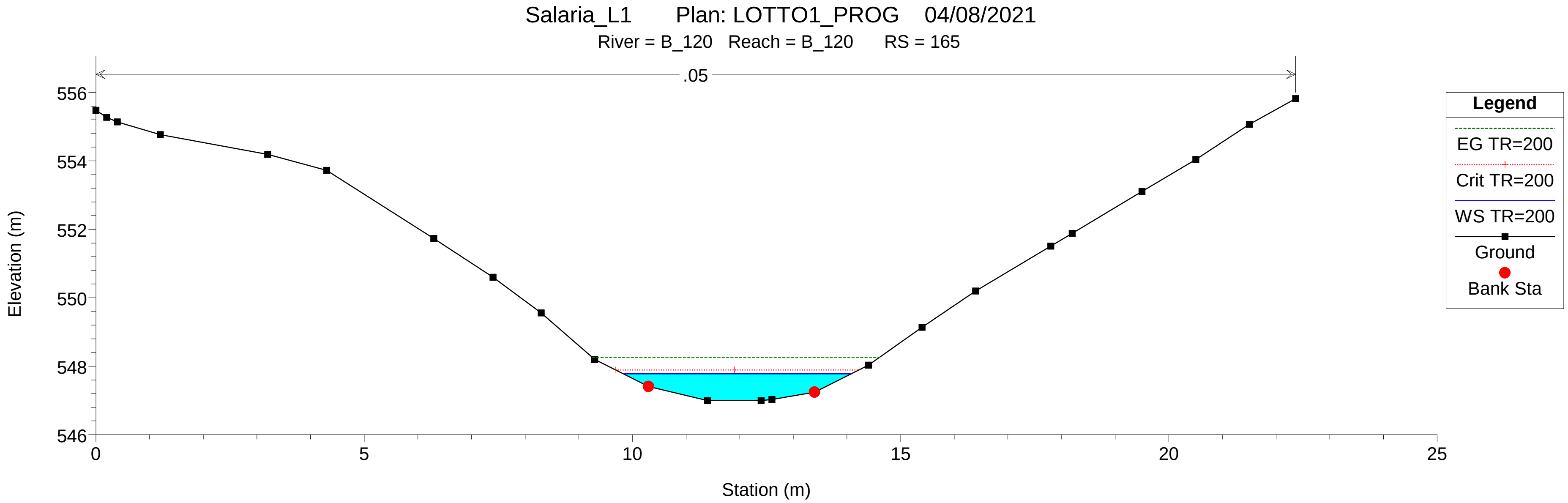




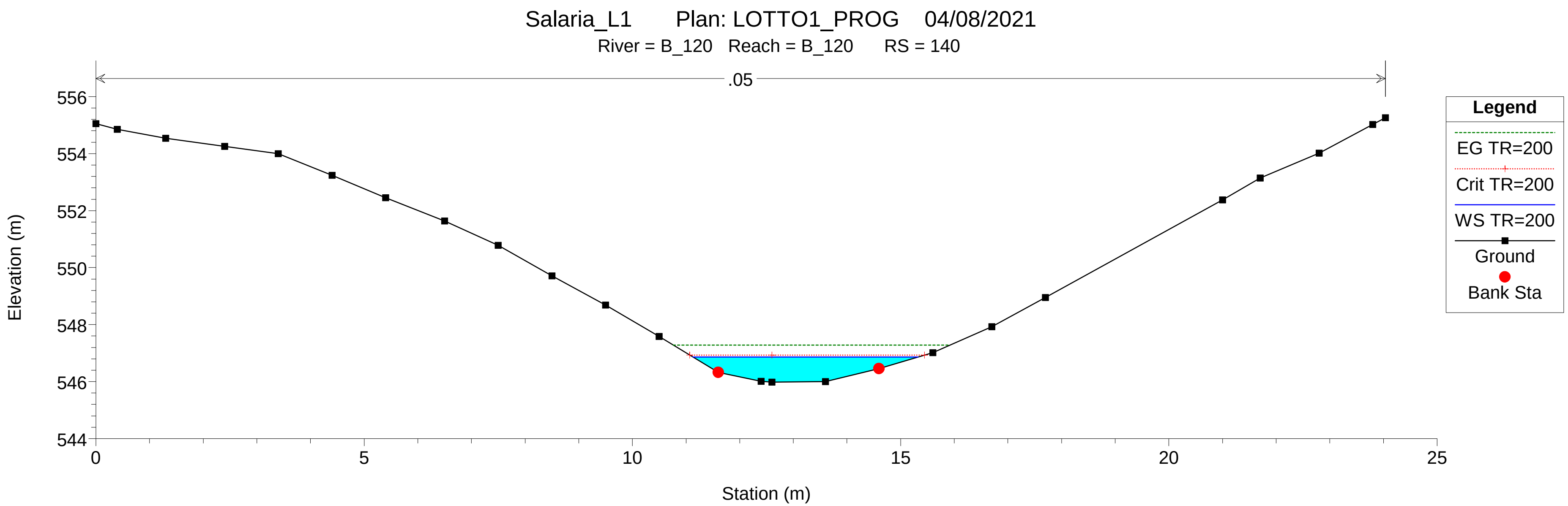
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 215
.05
Elevation (m)
559
558
557
556
555
554
553
552
551
550
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta



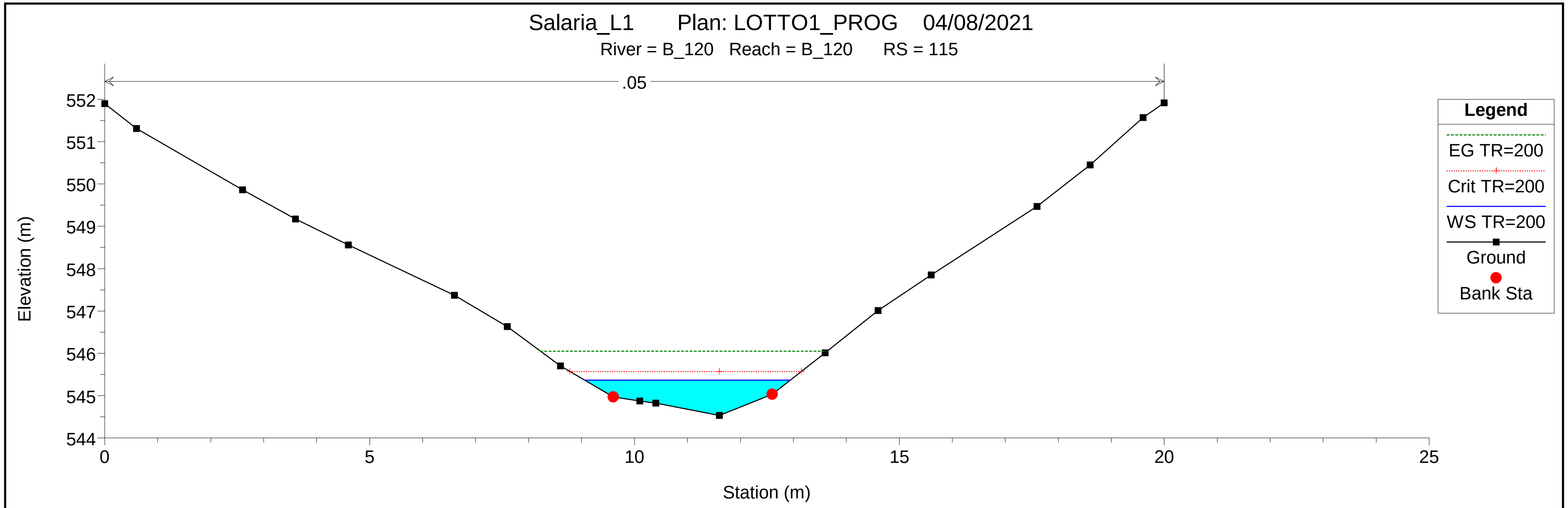
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 190
.05
Elevation (m)
558
556
554
552
550
548
0
5
10
15
20
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

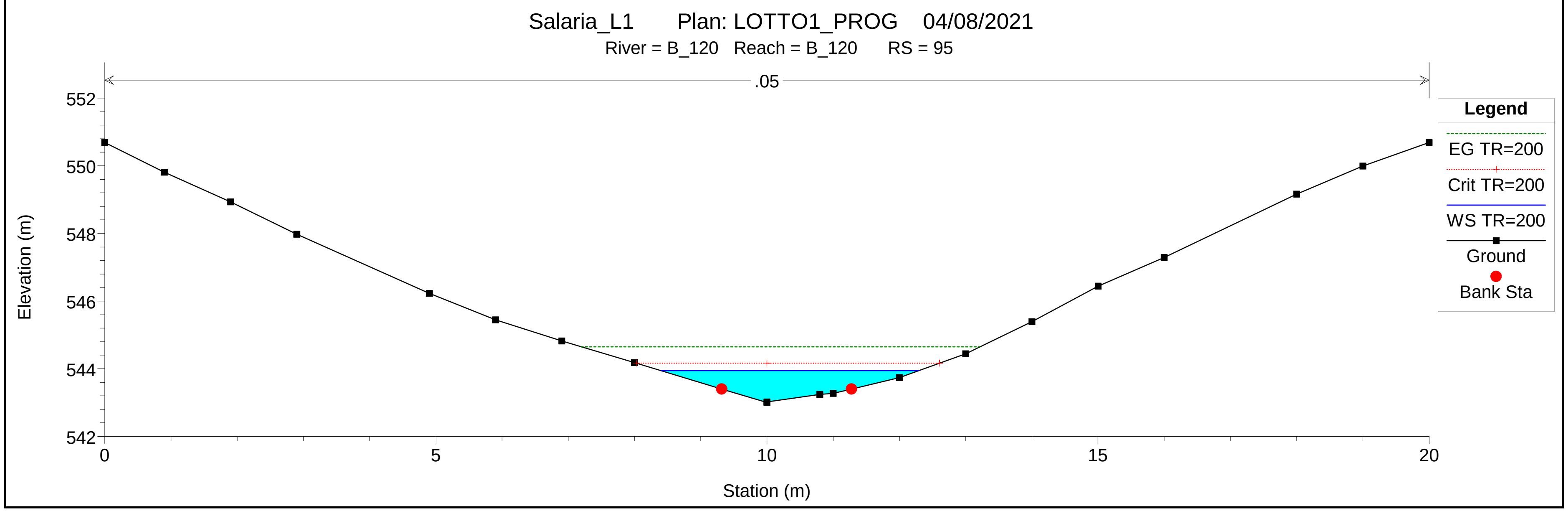


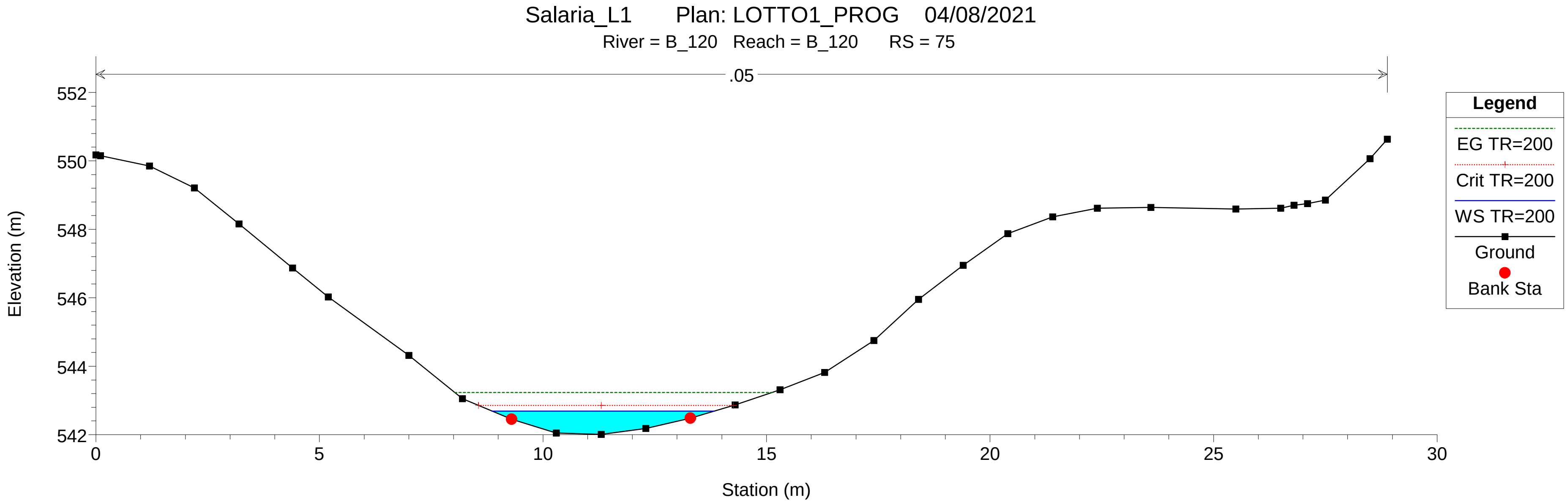
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 165
.05
Elevation (m)
556
554
552
550
548
546
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

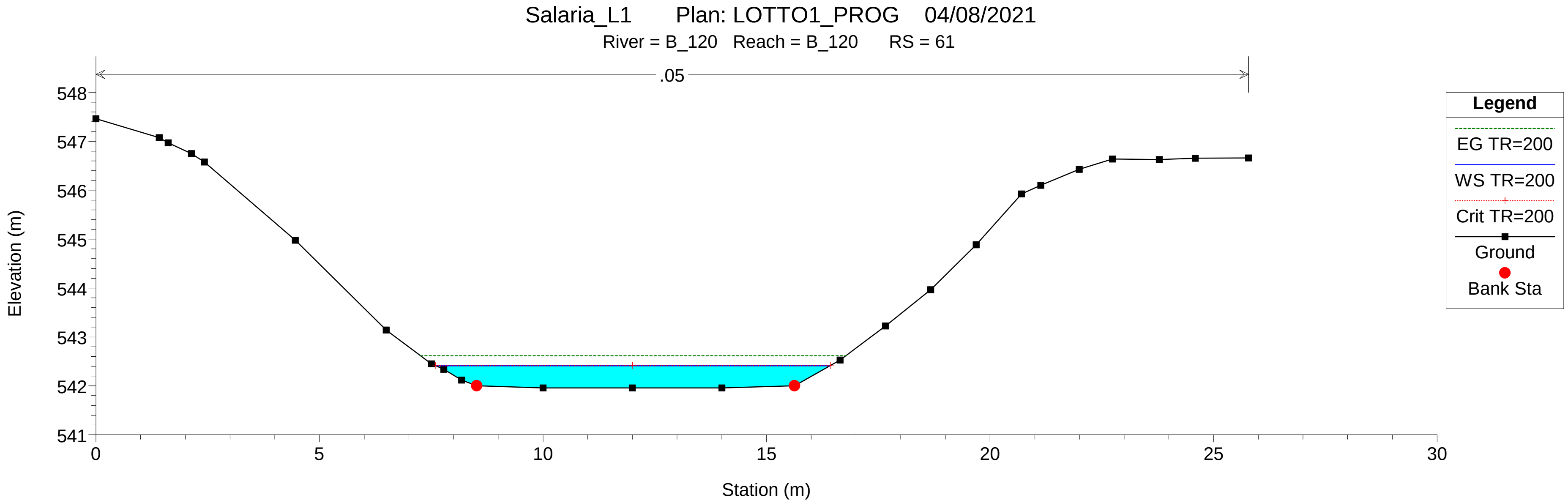


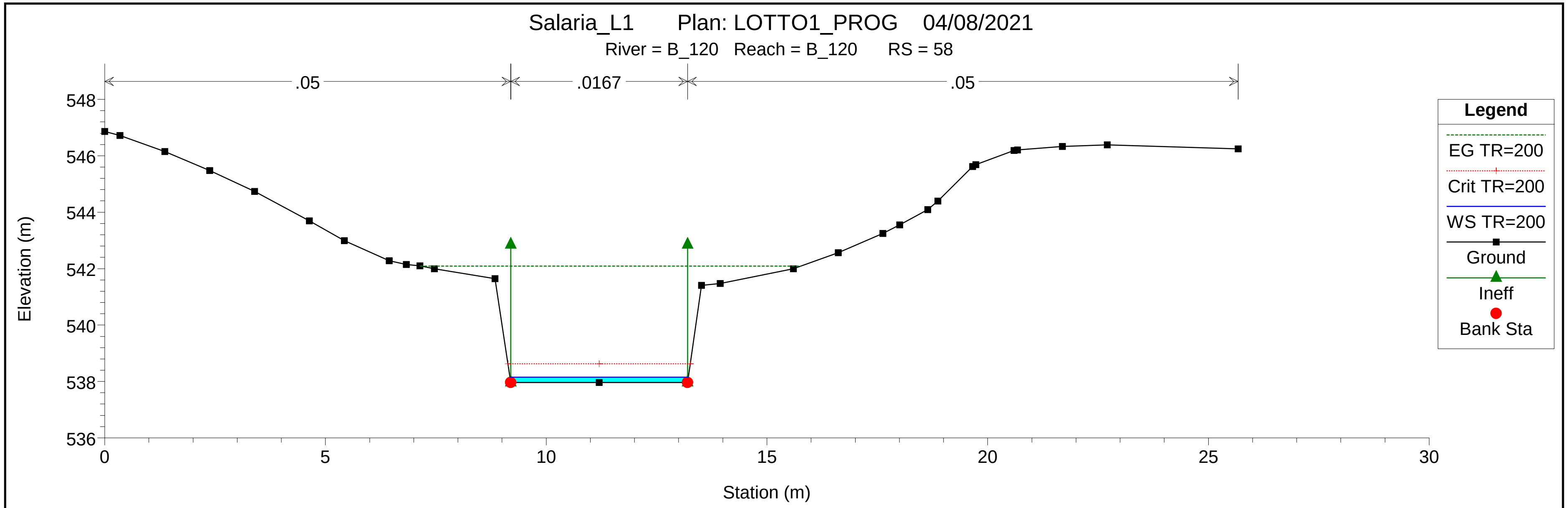
Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 140
.05
Elevation (m)
556
554
552
550
548
546
544
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

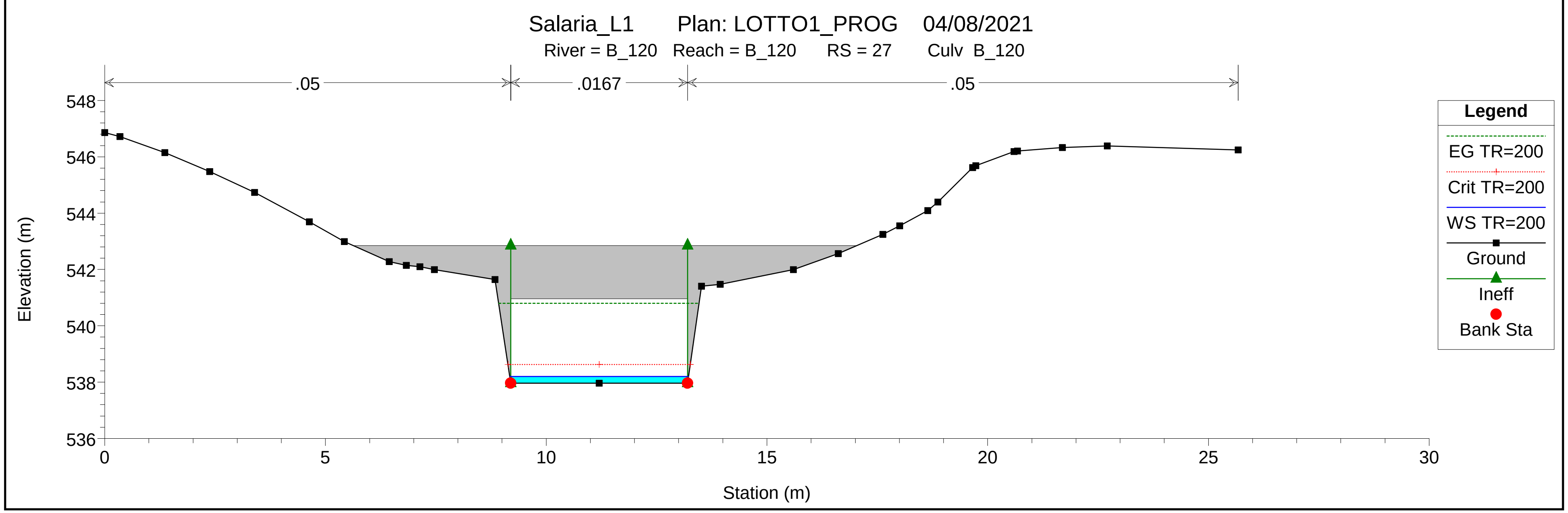

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 115
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

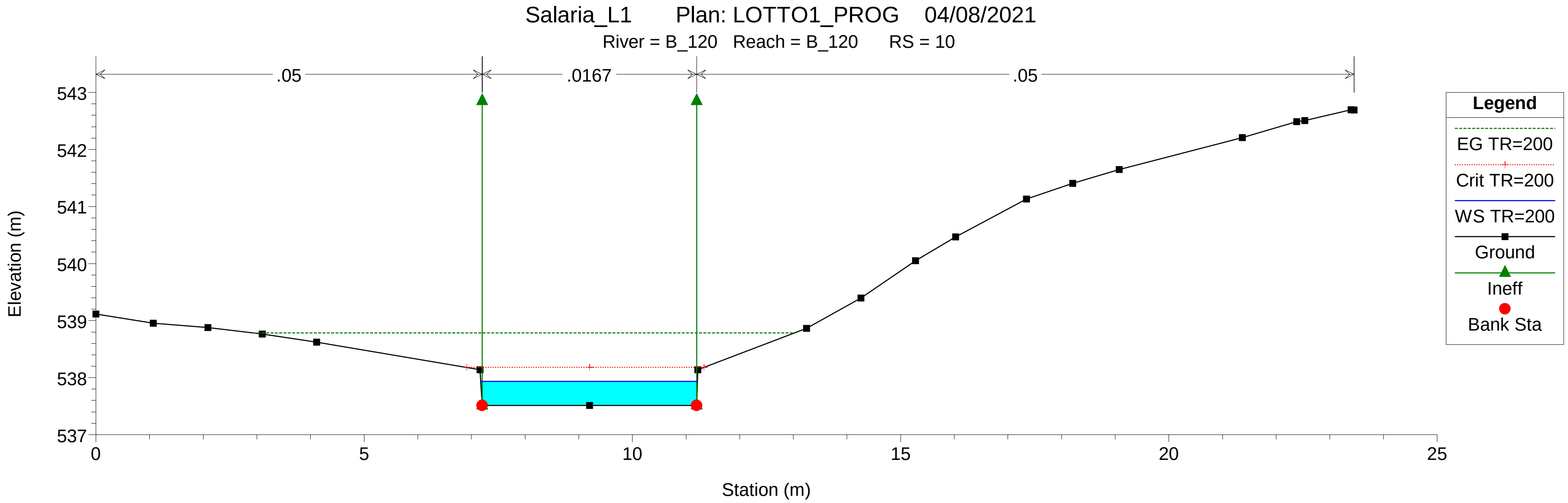

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 95
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

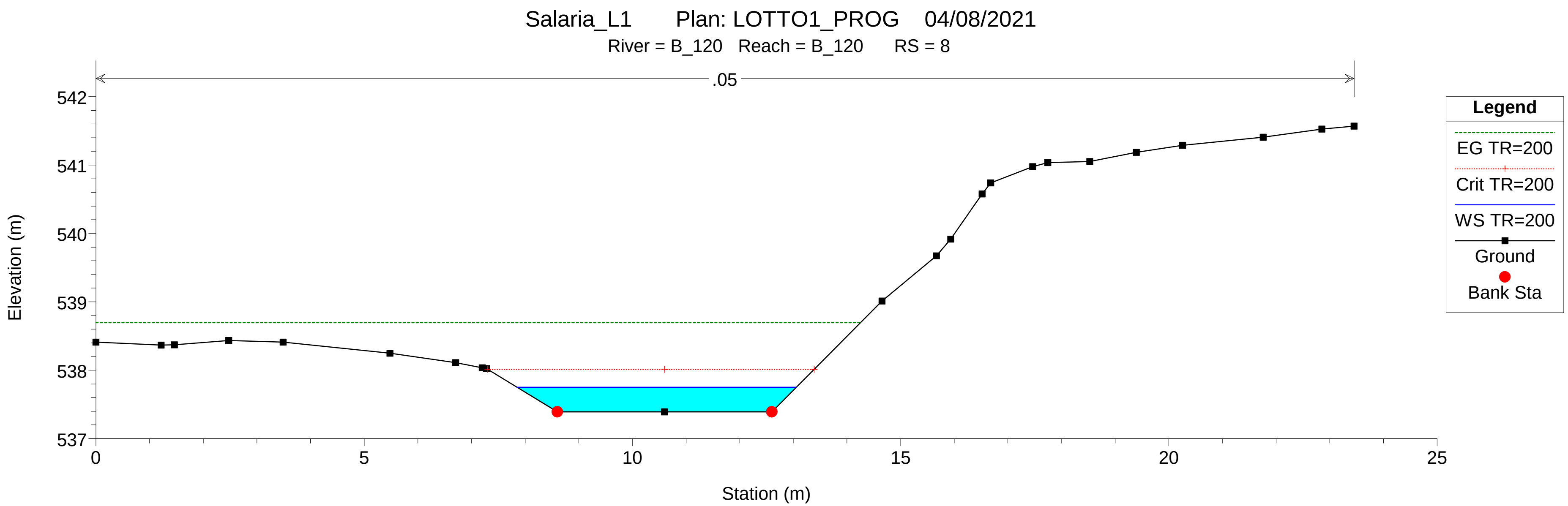

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 75
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 61
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 58
.05
.0167
.05
Elevation (m)
548
546
544
542
540
538
536
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

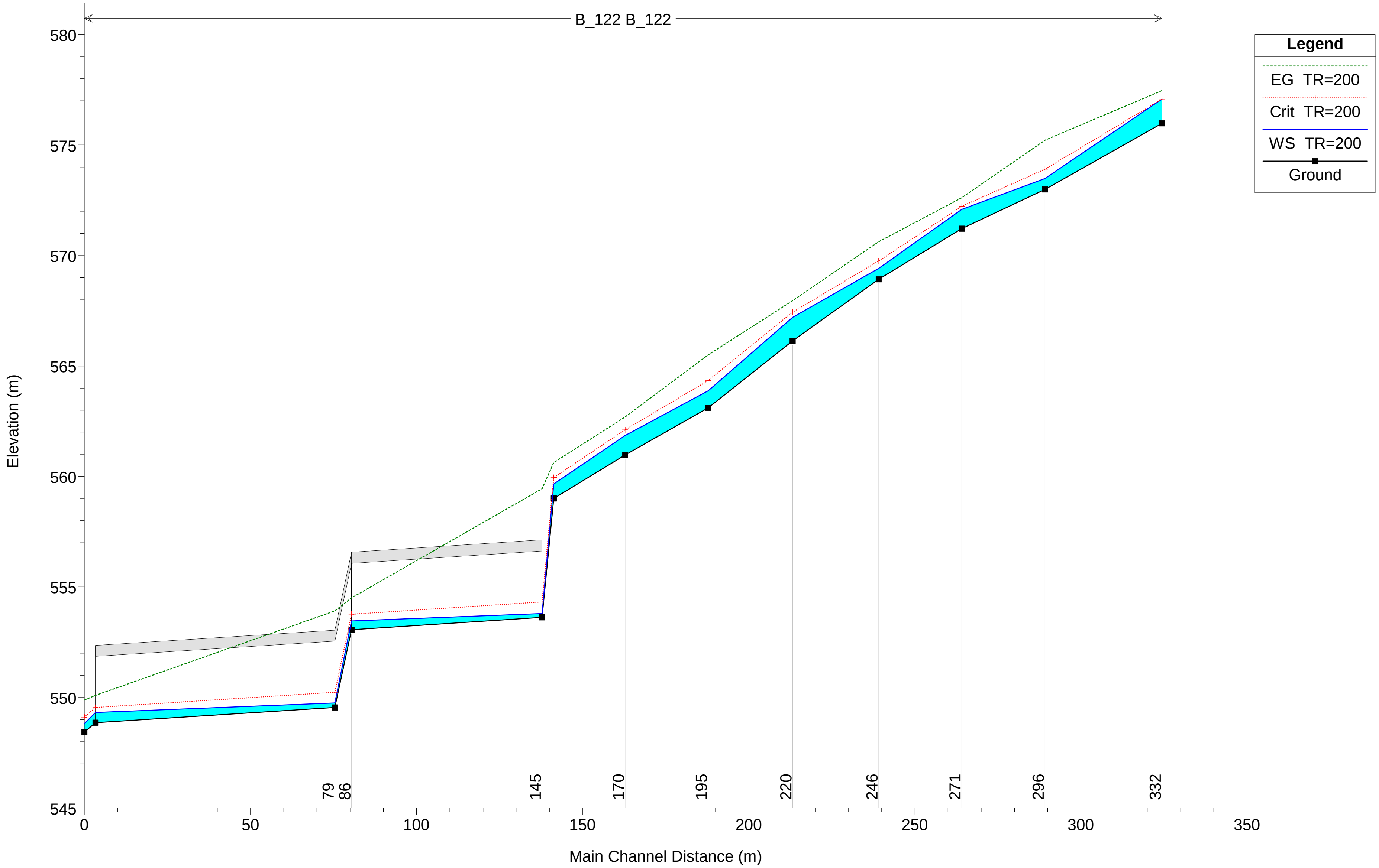

Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 27 Culv B_120
.05
.0167
.05
Elevation (m)
548
546
544
542
540
538
536
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 10
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 04/08/2021
River = B_120 Reach = B_120 RS = 8
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

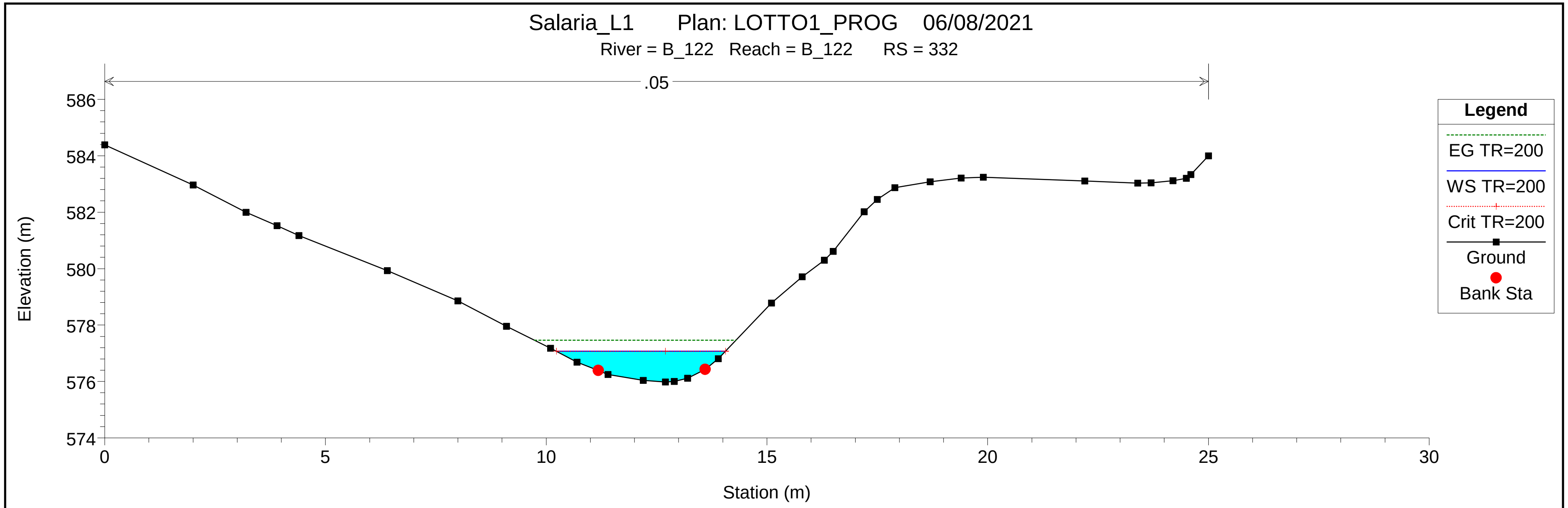
2.2.9. PROGETTO
B.122 - Progr.6+386

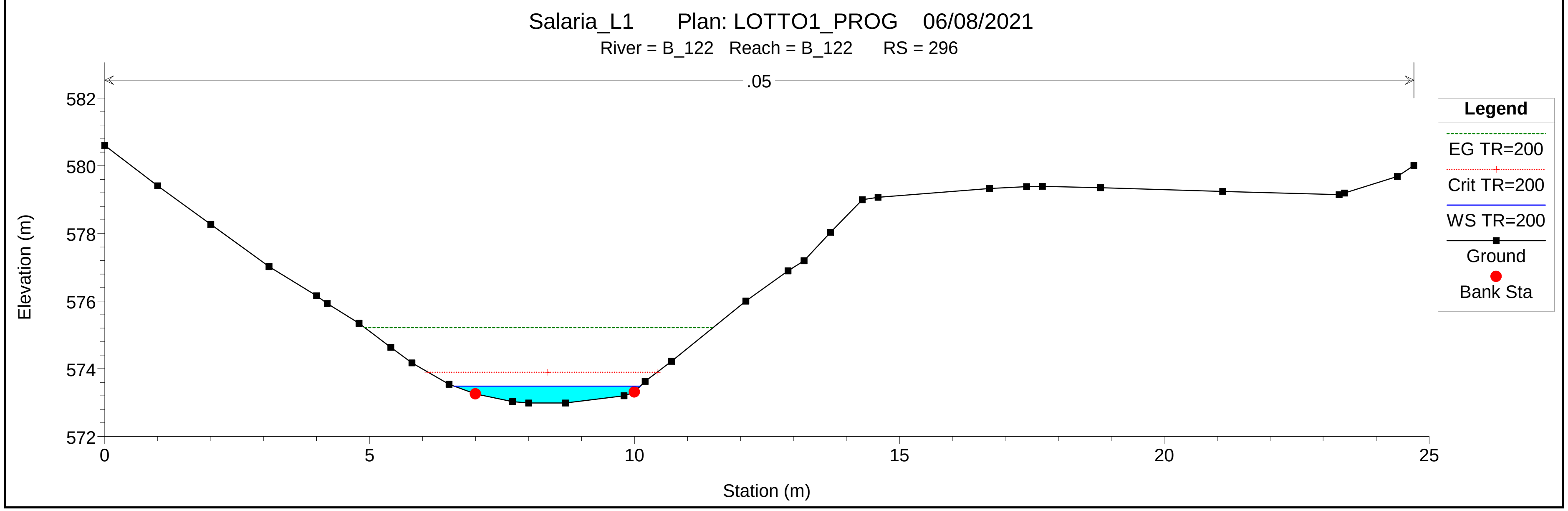
Salaria_L1 Plan: LOTTO1_PROG 06/08/2021

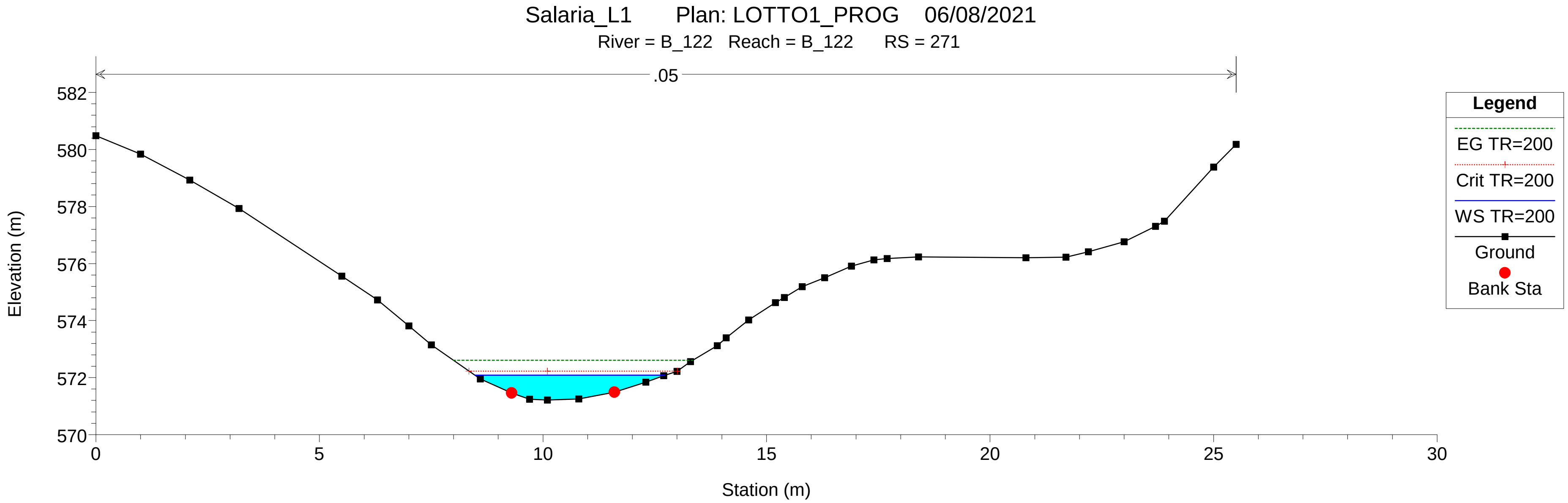


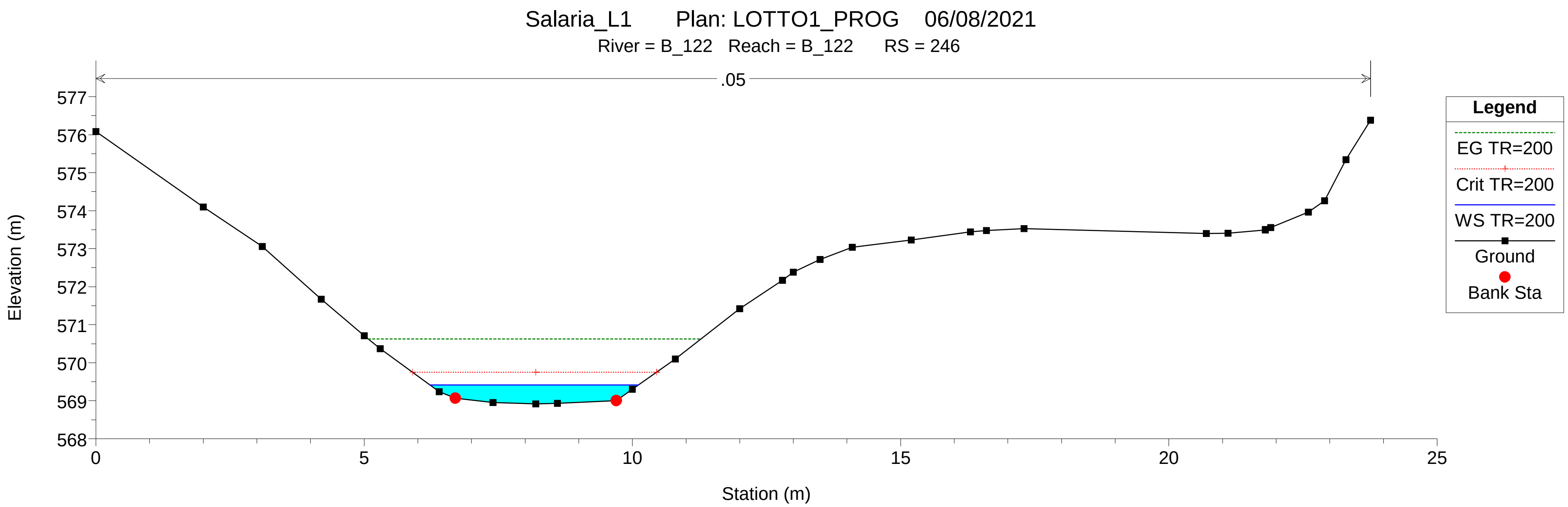
HEC-RAS Plan: L1_PROG   River: B_122   Reach: B_122   Profile: TR=200

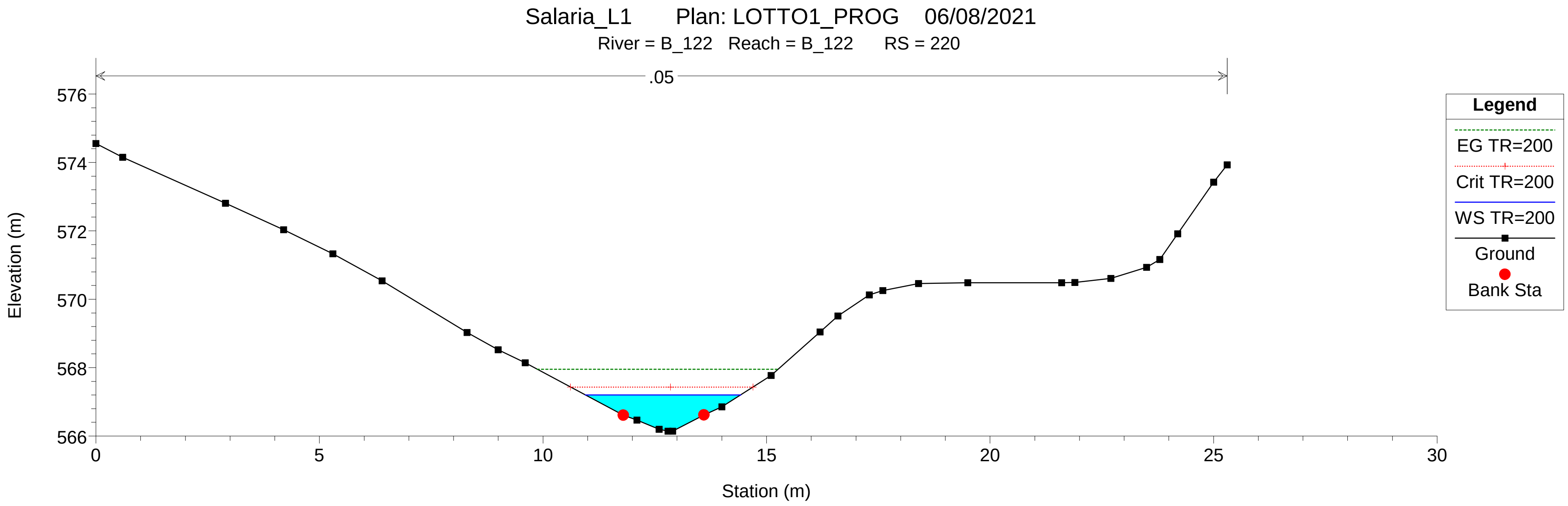
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B_122	332	TR=200	7.20	575.98	1.09	577.07	577.07	0.00	0.95	577.46	2.87	2.59	0.87	211.97	0.73
B_122	296	TR=200	7.20	572.99	0.50	573.49	573.90	-0.41	2.96	575.22	5.87	5.71	0.39	1155.33	0.36
B_122	271	TR=200	7.20	571.21	0.87	572.08	572.23	-0.15	1.23	572.61	3.41	2.97	0.75	312.78	0.57
B_122	246	TR=200	7.20	568.92	0.49	569.41	569.75	-0.34	2.37	570.62	4.98	4.68	0.45	794.04	0.40
B_122	220	TR=200	7.20	566.14	1.06	567.20	567.43	-0.23	1.41	567.95	4.05	3.53	0.74	445.28	0.59
B_122	195	TR=200	7.20	563.10	0.78	563.88	564.33	-0.45	2.25	565.51	5.98	5.17	0.66	1005.59	0.51
B_122	170	TR=200	7.20	560.97	0.89	561.86	562.12	-0.26	1.56	562.69	4.20	3.79	0.69	489.54	0.57
B_122	149	TR=200	7.20	559.00	0.66	559.66	559.96	-0.30	1.96	560.63	4.41	4.31	0.48	610.28	0.48
B_122	145	TR=200	7.20	553.63	0.17	553.80	554.32	-0.52	8.13	559.45	10.53	10.53	0.16	561.11	0.17
B_122	86	TR=200	7.20	553.07	0.40	553.47	553.76	-0.29	2.28	554.51	4.51	4.51	0.33	80.35	0.40
B_122	79	TR=200	7.20	549.55	0.20	549.75	550.24	-0.49	6.47	553.92	9.04	9.04	0.18	395.17	0.20
B_122	9	TR=200	7.20	548.86	0.46	549.32	549.55	-0.23	1.83	550.09	3.89	3.89	0.38	57.35	0.46
B_122	6	TR=200	7.20	548.43	0.39	548.82	549.11	-0.29	2.36	549.88	4.59	4.57	0.39	7915.88	0.38

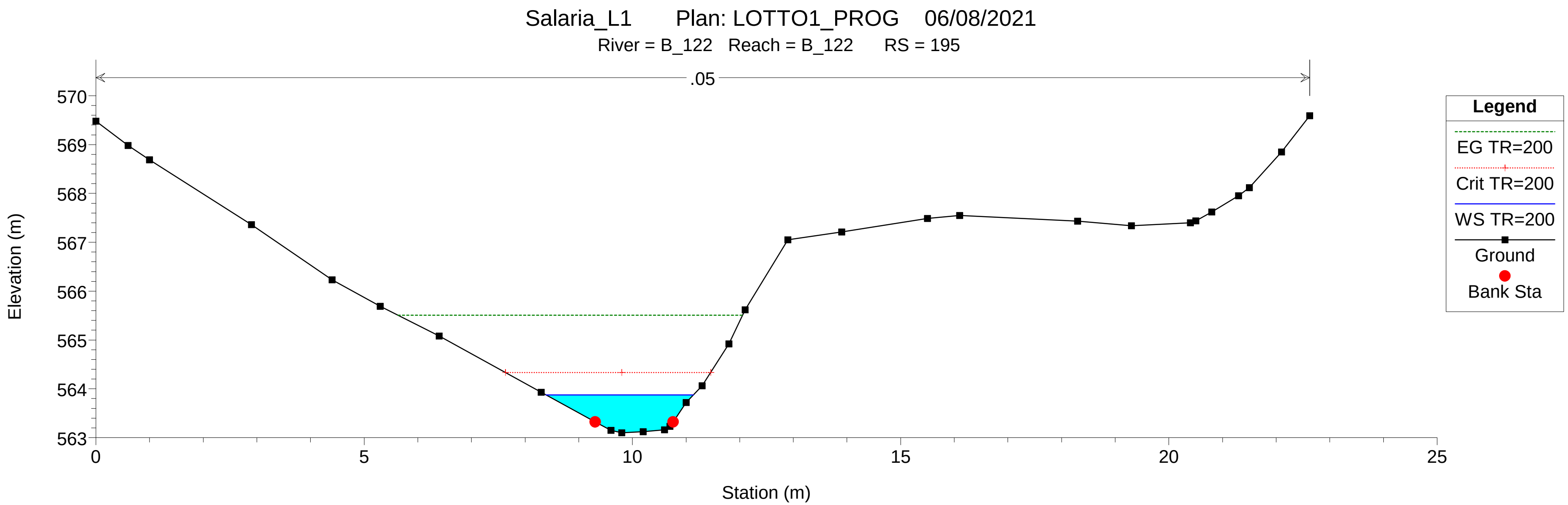

Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 332
.05
Elevation (m)
586
584
582
580
578
576
574
0
5
10
15
20
25
30
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

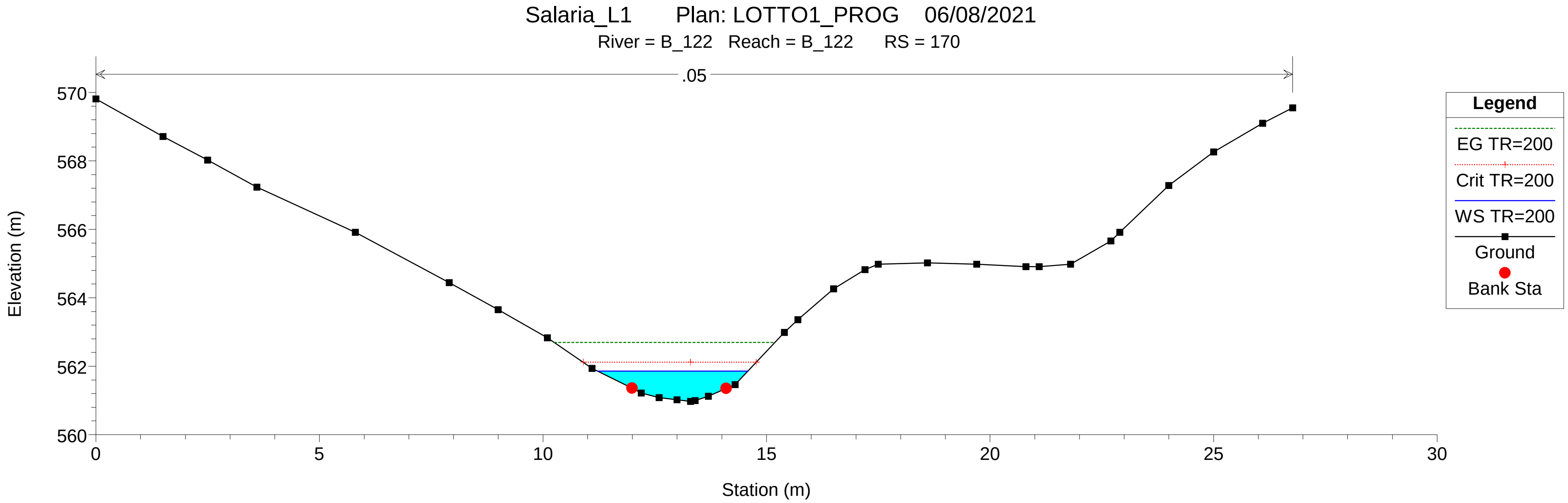

Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 296
.05
Elevation (m)
582
580
578
576
574
572
0
5
10
15
20
25
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

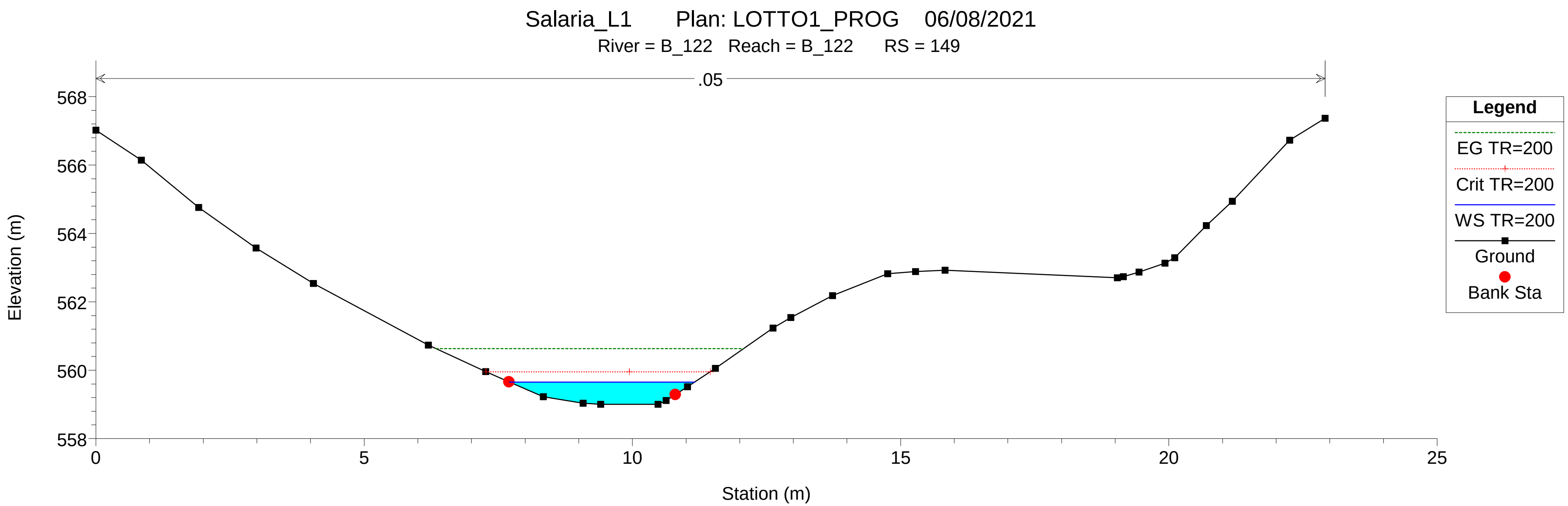

Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 271
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

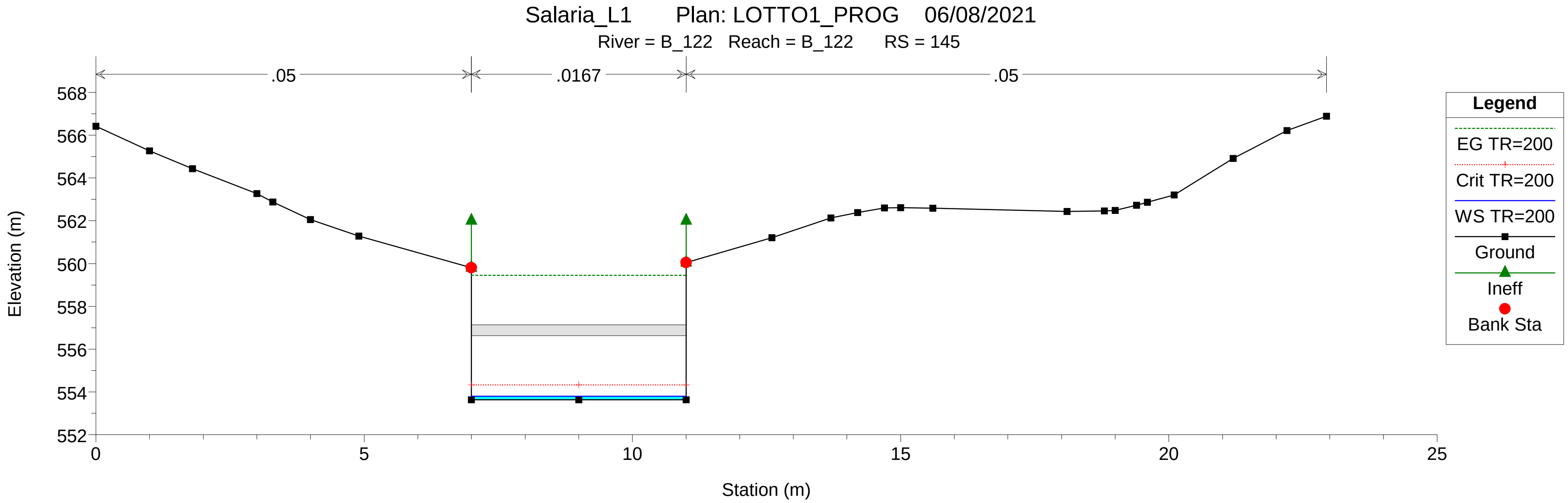

Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 246
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

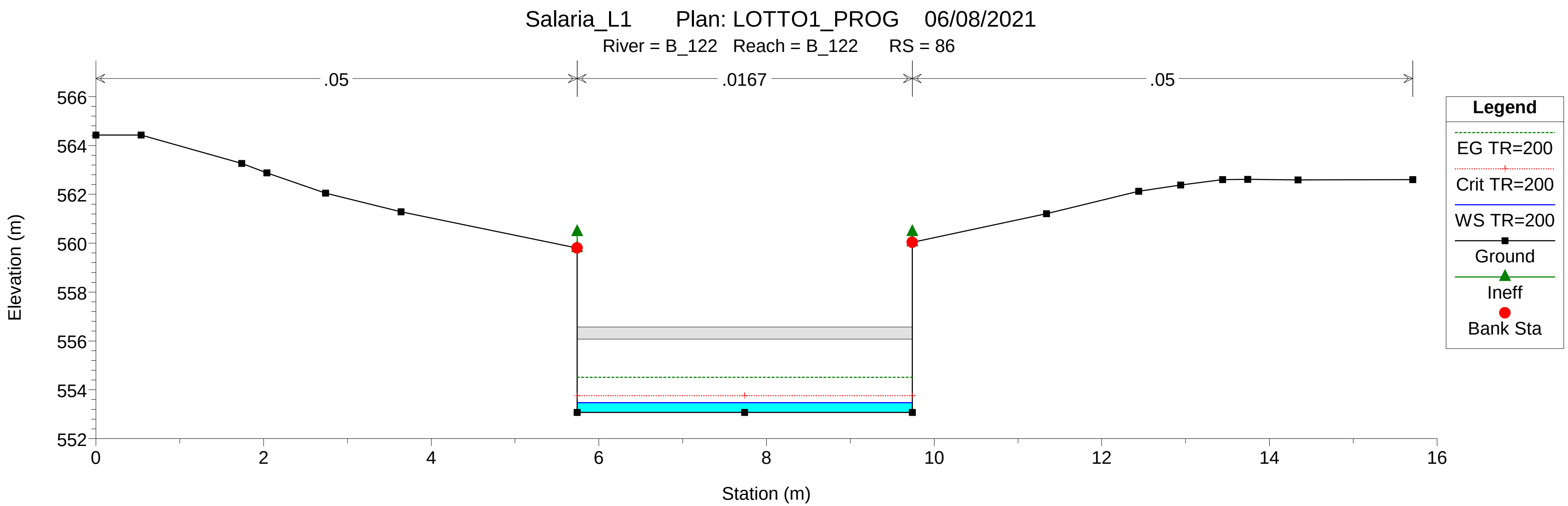

Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 220
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

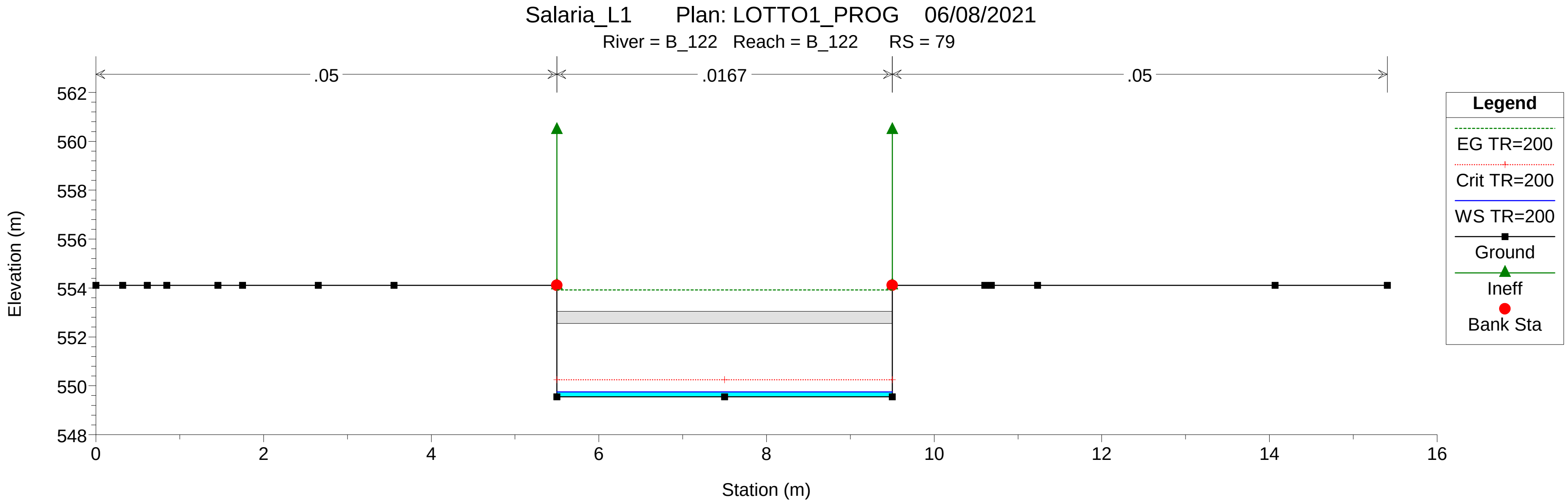

Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 195
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

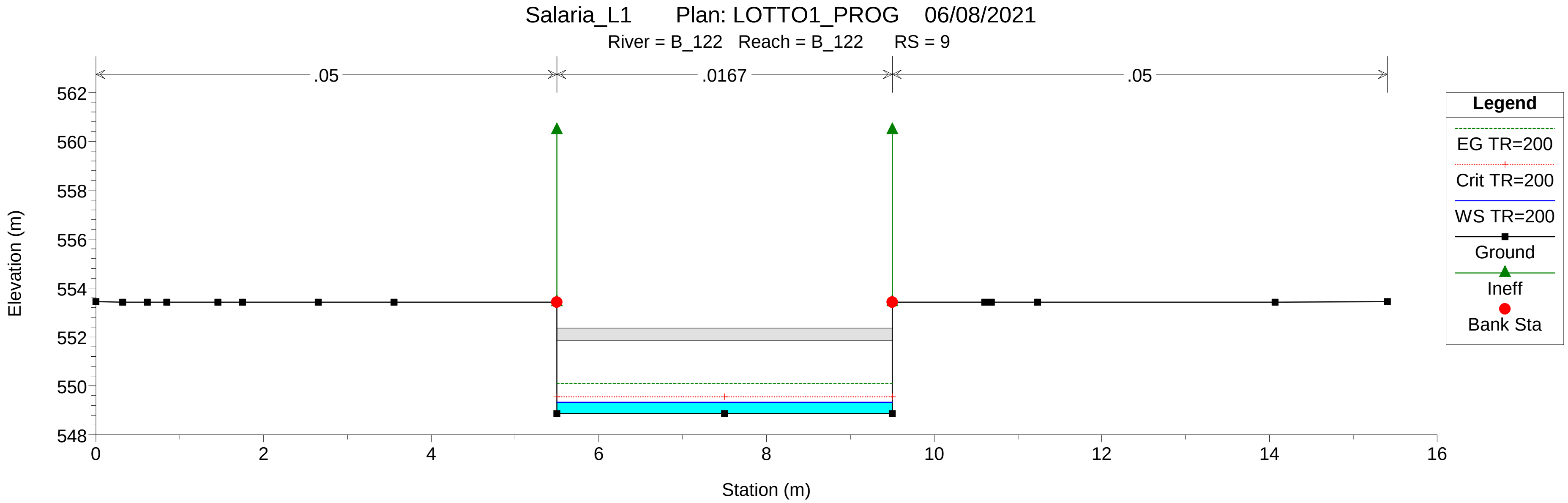

Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 170
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

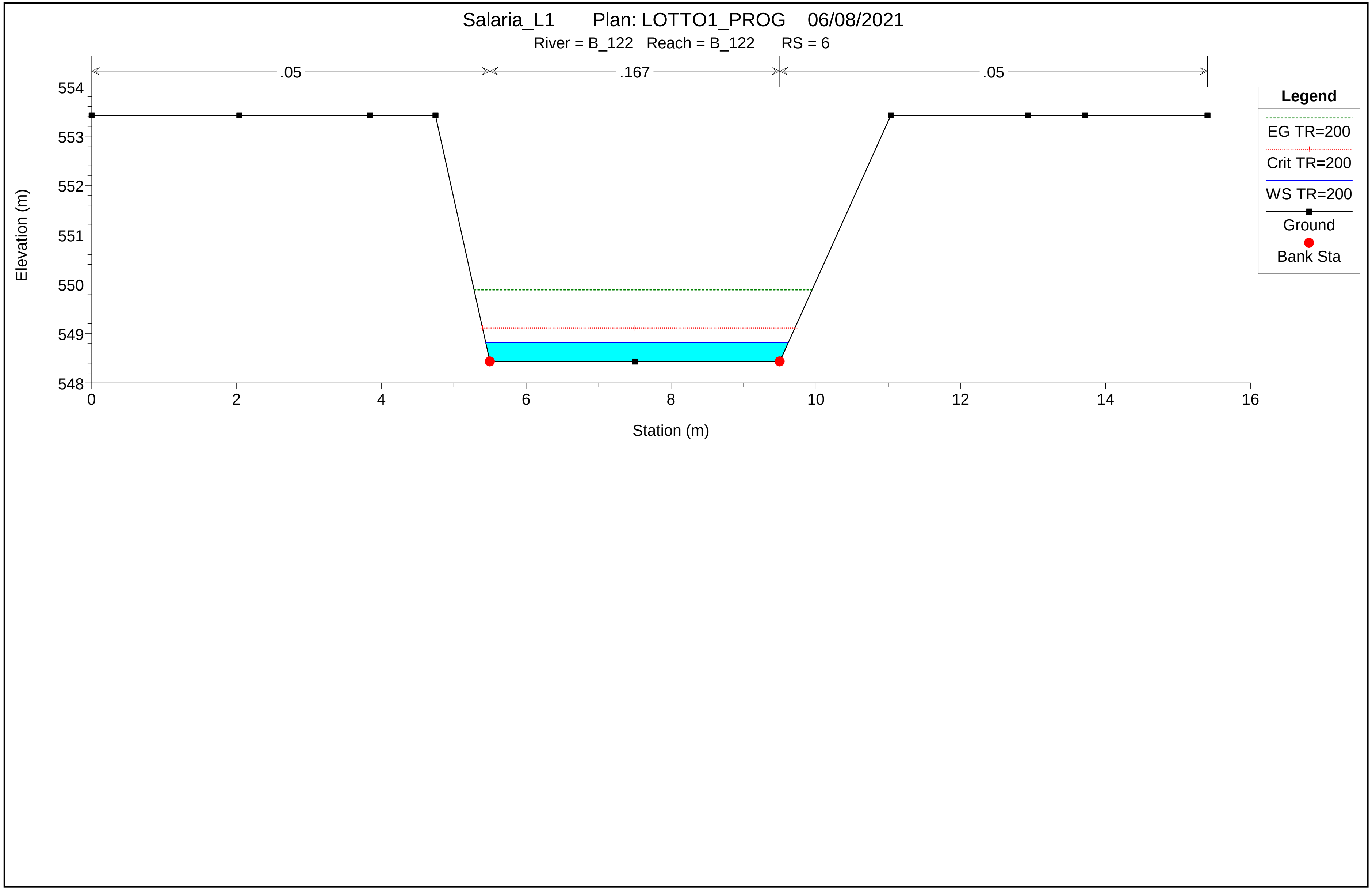

Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 149
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 145
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 86
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta

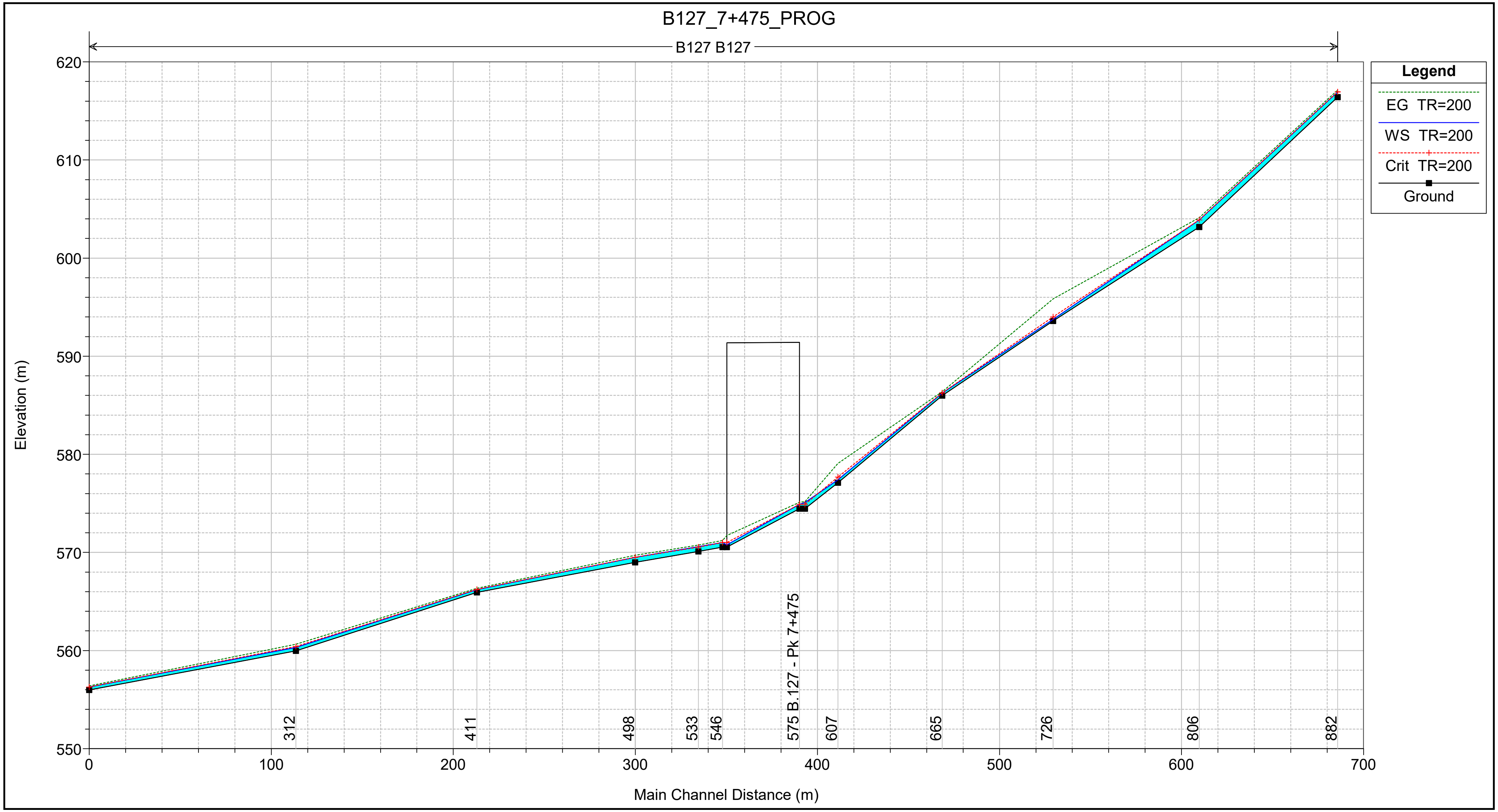

Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 79
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta


Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 9
.05
.0167
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Ineff
Bank Sta



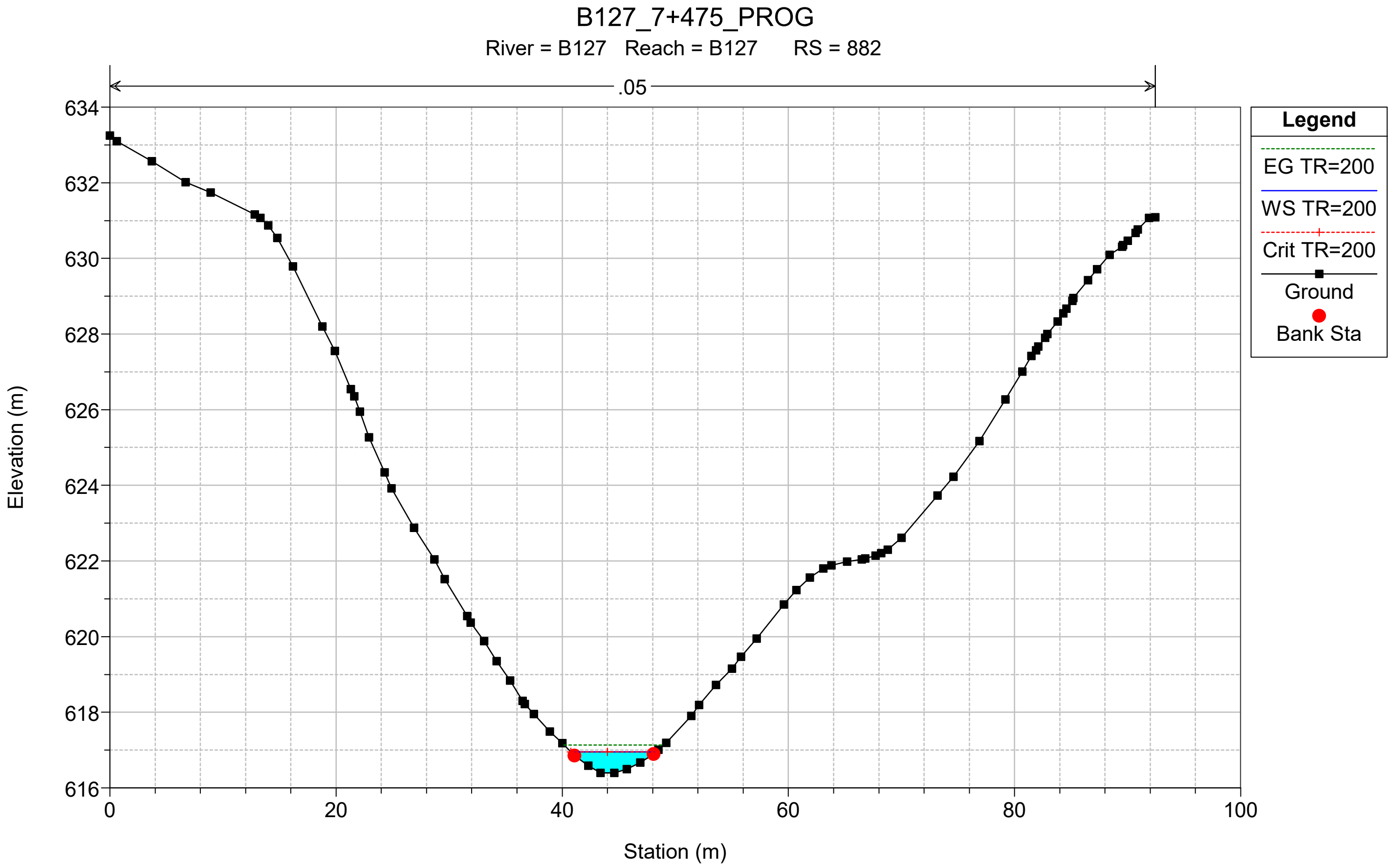
Salaria_L1 Plan: LOTTO1_PROG 06/08/2021
River = B_122 Reach = B_122 RS = 6
.05
.167
.05
554
553
552
551
550
549
548
Elevation (m)
0
2
4
6
8
10
12
14
16
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

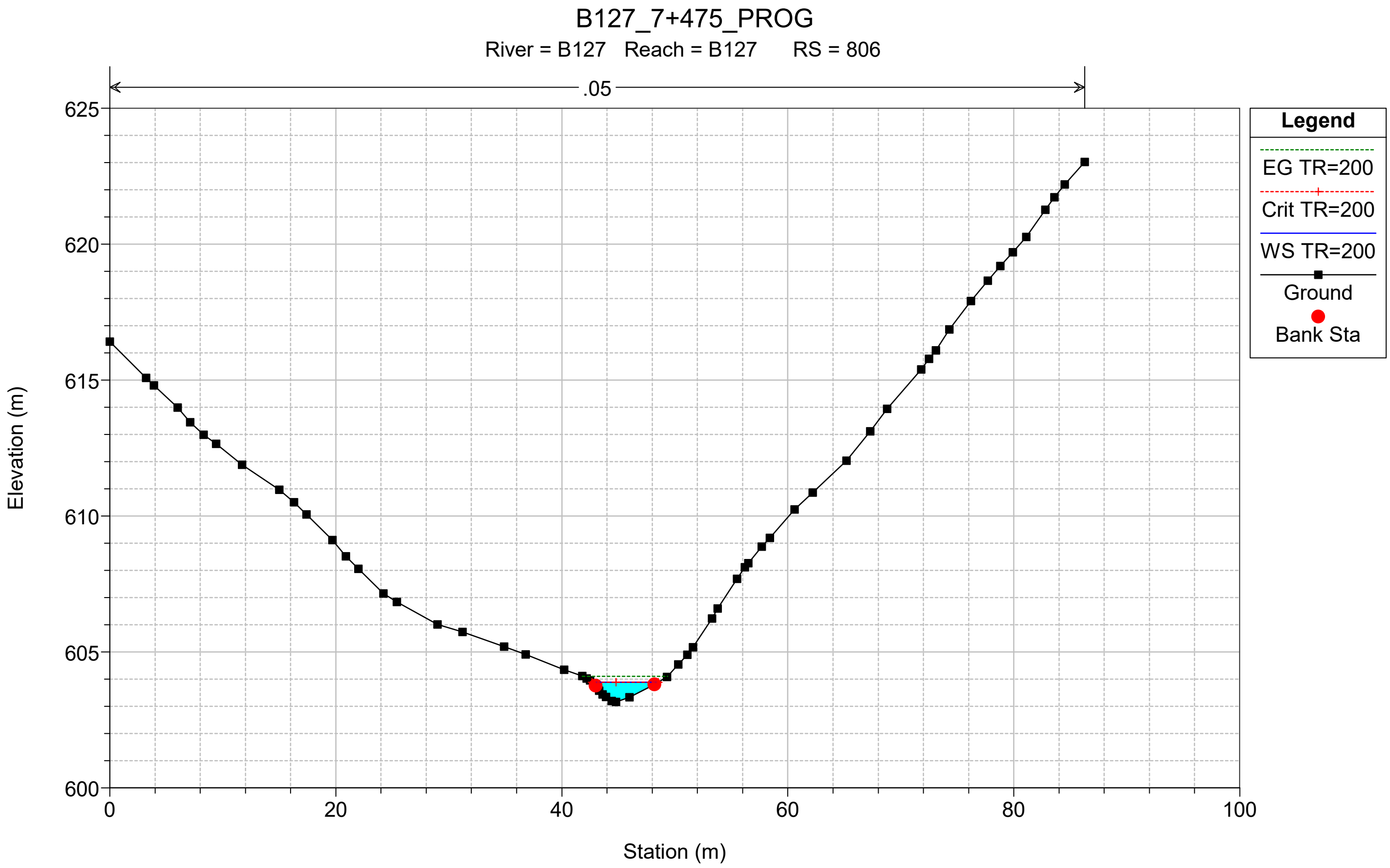
2.2.10. PROGETTO
B.127 - Progr.7+475

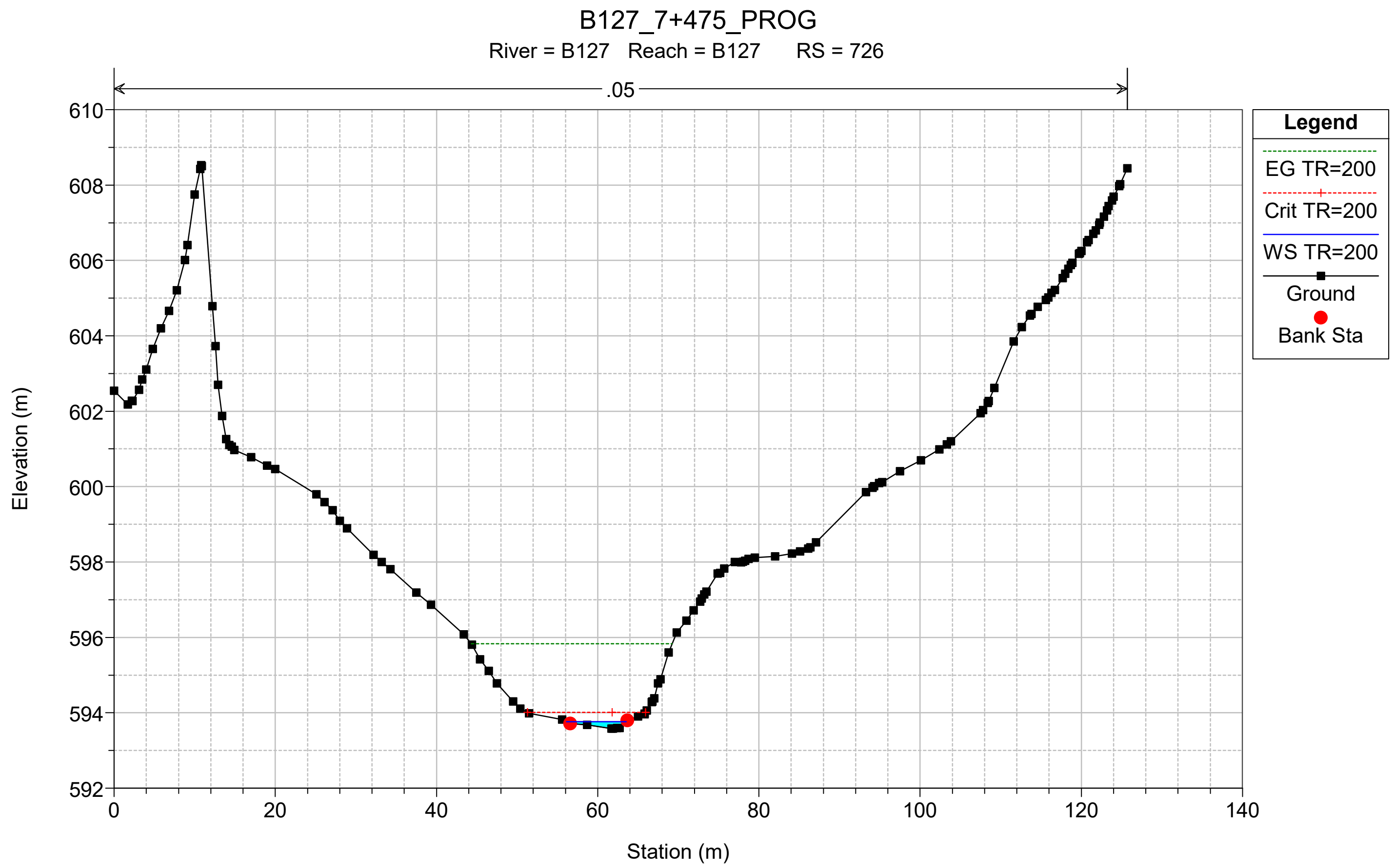

B127_7+475_PROG
B127 B127
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Elevation (m)
Main Channel Distance (m)
620
610
600
590
580
570
560
550
0
100
200
300
400
500
600
700
312
411
498
533
546
575 B.127 - Pk 7+475
607
665
726
806
882

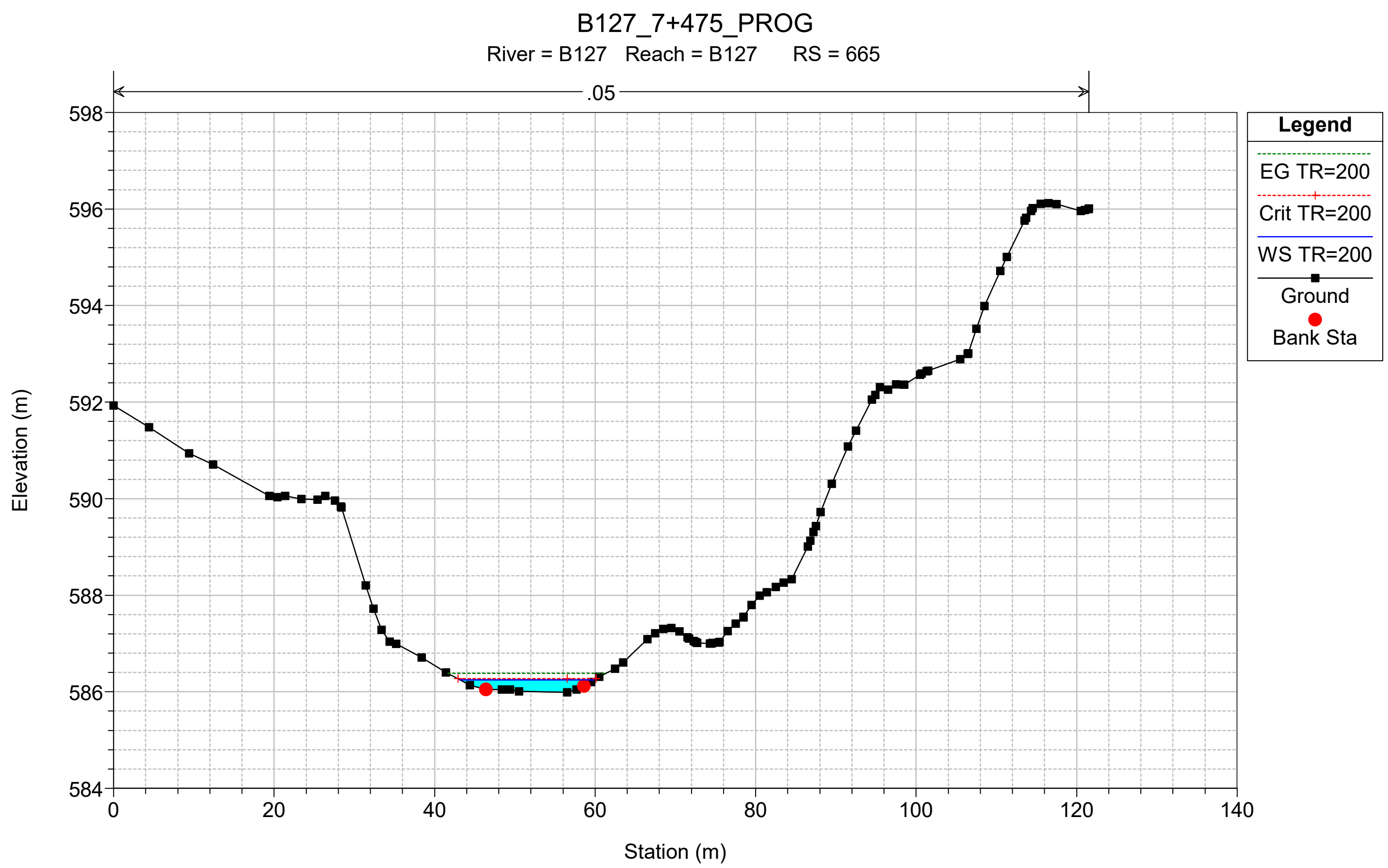
HEC-RAS Plan: B127_7+475_PROG River: B127 Reach: B127 Profile: TR=200

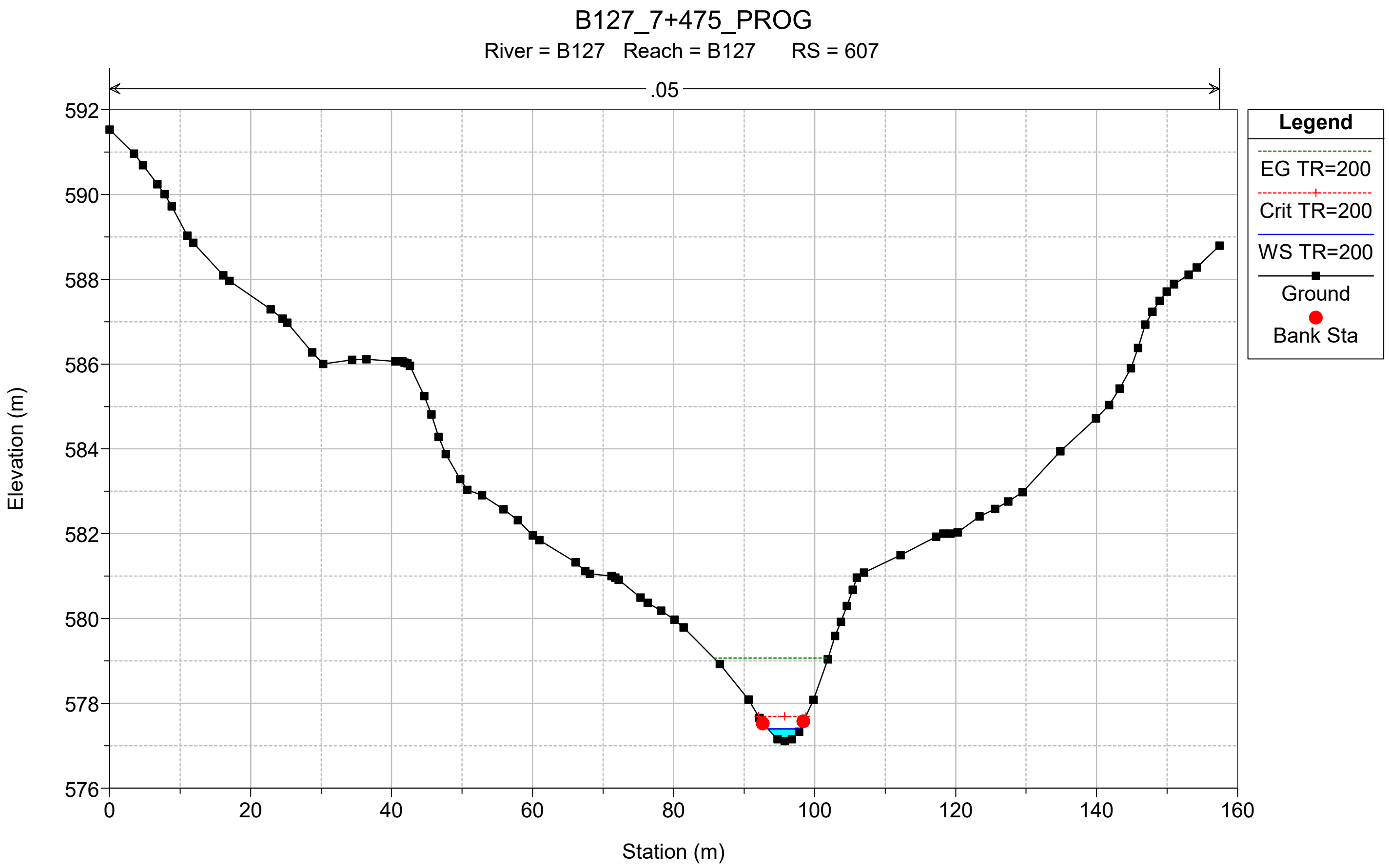
Reach	River Sta	Profile	Q Total	Min Ch El	Max Chl Dpth	W.S. Elev	Crit W.S.	Diff	Froude # Chl	E.G. Elev	Vel Chnl	Vel Total	Hydr Radius C	Shear Chan	Hydr Depth
			(m3/s)	(m)	(m)	(m)	(m)			(m)	(m/s)	(m/s)	(m)	(N/m2)	(m)
B127	882	TR=200	5.00	616.40	0.55	616.95	616.95	0.00	1.00	617.13	1.91	1.89	0.37	124.05	0.35
B127	806	TR=200	5.00	603.16	0.72	603.88	603.88	0.00	0.99	604.11	2.09	2.07	0.44	140.39	0.41
B127	726	TR=200	5.00	593.58	0.18	593.76	594.01	-0.25	6.07	595.83	6.38	6.32	0.11	2069.49	0.11
B127	665	TR=200	5.00	585.99	0.26	586.25	586.27	-0.02	1.10	586.38	1.64	1.55	0.23	108.90	0.19
B127	607	TR=200	5.00	577.11	0.29	577.40	577.69	-0.29	4.20	579.07	5.73	5.73	0.19	1404.64	0.19
B127	589	TR=200	5.00	574.46	0.62	575.08	574.90	0.18	0.60	575.17	1.37	1.37	0.51	57.42	0.53
B127	575		Bridge												
B127	546	TR=200	5.00	570.55	0.46	571.01	571.01	0.00	1.00	571.21	1.97	1.97	0.38	131.98	0.39
B127	533	TR=200	5.00	570.10	0.48	570.58	570.55	0.03	0.90	570.75	1.82	1.82	0.40	110.38	0.42
B127	498	TR=200	5.00	568.99	0.51	569.50	569.50	0.00	0.99	569.70	2.05	1.97	0.43	136.56	0.40
B127	411	TR=200	5.00	565.92	0.29	566.21	566.23	-0.02	1.10	566.36	1.70	1.64	0.24	113.80	0.21
B127	312	TR=200	5.00	559.98	0.35	560.33	560.42	-0.09	1.41	560.64	2.55	2.40	0.33	229.30	0.28
B127	198	TR=200	5.00	555.98	0.30	556.28	556.28	0.00	0.96	556.41	1.59	1.54	0.28	95.28	0.25

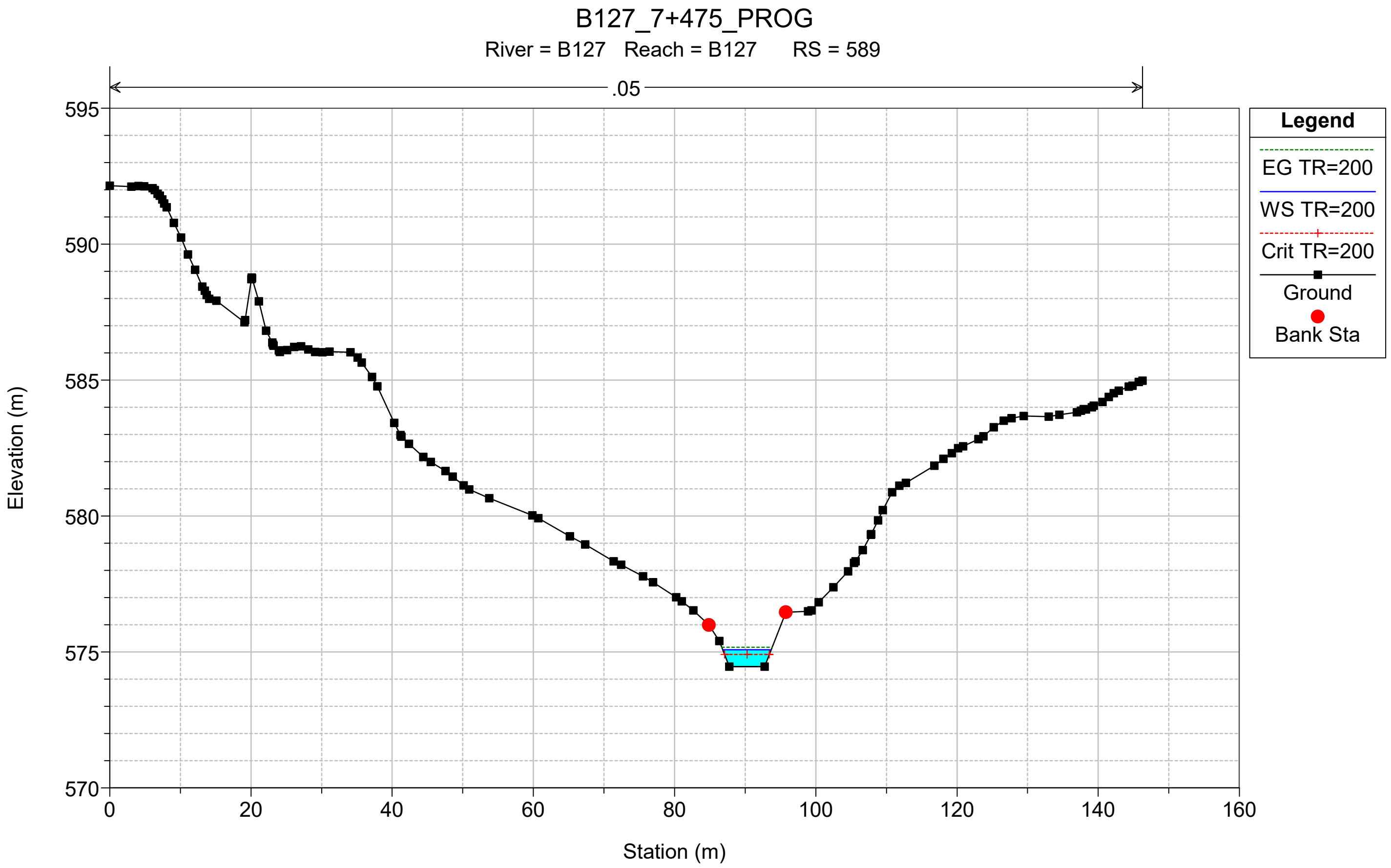

B127_7+475_PROG
River = B127 Reach = B127 RS = 882
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
634
632
630
628
626
624
622
620
618
616
0
20
40
60
80
100

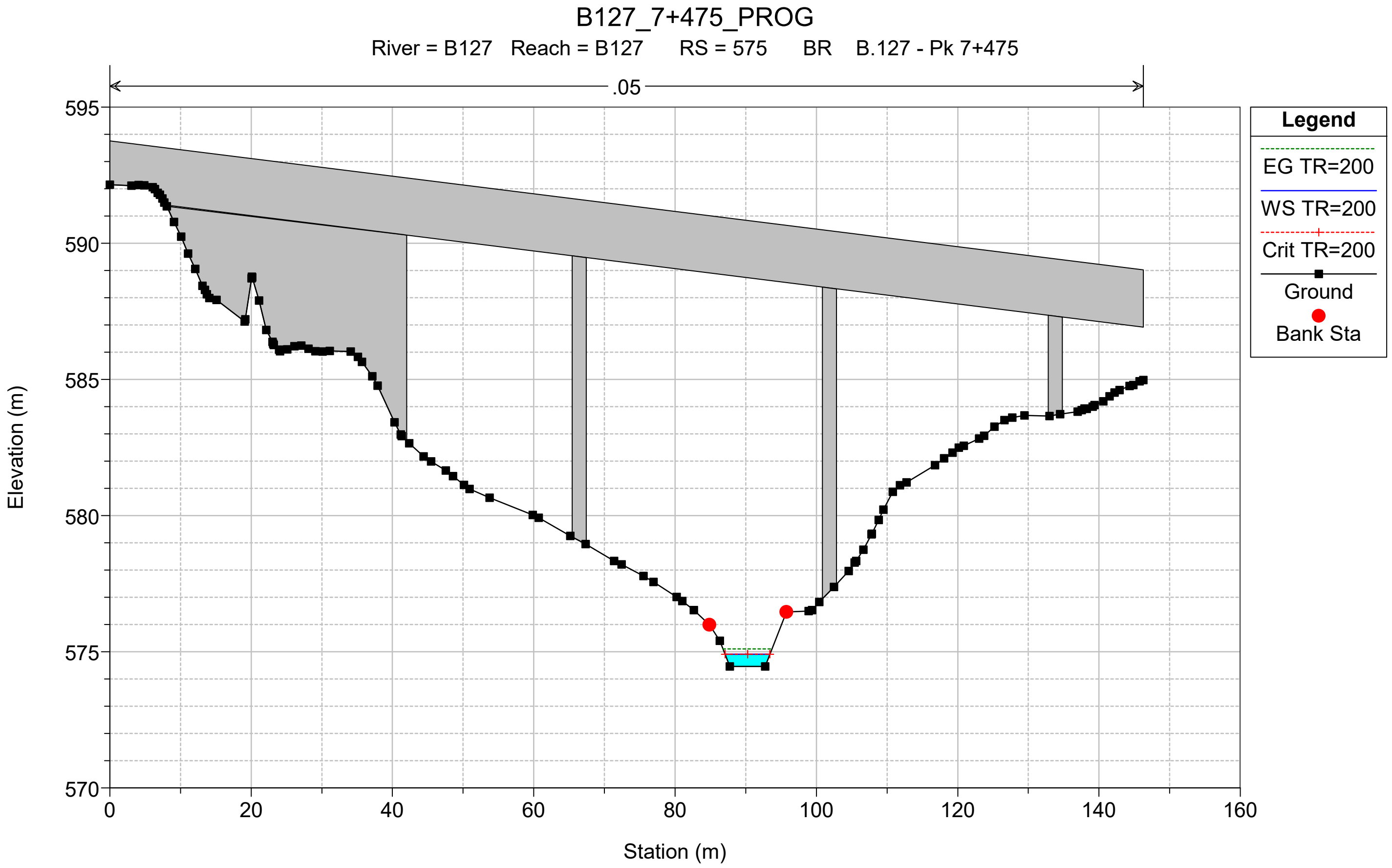

B127_7+475_PROG
River = B127 Reach = B127 RS = 806
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
625
620
615
610
605
600
0
20
40
60
80
100


B127_7+475_PROG
River = B127 Reach = B127 RS = 726
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta

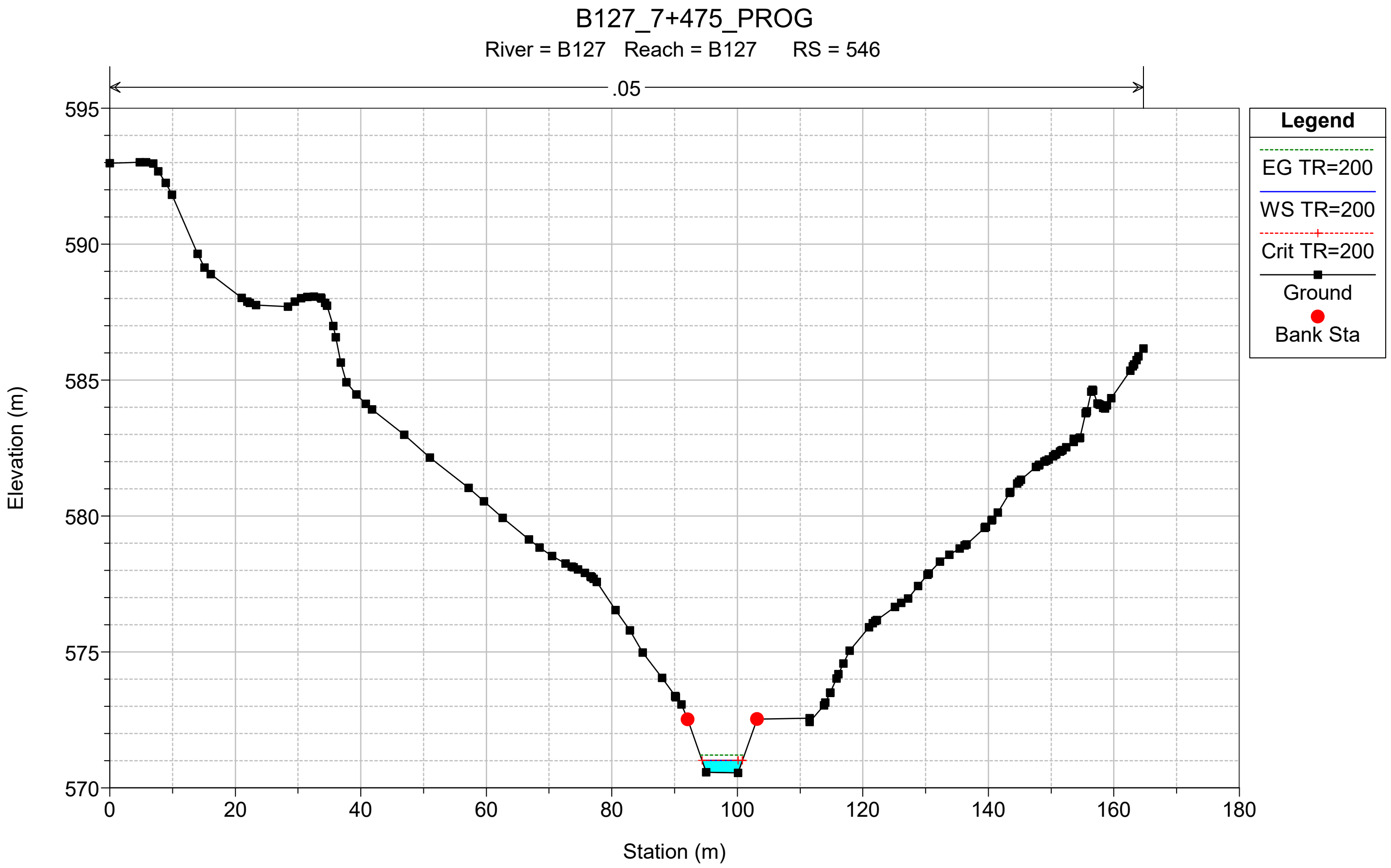

B127_7+475_PROG
River = B127 Reach = B127 RS = 665
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


B127_7+475_PROG
River = B127   Reach = B127   RS = 607
.05
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
592
590
588
586
584
582
580
578
576
0
20
40
60
80
100
120
140
160

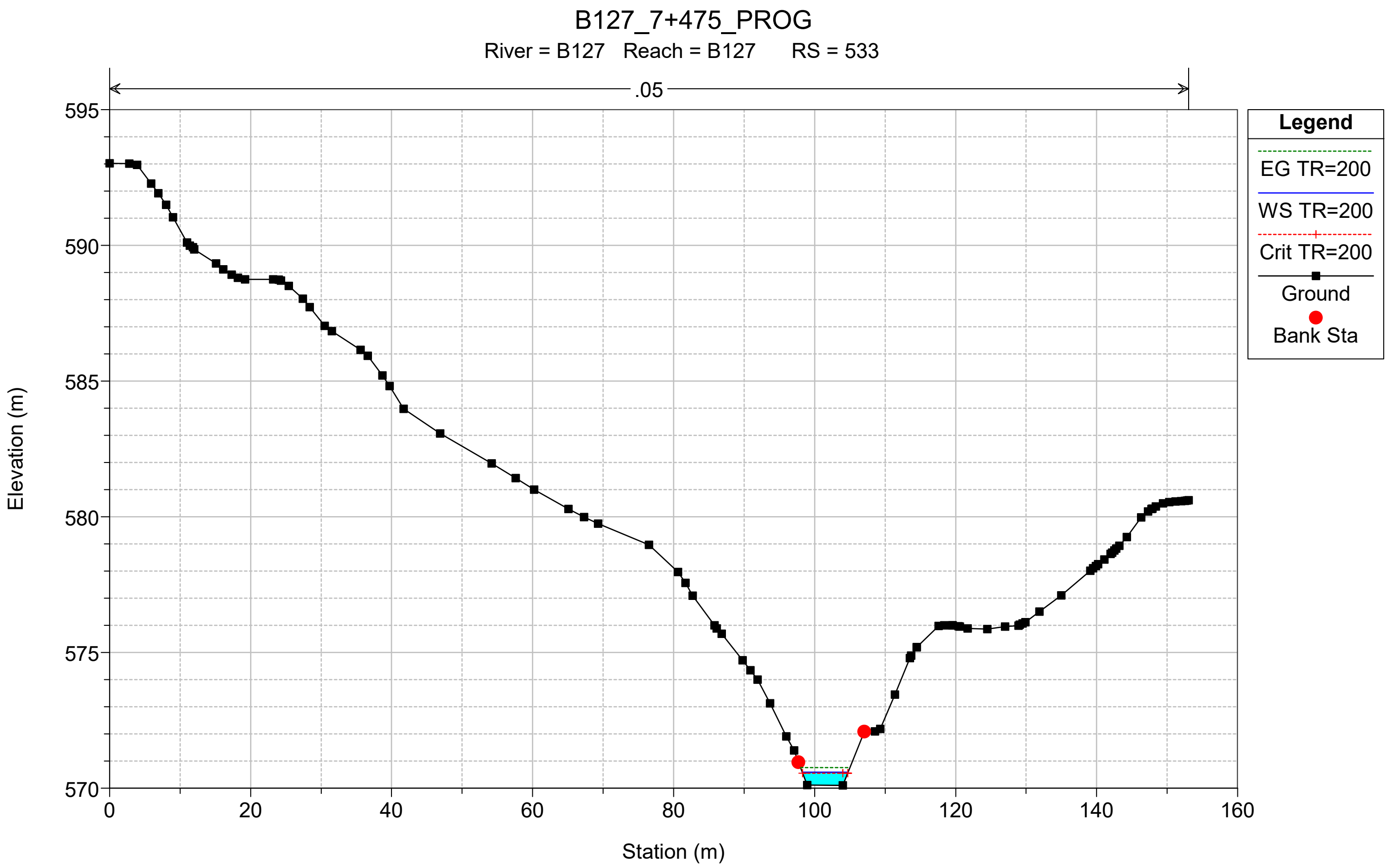

B127_7+475_PROG
River = B127   Reach = B127   RS = 589
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
595
590
585
580
575
570
0
20
40
60
80
100
120
140
160

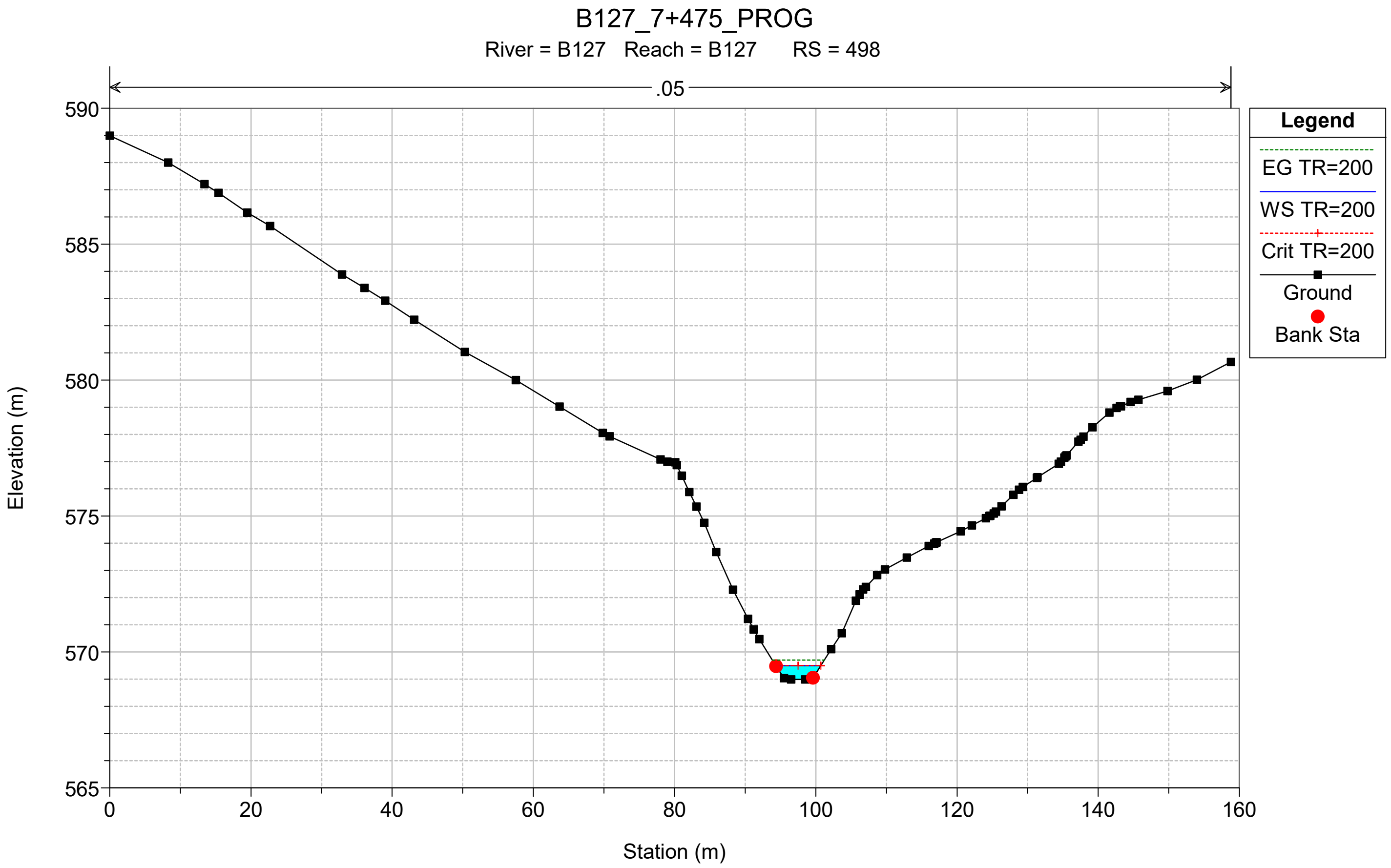


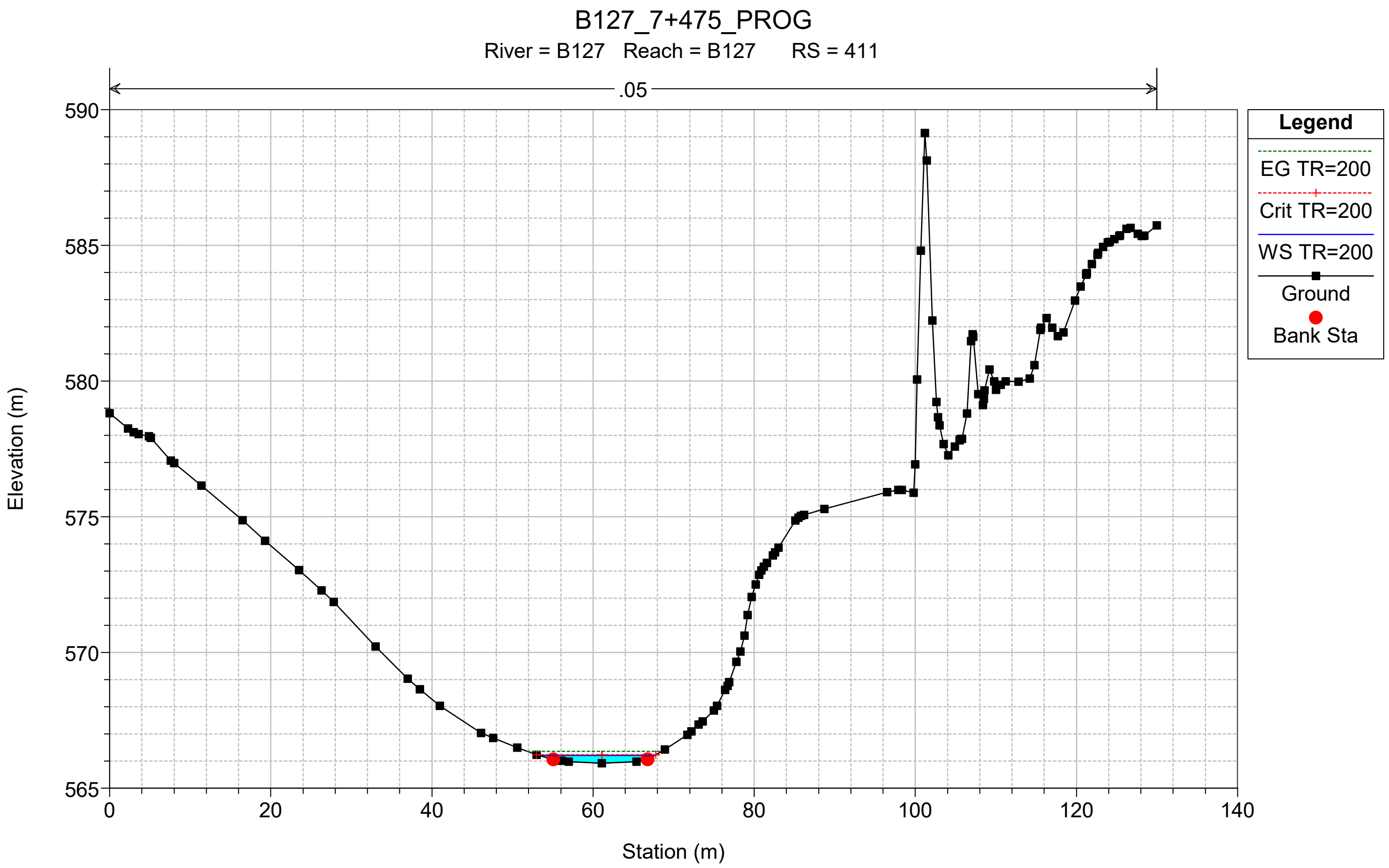
B127_7+475_PROG
River = B127 Reach = B127 RS = 575 BR B.127 - Pk 7+475
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
595
590
585
580
575
570
0
20
40
60
80
100
120
140
160

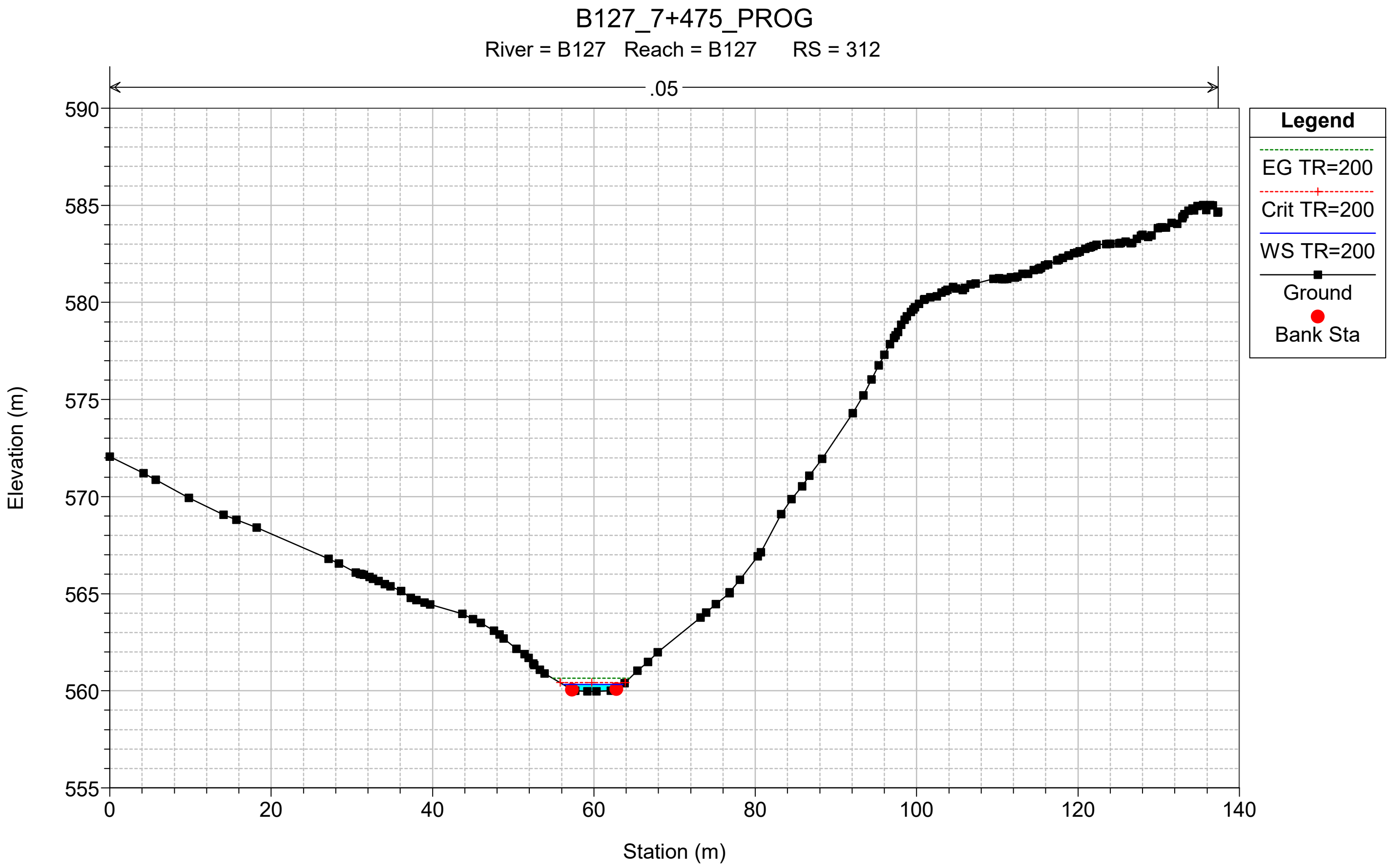


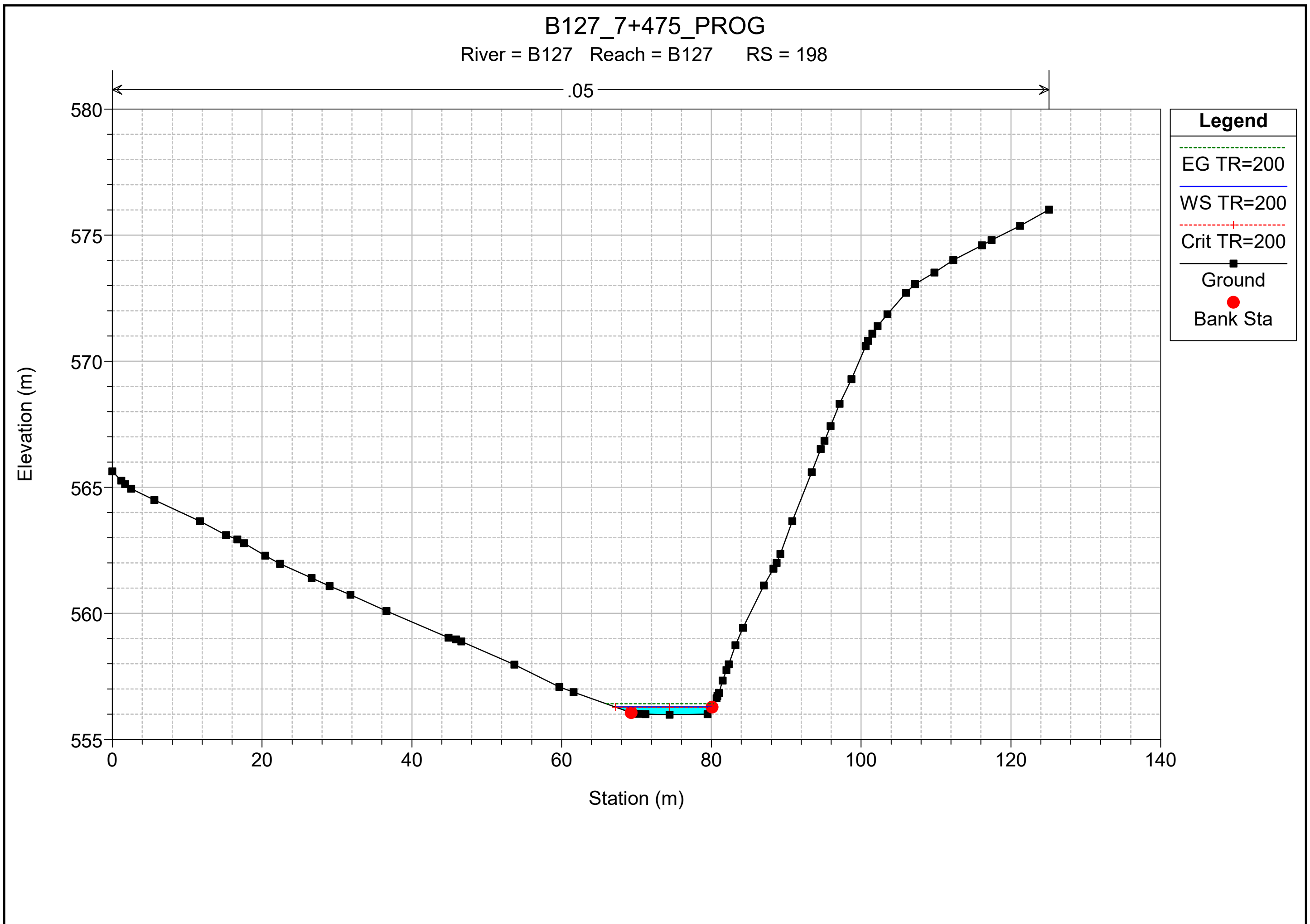
B127_7+475_PROG
River = B127 Reach = B127 RS = 546
.05
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta
Elevation (m)
Station (m)
595
590
585
580
575
570
0
20
40
60
80
100
120
140
160
180


B127_7+475_PROG
River = B127 Reach = B127 RS = 533
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


B127_7+475_PROG
River = B127 Reach = B127 RS = 498
.05
Elevation (m)
Station (m)
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta


B127_7+475_PROG
River = B127 Reach = B127 RS = 411
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


B127_7+475_PROG
River = B127 Reach = B127 RS = 312
.05
Elevation (m)
Station (m)
Legend
EG TR=200
Crit TR=200
WS TR=200
Ground
Bank Sta


B127_7+475_PROG
River = B127 Reach = B127 RS = 198
.05
Elevation (m)
Station (m)
580
575
570
565
560
555
0
20
40
60
80
100
120
140
Legend
EG TR=200
WS TR=200
Crit TR=200
Ground
Bank Sta

3 ALLEGATO III - RISULTATI SIMULAZIONI INLET/OUTLET CONTROL

3.1.1. C.101.1 - Progr.0+100

Table 1 - Summary of Culvert Flows at Crossing: TO.02 - 0+100

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	DN1000 Discharge (cms)	Roadway Discharge (cms)	Iterations
281.72	TR=50	0.47	0.47	0.00	1
281.83	TR=100	0.61	0.61	0.00	1
281.95	TR=200	0.77	0.77	0.00	1
284.00	Overtopping	2.53	2.53	0.00	Overtopping

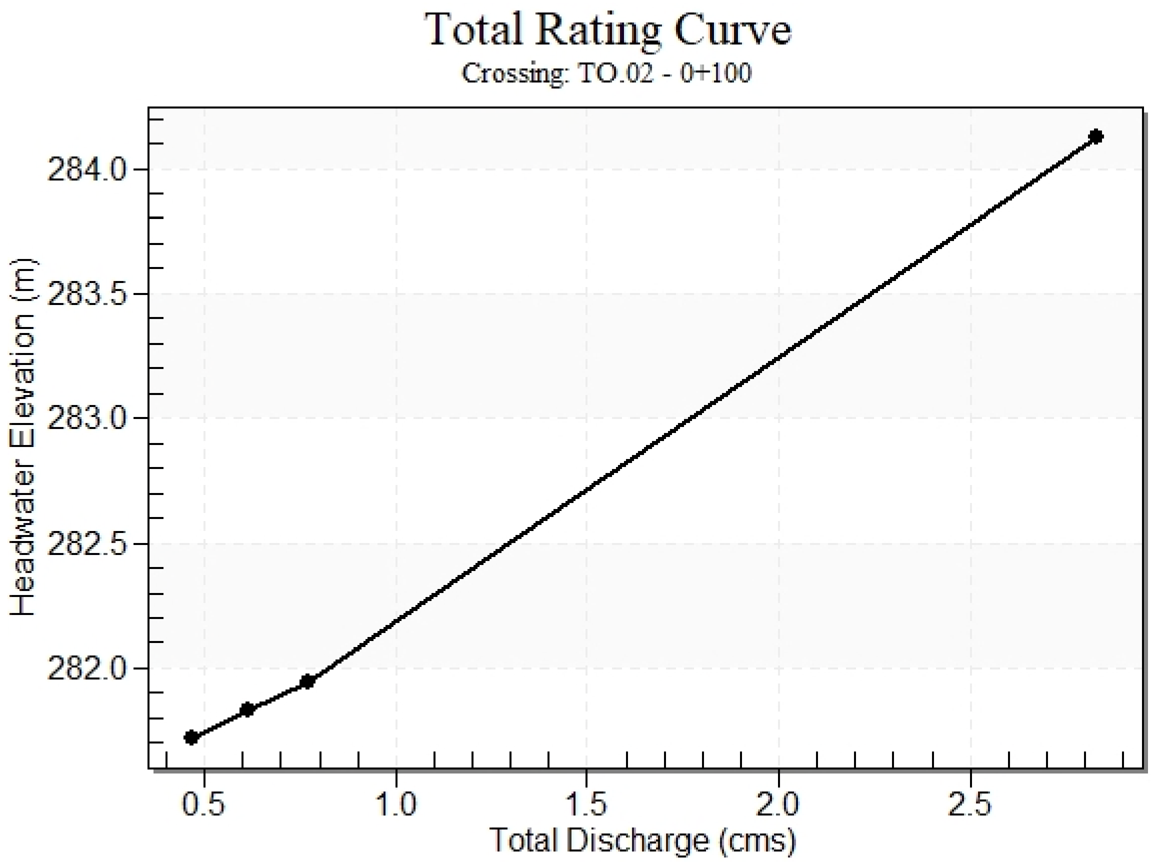


Table 2 - Culvert Summary Table: DN1000

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.47	0.47	281.72	0.572	0.309	1-S2n	0.329	0.386	0.334	0.160	2.046	3.217
TR=100	0.61	0.61	281.83	0.682	0.398	1-S2n	0.379	0.444	0.386	0.187	2.196	3.496
TR=200	0.77	0.77	281.95	0.794	0.499	1-S2n	0.431	0.501	0.439	0.214	2.332	3.748

****

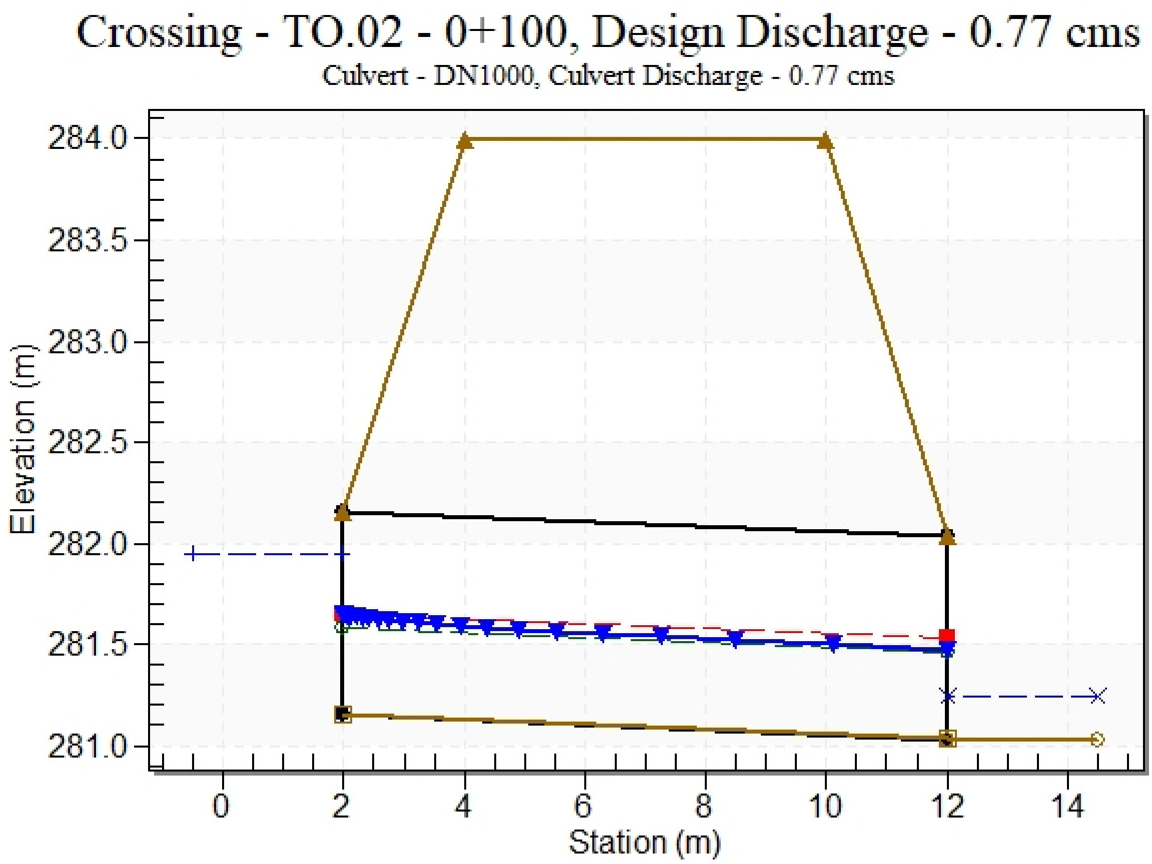
Straight Culvert

Inlet Elevation (invert): 281.15 m, Outlet Elevation (invert): 281.03 m

Culvert Length: 10.00 m, Culvert Slope: 0.0120

****

Water Surface Profile Plot for Culvert: DN1000



Site Data - DN1000

Site Data Option: Culvert Invert Data

Inlet Station: 2.00 m

Inlet Elevation: 281.15 m

Outlet Station: 12.00 m

Outlet Elevation: 281.03 m

Number of Barrels: 1

Culvert Data Summary - DN1000

Barrel Shape: Circular

Barrel Diameter: 1000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: TO.02 - 0+100)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.47	281.19	0.16	3.22	78.35	2.79
0.61	281.22	0.19	3.50	91.70	2.83
0.77	281.24	0.21	3.75	104.75	2.86

Tailwater Channel Data - TO.02 - 0+100

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 0.75 m

Side Slope (H:V): 1.00 (_:1)

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 281.03 m

Roadway Data for Crossing: TO.02 - 0+100

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 6.00 m

Crest Elevation: 284.00 m

Roadway Surface: Paved

Roadway Top Width: 6.00 m

3.1.2. C.101.2 - Progr.0+270

Table 1 - Summary of Culvert Flows at Crossing: TO.03 - 0+270

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
288.21	TR=50	0.24	0.24	0.00	1
288.25	TR=100	0.32	0.32	0.00	1
288.30	TR=200	0.41	0.41	0.00	1
302.00	Overtopping	37.21	37.21	0.00	Overtopping

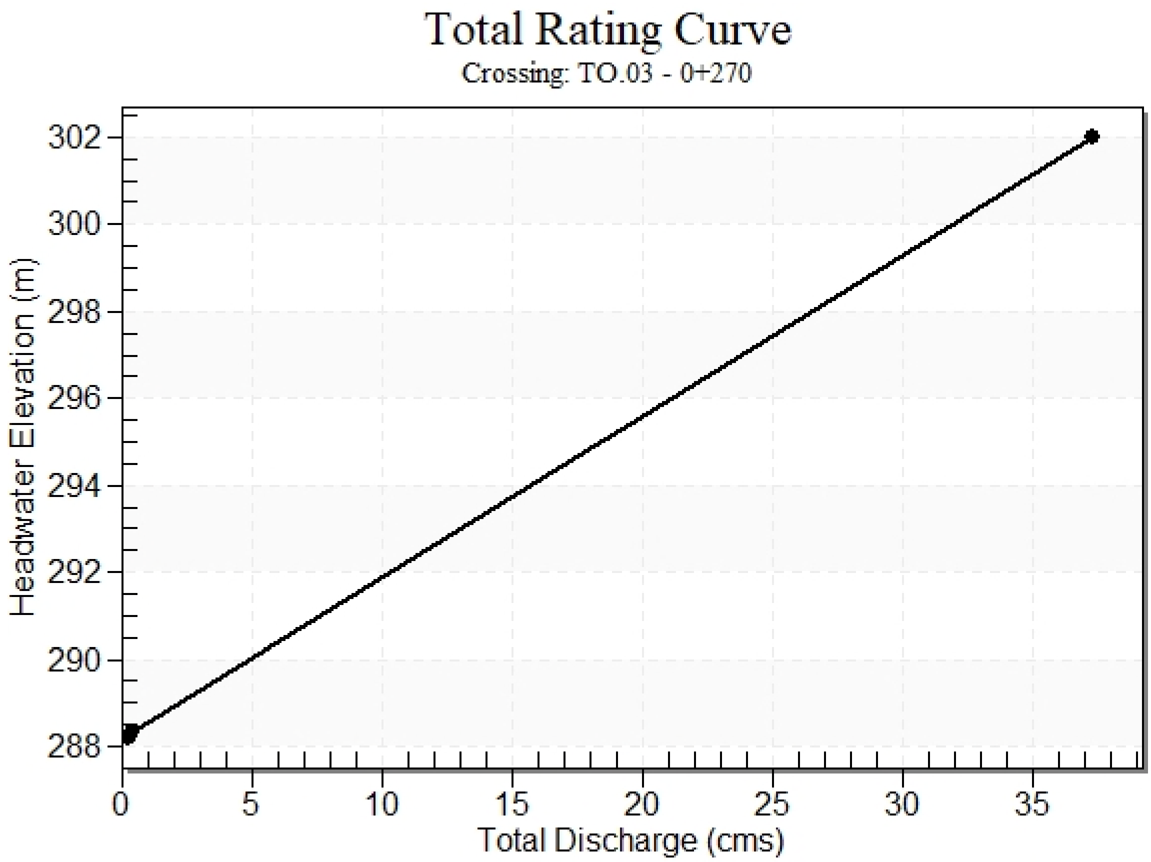


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.24	0.24	288.21	0.178	0.0*	1-S2n	0.099	0.112	0.099	0.061	1.197	1.950
TR=100	0.32	0.32	288.25	0.222	0.0*	1-S2n	0.118	0.137	0.118	0.073	1.343	2.184
TR=200	0.41	0.41	288.30	0.272	0.0*	1-S2n	0.138	0.162	0.138	0.085	1.470	2.403

* Full Flow Headwater elevation is below inlet invert.

****

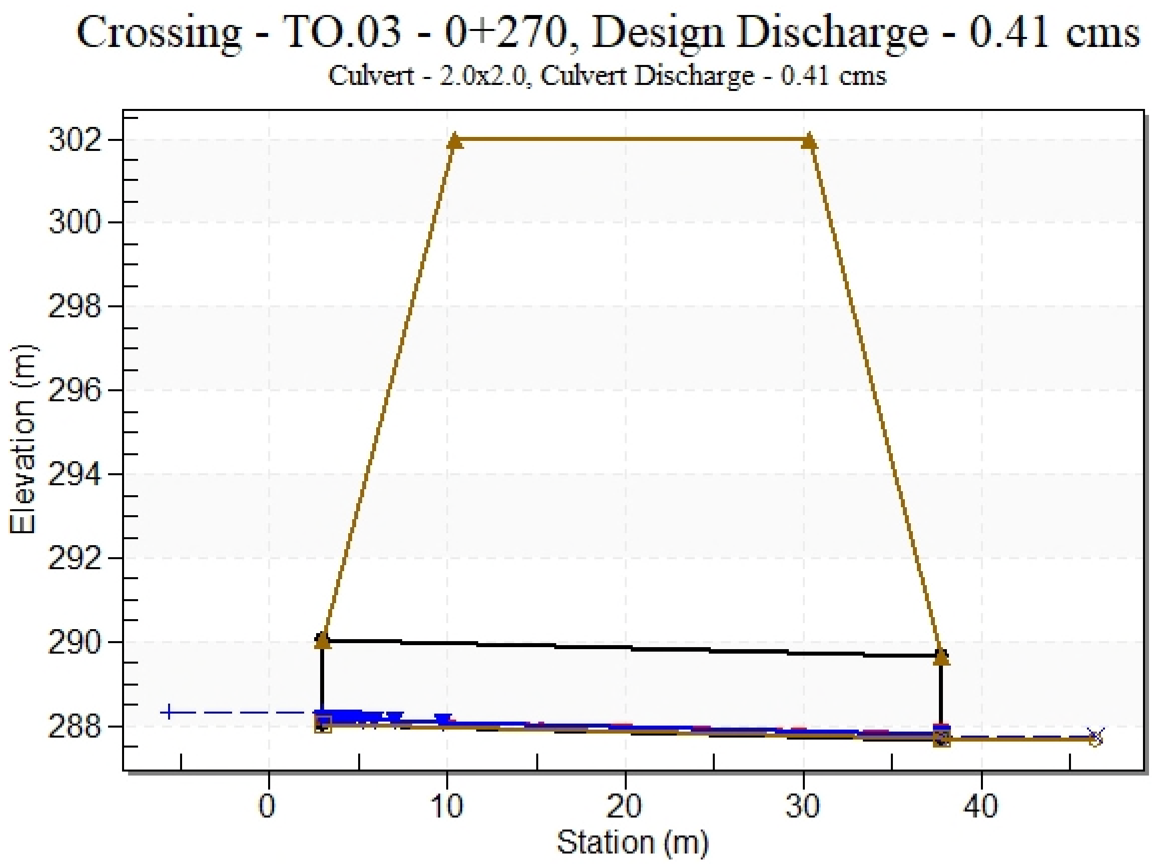
Straight Culvert

Inlet Elevation (invert): 288.03 m,   Outlet Elevation (invert): 287.68 m

Culvert Length: 34.80 m,   Culvert Slope: 0.0101

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 288.03 m

Outlet Station: 37.80 m

Outlet Elevation: 287.68 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.03 - 0+270)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.24	287.74	0.06	1.95	29.65	2.53
0.32	287.75	0.07	2.18	35.57	2.59
0.41	287.76	0.08	2.40	41.50	2.64

Tailwater Channel Data - TO.03 - 0+270

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 287.68 m

Roadway Data for Crossing: TO.03 - 0+270

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.50 m

Crest Elevation: 302.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.3. C.101.3 - Progr.0+346

Table 1 - Summary of Culvert Flows at Crossing: TO.04 - 0+350

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
292.14	TR=50	1.06	1.06	0.00	1
292.25	TR=100	1.42	1.42	0.00	1
292.37	TR=200	1.83	1.83	0.00	1
305.00	Overtopping	36.35	36.35	0.00	Overtopping

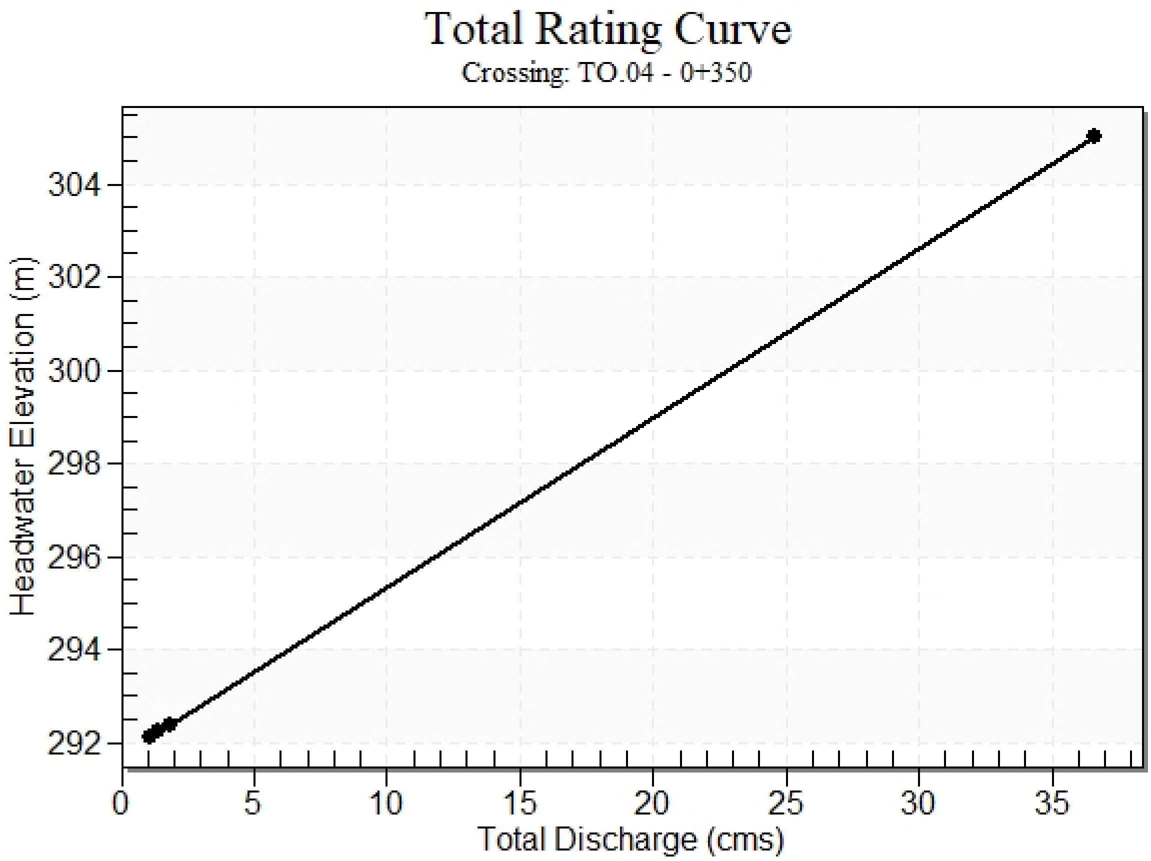


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	1.06	1.06	292.14	0.519	0.0*	1-S2n	0.254	0.305	0.254	0.154	2.086	3.435
TR=100	1.42	1.42	292.25	0.632	0.005	1-S2n	0.308	0.372	0.308	0.186	2.308	3.826
TR=200	1.83	1.83	292.37	0.748	0.082	1-S2n	0.365	0.440	0.365	0.219	2.510	4.185

* Full Flow Headwater elevation is below inlet invert.

****

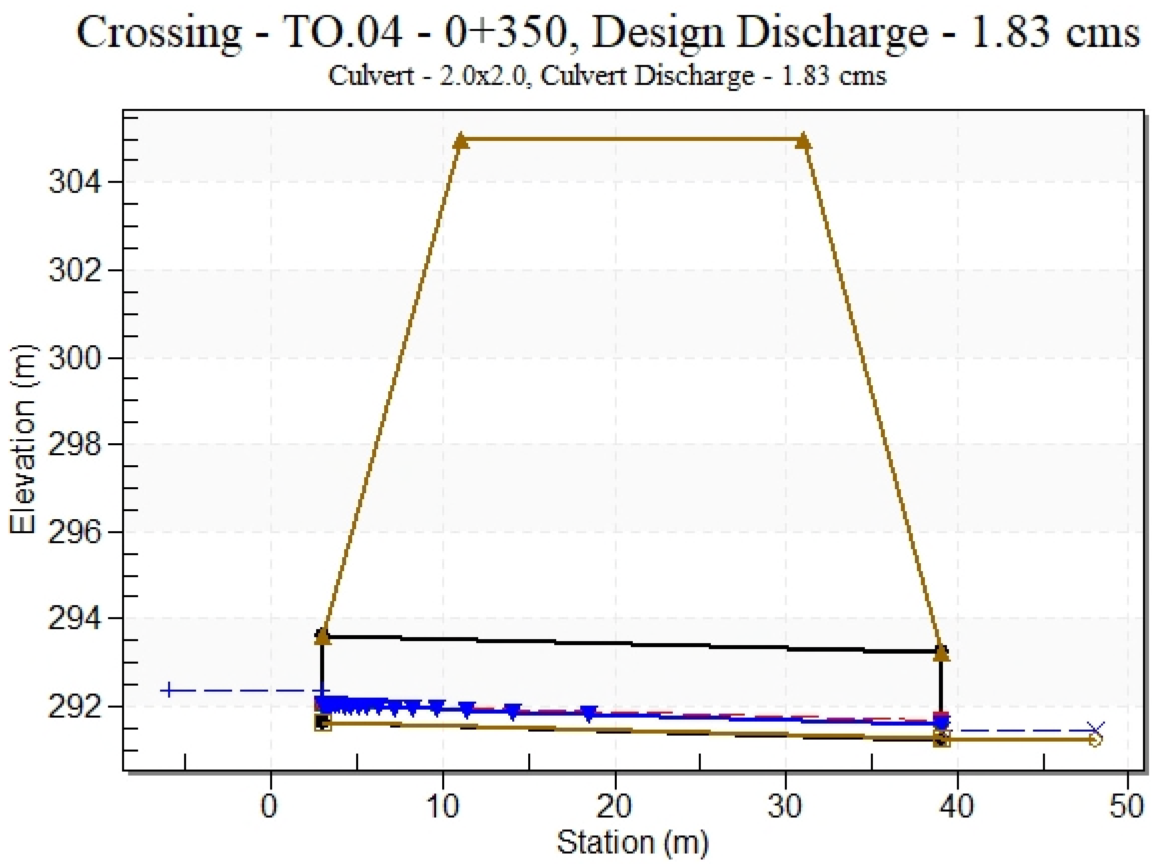
Straight Culvert

Inlet Elevation (invert): 291.62 m, Outlet Elevation (invert): 291.24 m

Culvert Length: 36.10 m, Culvert Slope: 0.0105

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 291.62 m

Outlet Station: 39.10 m

Outlet Elevation: 291.24 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.04 - 0+350)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
1.06	291.39	0.15	3.43	75.49	2.79
1.42	291.43	0.19	3.83	91.15	2.83
1.83	291.46	0.22	4.19	107.16	2.86

Tailwater Channel Data - TO.04 - 0+350

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 291.24 m

Roadway Data for Crossing: TO.04 - 0+350

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.50 m

Crest Elevation: 305.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.4. C.101.4 - Progr.0+400

Table 1 - Summary of Culvert Flows at Crossing: TO.05 - 0+400

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	DN1000 Discharge (cms)	Roadway Discharge (cms)	Iterations
302.88	TR=50	0.48	0.48	0.00	1
303.01	TR=100	0.64	0.64	0.00	1
303.14	TR=200	0.83	0.83	0.00	1
306.00	Overtopping	2.95	2.95	0.00	Overtopping

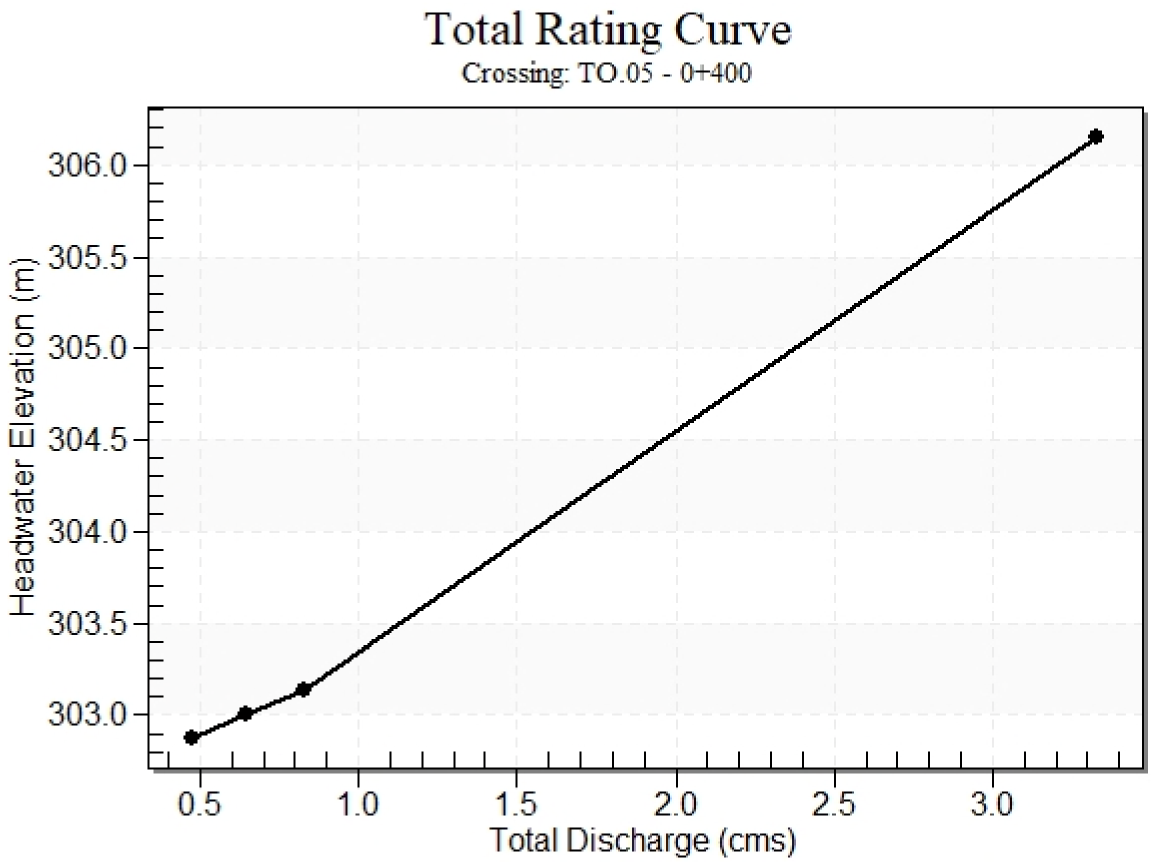


Table 2 - Culvert Summary Table: DN1000

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.48	0.48	302.88	0.579	0.352	1-S2n	0.336	0.389	0.343	0.152	2.002	3.136
TR=100	0.64	0.64	303.01	0.705	0.454	1-S2n	0.395	0.456	0.405	0.186	2.166	3.469
TR=200	0.83	0.83	303.14	0.837	0.571	1-S2n	0.455	0.521	0.467	0.221	2.317	3.767

****

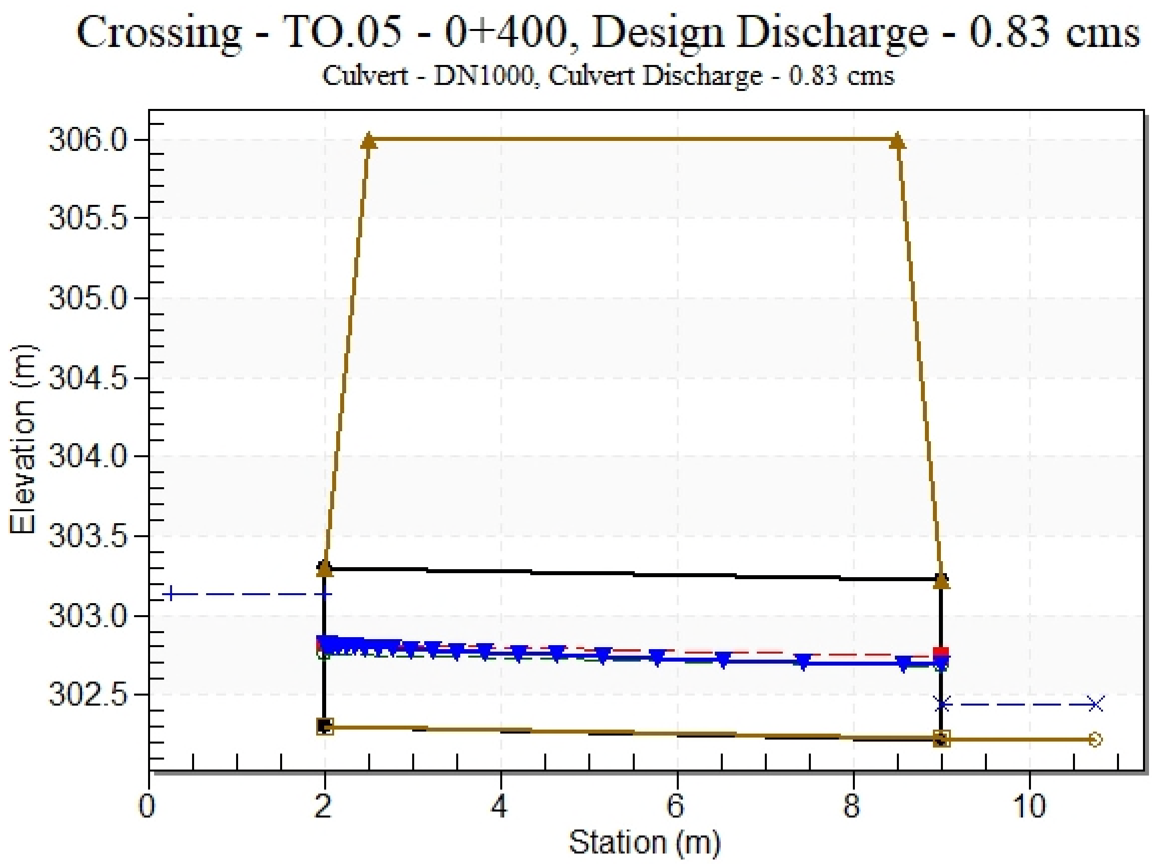
Straight Culvert

Inlet Elevation (invert): 302.30 m,   Outlet Elevation (invert): 302.22 m

Culvert Length: 7.00 m,   Culvert Slope: 0.0114

****

Water Surface Profile Plot for Culvert: DN1000



Site Data - DN1000

Site Data Option: Culvert Invert Data

Inlet Station: 2.00 m

Inlet Elevation: 302.30 m

Outlet Station: 9.00 m

Outlet Elevation: 302.22 m

Number of Barrels: 1

Culvert Data Summary - DN1000

Barrel Shape: Circular

Barrel Diameter: 1000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: TO.05 - 0+400)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.48	302.37	0.15	3.14	74.38	2.57
0.64	302.41	0.19	3.47	90.99	2.57
0.83	302.44	0.22	3.77	108.26	2.56

Tailwater Channel Data - TO.05 - 0+400

Tailwater Channel Option: Rectangular Channel

Bottom Width: 1.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 302.22 m

Roadway Data for Crossing: TO.05 - 0+400

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 6.00 m

Crest Elevation: 306.00 m

Roadway Surface: Paved

Roadway Top Width: 6.00 m

3.1.5. C.101.5 - Progr.0+597

Table 1 - Summary of Culvert Flows at Crossing: TO.06 - 0+610

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
303.40	TR=50	0.99	0.99	0.00	1
303.53	TR=100	1.43	1.43	0.00	1
303.68	TR=200	1.93	1.93	0.00	1
310.00	Overtopping	25.51	25.51	0.00	Overtopping

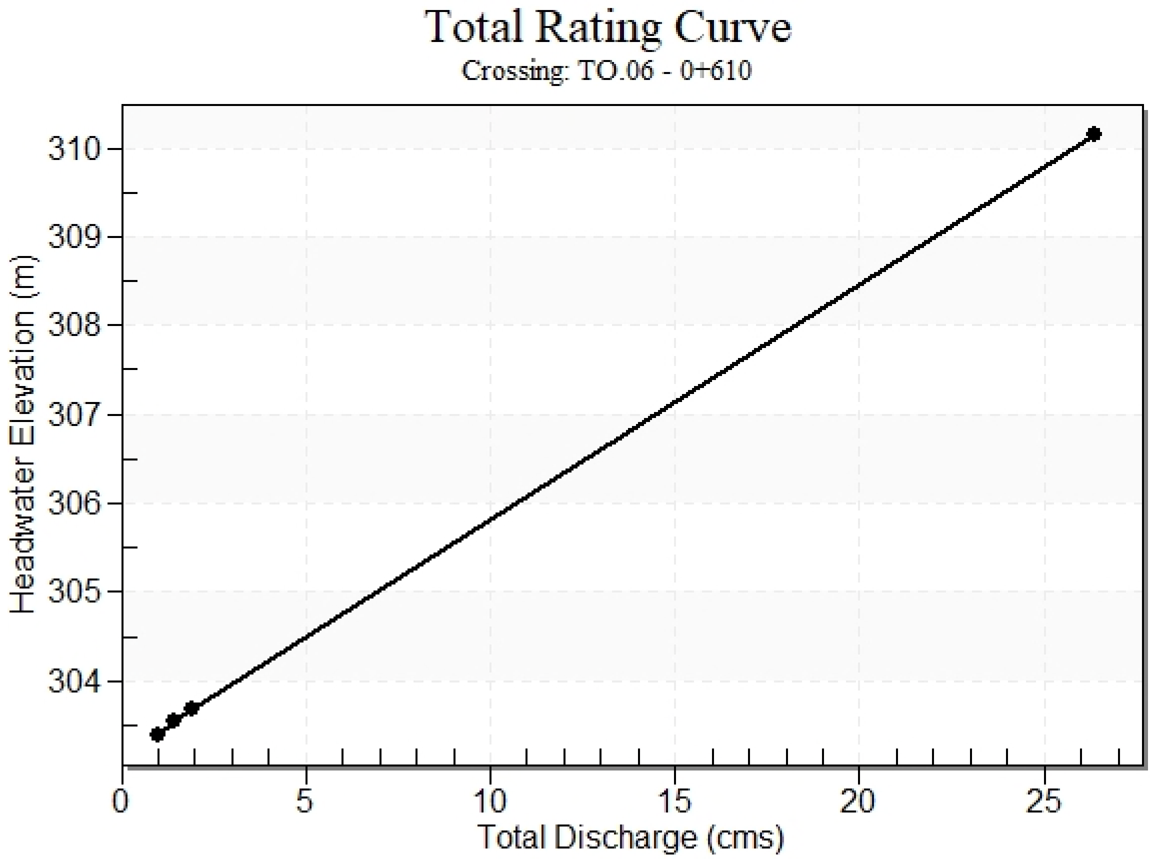


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.99	0.99	303.40	0.497	0.058	1-S2n	0.248	0.292	0.248	0.148	1.993	3.353
TR=100	1.43	1.43	303.53	0.634	0.145	1-S2n	0.316	0.373	0.318	0.186	2.245	3.828
TR=200	1.93	1.93	303.68	0.775	0.238	1-S2n	0.387	0.456	0.389	0.226	2.480	4.264

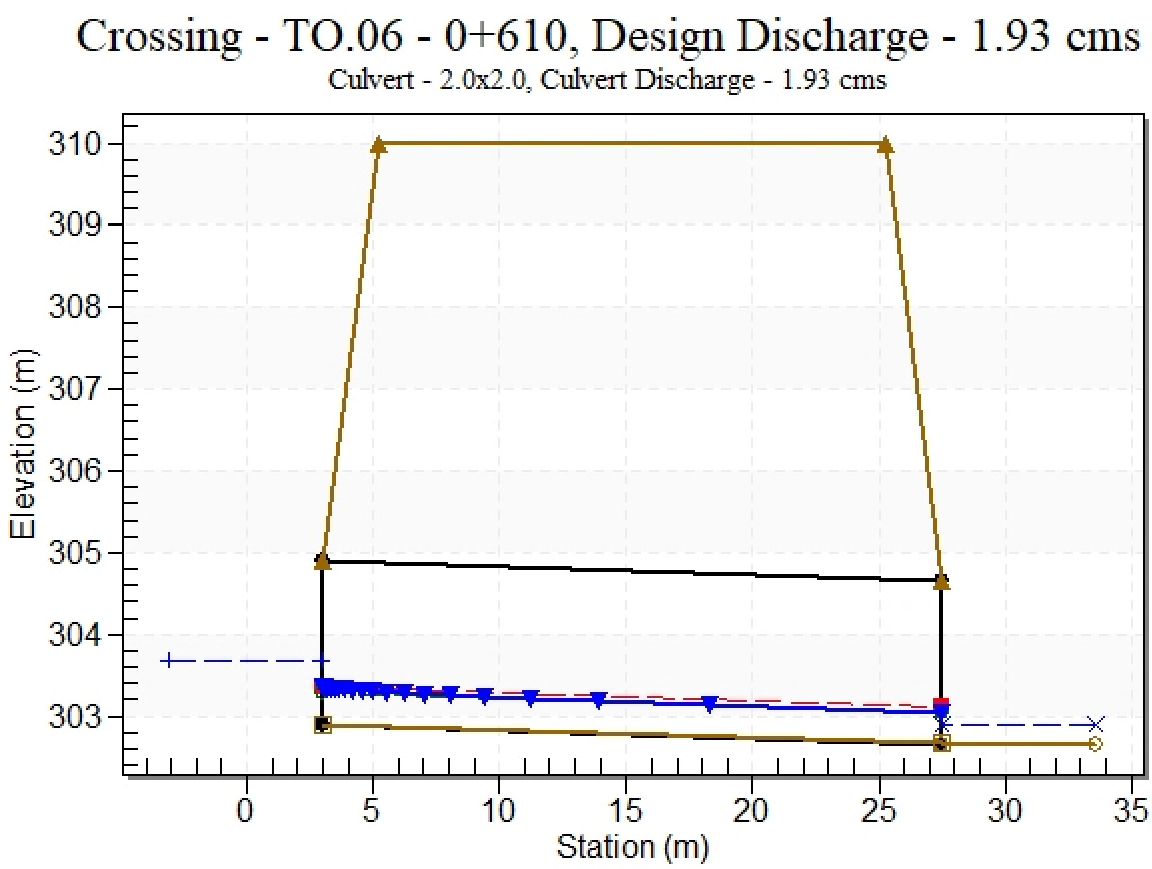
****

Straight Culvert

Inlet Elevation (invert): 302.90 m, Outlet Elevation (invert): 302.66 m

Culvert Length: 24.50 m, Culvert Slope: 0.0098

****



Water Surface Profile Plot for Culvert: 2.0x2.0

Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 302.90 m

Outlet Station: 27.50 m

Outlet Elevation: 302.66 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.06 - 0+610)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.99	302.81	0.15	3.35	72.36	2.79
1.43	302.85	0.19	3.83	91.29	2.83
1.93	302.89	0.23	4.26	110.92	2.86

Tailwater Channel Data - TO.06 - 0+610

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 302.66 m

Roadway Data for Crossing: TO.06 - 0+610

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 10.00 m

Crest Elevation: 310.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.6. C.102 - Progr.0+969

Table 1 - Summary of Culvert Flows at Crossing: TO.07 - 0+975

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
320.25	TR=50	1.15	1.15	0.00	1
320.41	TR=100	1.68	1.68	0.00	1
320.57	TR=200	2.29	2.29	0.00	1
325.00	Overtopping	21.24	21.24	0.00	Overtopping

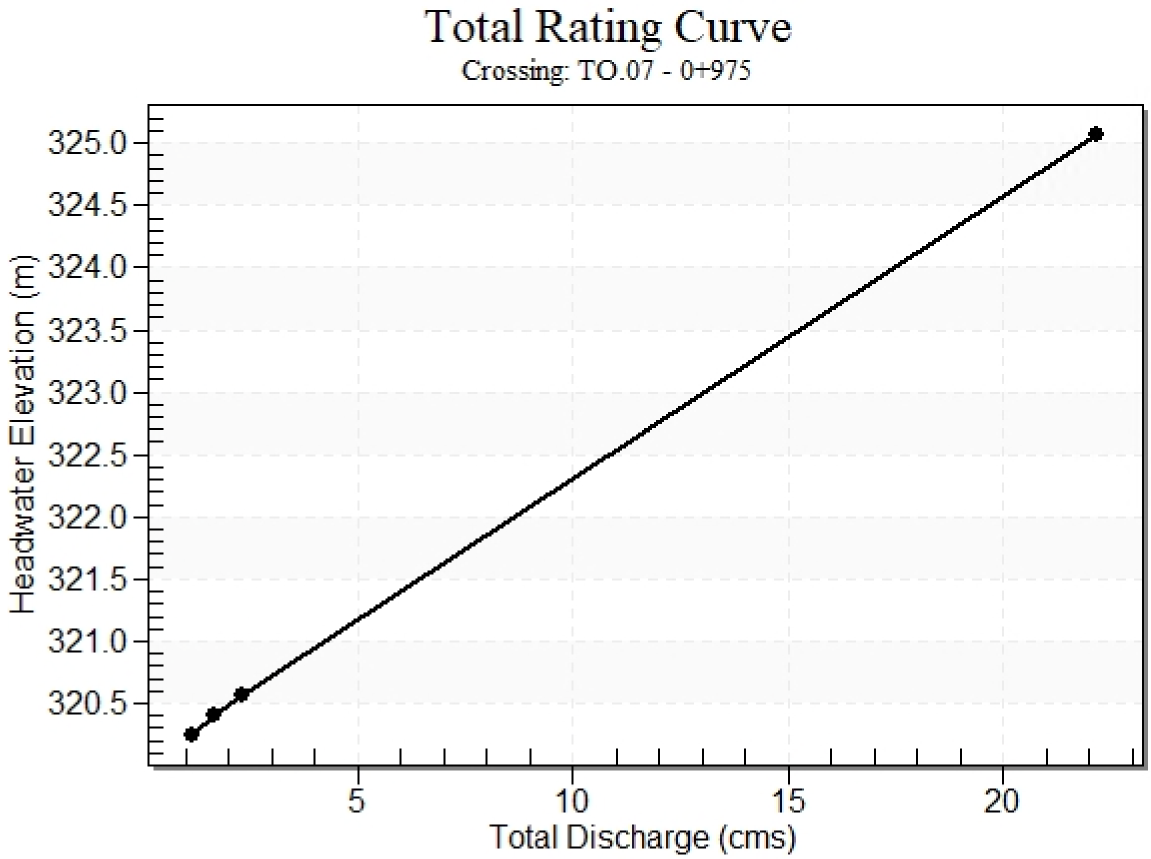


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	1.15	1.15	320.25	0.550	0.032	1-S2n	0.272	0.323	0.272	0.163	2.118	3.544
TR=100	1.68	1.68	320.41	0.707	0.133	1-S2n	0.350	0.416	0.350	0.207	2.402	4.060
TR=200	2.29	2.29	320.57	0.870	0.244	1-S2n	0.432	0.512	0.432	0.253	2.657	4.530

****

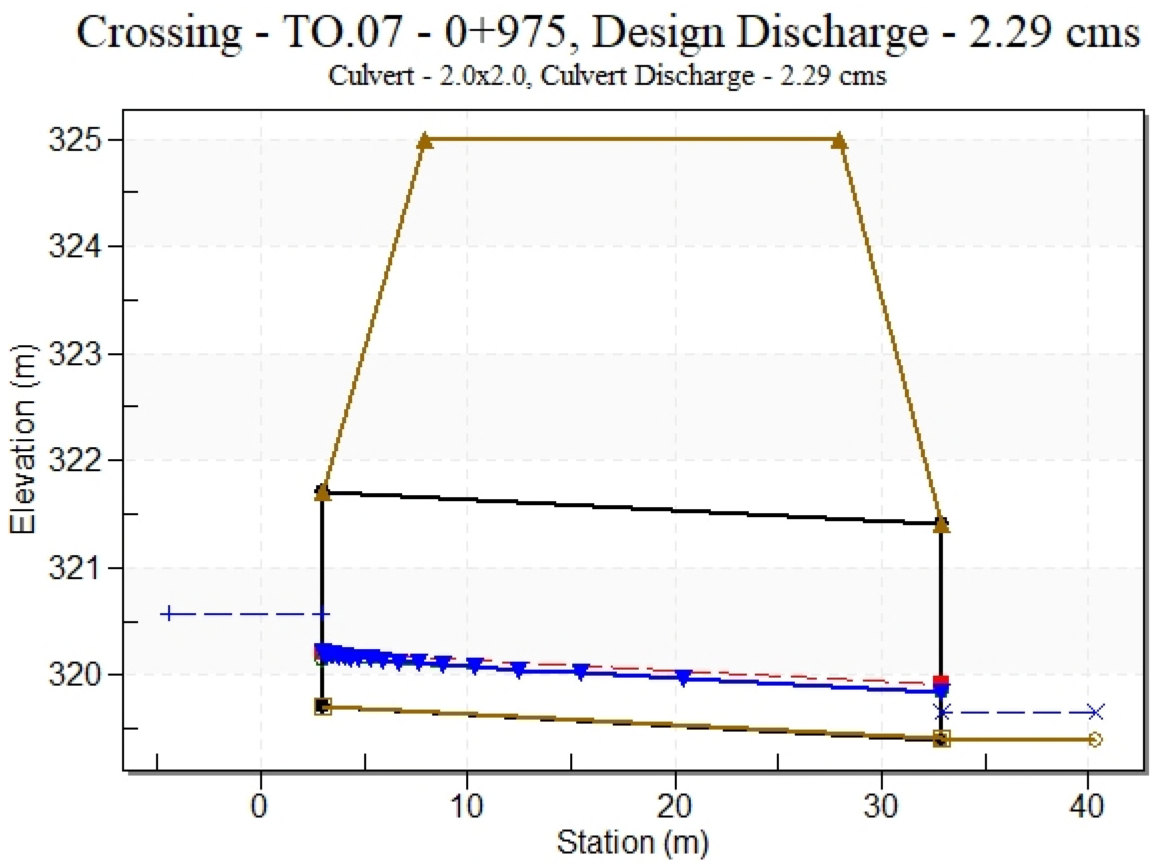
Straight Culvert

Inlet Elevation (invert): 319.70 m,   Outlet Elevation (invert): 319.40 m

Culvert Length: 29.90 m,   Culvert Slope: 0.0100

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 319.70 m

Outlet Station: 32.90 m

Outlet Elevation: 319.40 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.07 - 0+975)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
1.15	319.56	0.16	3.54	79.72	2.81
1.68	319.61	0.21	4.06	101.40	2.85
2.29	319.65	0.25	4.53	124.11	2.87

Tailwater Channel Data - TO.07 - 0+975

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 319.40 m

Roadway Data for Crossing: TO.07 - 0+975

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.50 m

Crest Elevation: 325.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.7. C.102.1 - Progr.1+070

Table 1 - Summary of Culvert Flows at Crossing: TO.08 - 1+075

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
323.60	TR=50	0.23	0.23	0.00	1
323.66	TR=100	0.36	0.36	0.00	1
323.74	TR=200	0.51	0.51	0.00	1
330.00	Overtopping	24.40	24.40	0.00	Overtopping

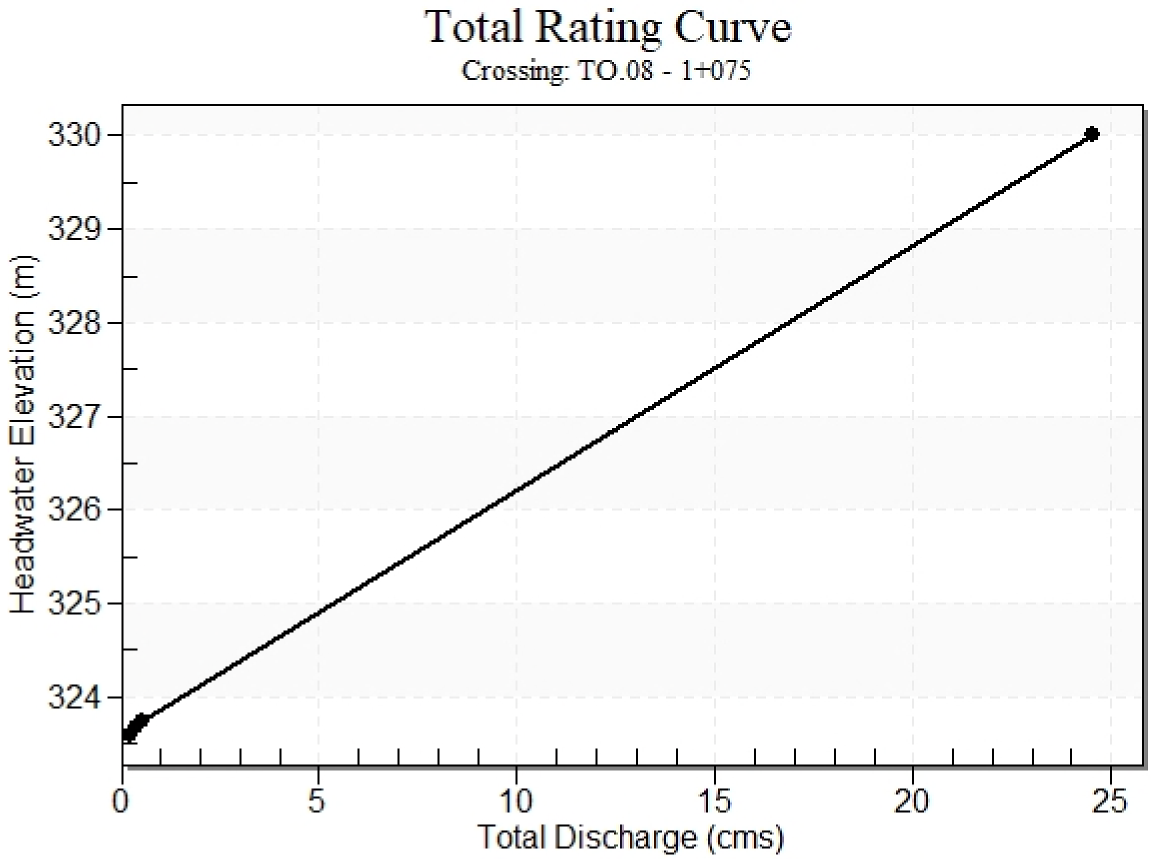


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.23	0.23	323.60	0.174	0.0*	1-S2n	0.098	0.110	0.098	0.060	1.178	1.931
TR=100	0.36	0.36	323.66	0.243	0.0*	1-S2n	0.128	0.148	0.128	0.078	1.392	2.284
TR=200	0.51	0.51	323.74	0.319	0.0*	1-S2n	0.161	0.187	0.161	0.097	1.574	2.613

* Full Flow Headwater elevation is below inlet invert.

****

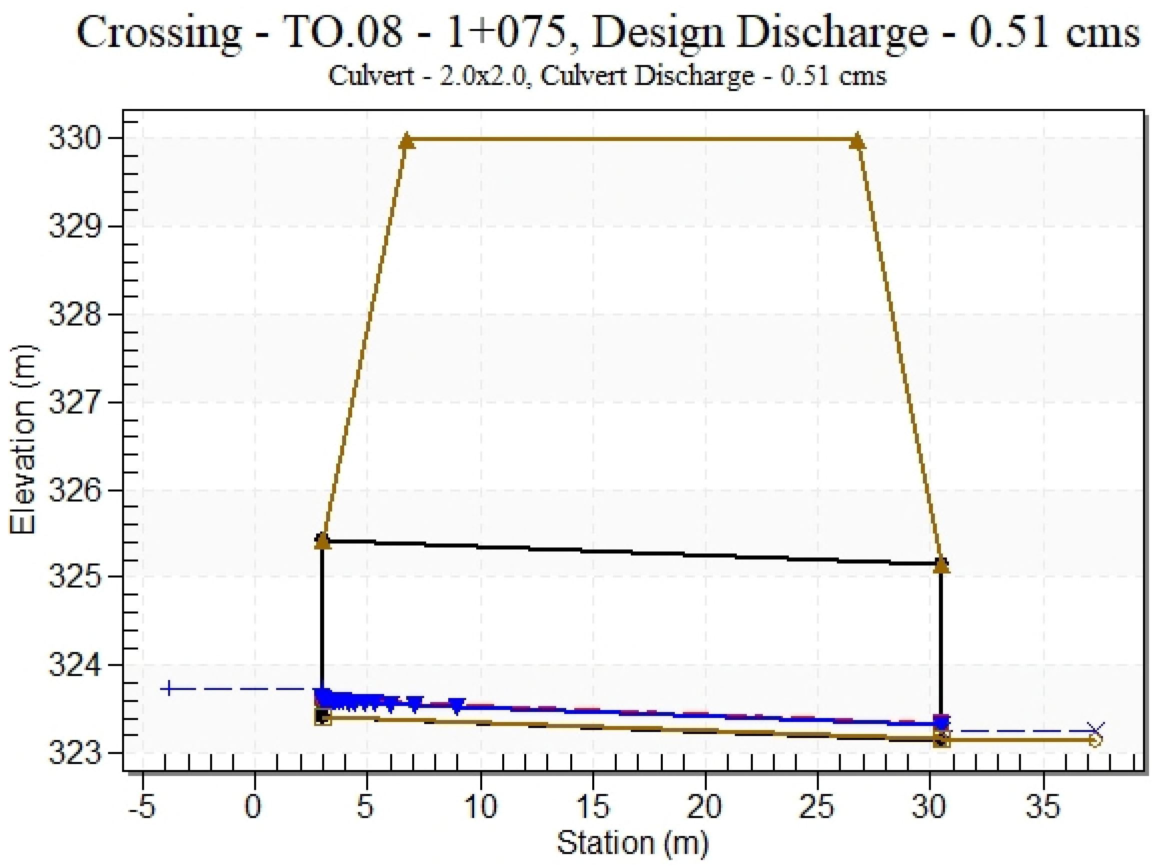
Straight Culvert

Inlet Elevation (invert): 323.42 m, Outlet Elevation (invert): 323.15 m

Culvert Length: 27.50 m, Culvert Slope: 0.0098

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 323.42 m

Outlet Station: 30.50 m

Outlet Elevation: 323.15 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.08 - 1+075)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.23	323.21	0.06	1.93	29.19	2.53
0.36	323.23	0.08	2.28	38.20	2.61
0.51	323.25	0.10	2.61	47.64	2.68

Tailwater Channel Data - TO.08 - 1+075

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 323.15 m

Roadway Data for Crossing: TO.08 - 1+075

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.50 m

Crest Elevation: 330.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.8. C.106 - Progr.1+531

Table 1 - Summary of Culvert Flows at Crossing: TO.12 - 1+525

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
338.33	TR=50	0.12	0.12	0.00	1
338.38	TR=100	0.20	0.20	0.00	1
338.42	TR=200	0.28	0.28	0.00	1
345.00	Overtopping	24.84	24.84	0.00	Overtopping

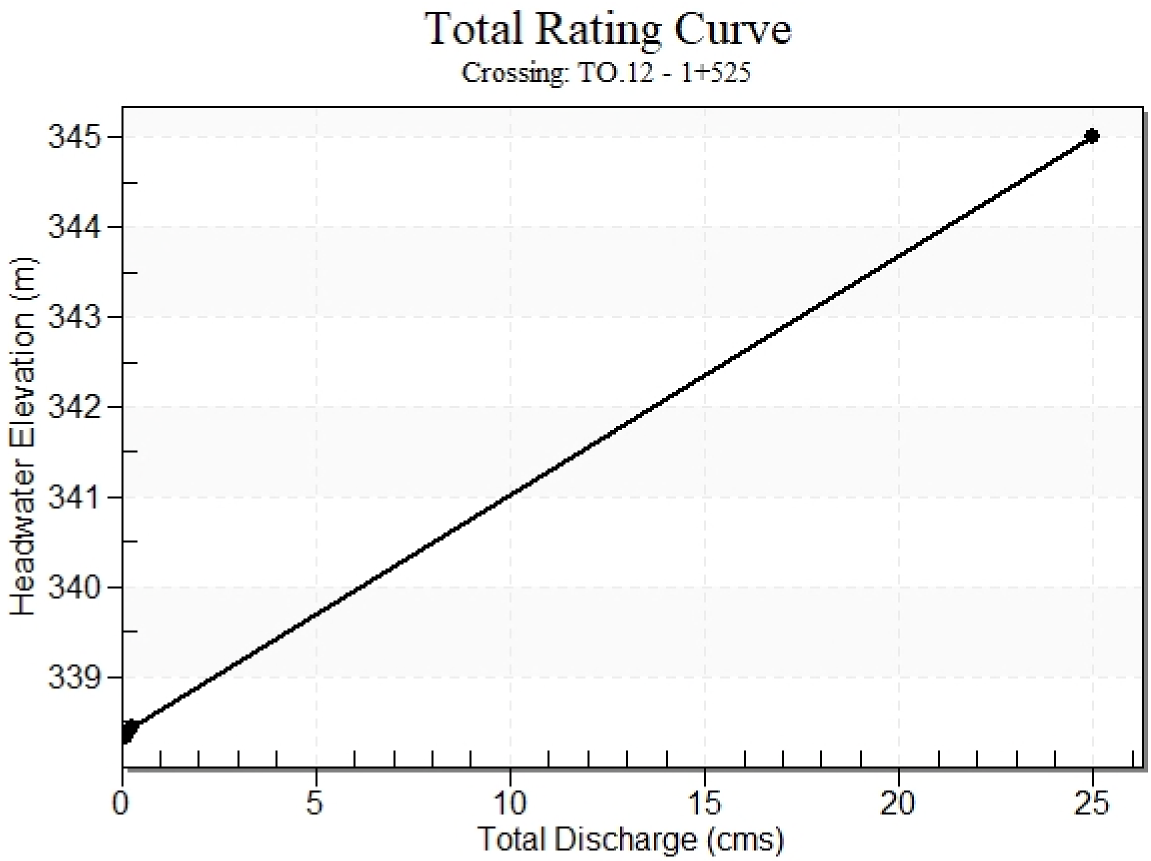


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.12	0.12	338.33	0.113	0.0*	1-S2n	0.065	0.074	0.065	0.041	0.964	1.524
TR=100	0.20	0.20	338.38	0.156	0.0*	1-S2n	0.087	0.100	0.087	0.054	1.134	1.818
TR=200	0.28	0.28	338.42	0.204	0.0*	1-S2n	0.111	0.127	0.111	0.068	1.283	2.094

* Full Flow Headwater elevation is below inlet invert.

****

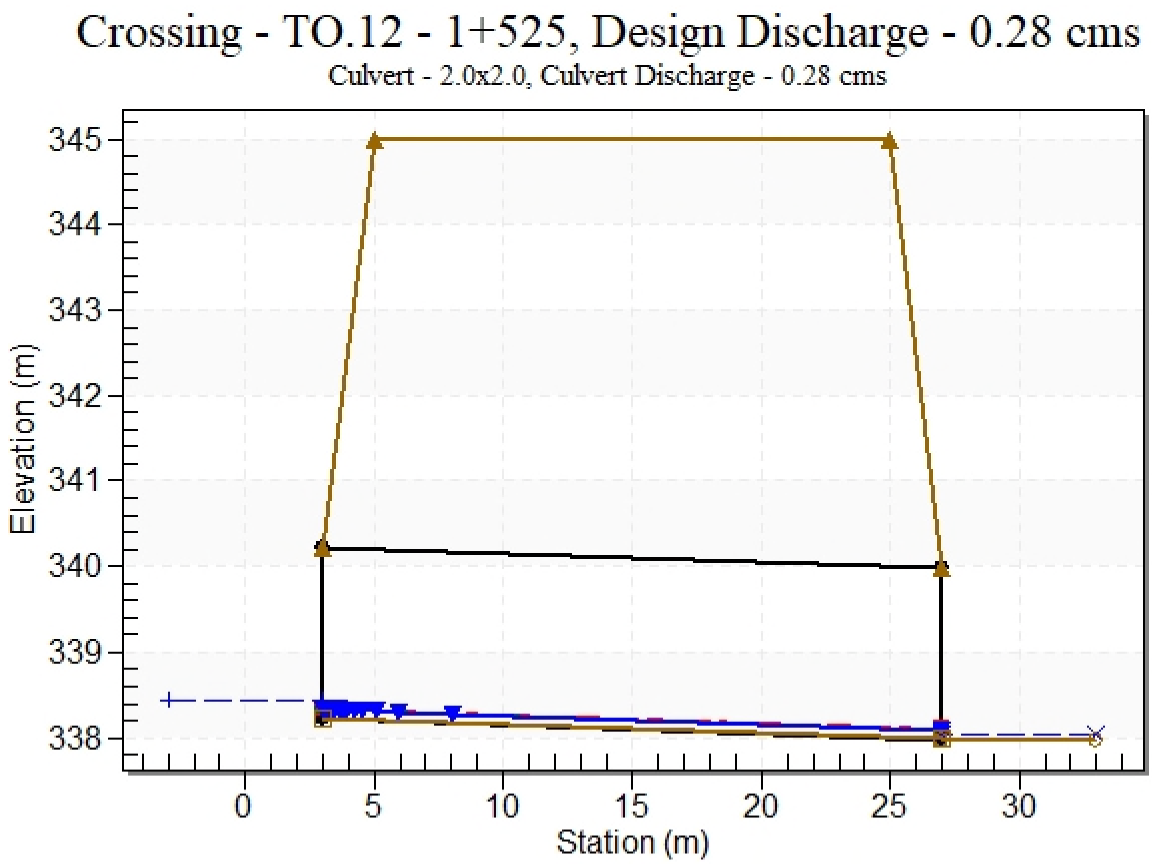
Straight Culvert

Inlet Elevation (invert): 338.22 m, Outlet Elevation (invert): 337.98 m

Culvert Length: 24.00 m, Culvert Slope: 0.0100

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 338.22 m

Outlet Station: 27.00 m

Outlet Elevation: 337.98 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.12 - 1+525)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.12	338.02	0.04	1.52	20.10	2.40
0.20	338.03	0.05	1.82	26.55	2.49
0.28	338.05	0.07	2.09	33.24	2.57

Tailwater Channel Data - TO.12 - 1+525

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 337.98 m

Roadway Data for Crossing: TO.12 - 1+525

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.50 m

Crest Elevation: 345.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.9. C.108.1 - Progr.1+825

Table 1 - Summary of Culvert Flows at Crossing: TO.15 - 1+825

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
351.19	TR=50	0.26	0.26	0.00	1
351.27	TR=100	0.40	0.40	0.00	1
351.35	TR=200	0.57	0.57	0.00	1
355.00	Overtopping	17.22	17.22	0.00	Overtopping

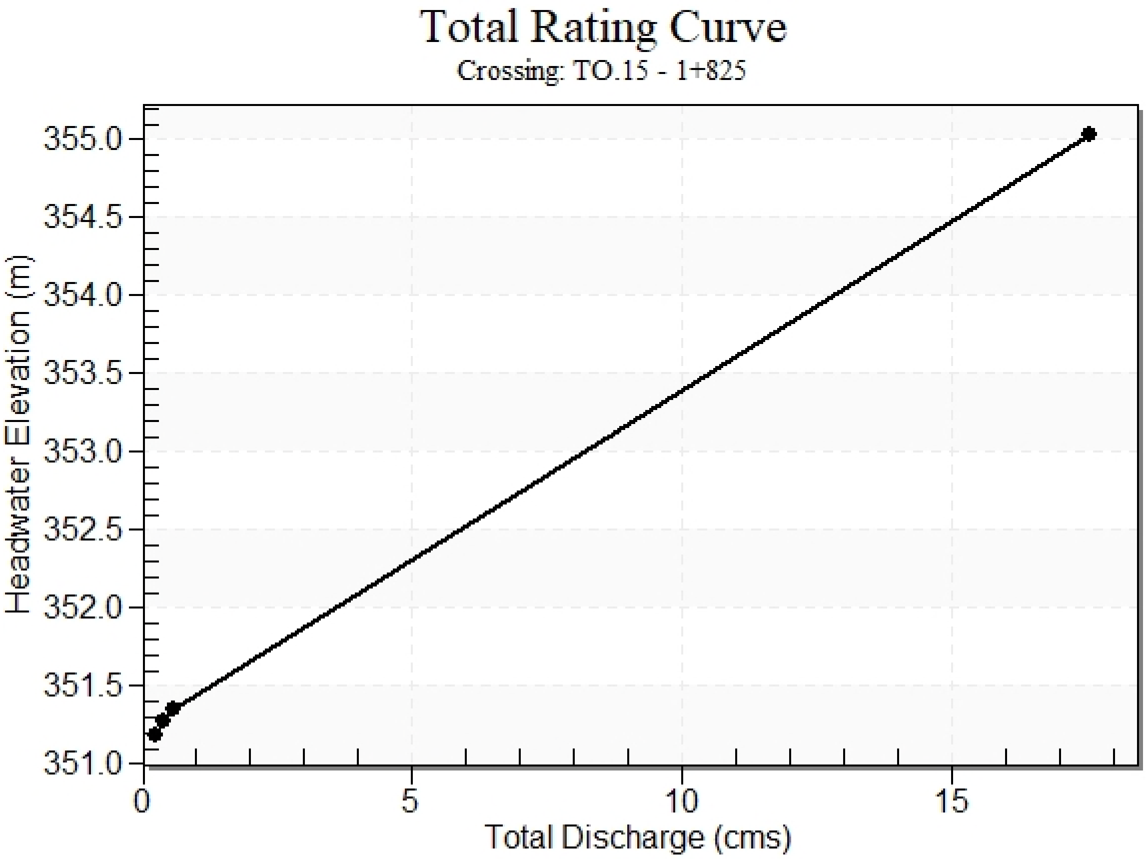


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.26	0.26	351.19	0.190	0.0*	1-S2n	0.105	0.120	0.105	0.064	1.237	2.021
TR=100	0.40	0.40	351.27	0.269	0.0*	1-S2n	0.137	0.160	0.137	0.084	1.466	2.392
TR=200	0.57	0.57	351.35	0.345	0.0*	1-S2n	0.172	0.203	0.172	0.105	1.664	2.735

* Full Flow Headwater elevation is below inlet invert.

****

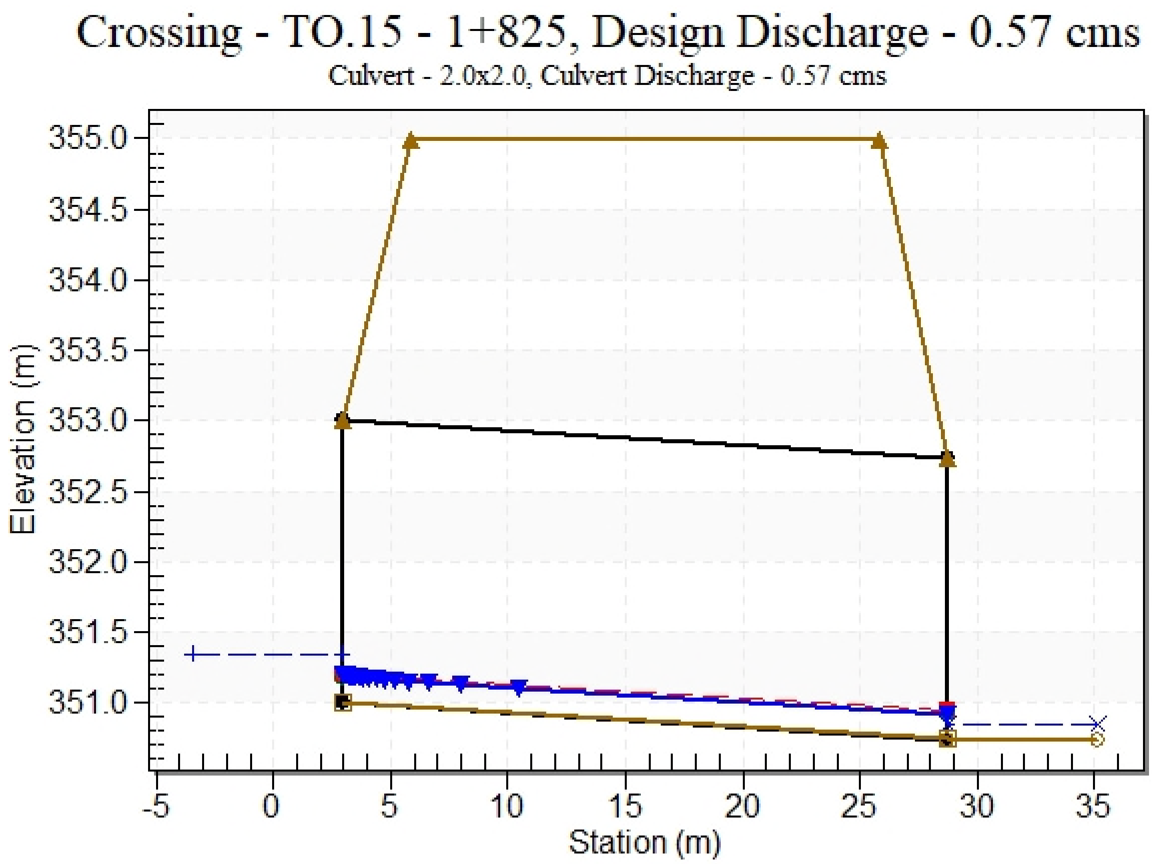
Straight Culvert

Inlet Elevation (invert): 351.00 m, Outlet Elevation (invert): 350.74 m

Culvert Length: 25.70 m, Culvert Slope: 0.0101

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 351.00 m

Outlet Station: 28.70 m

Outlet Elevation: 350.74 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.15 - 1+825)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.26	350.80	0.06	2.02	31.41	2.55
0.40	350.82	0.08	2.39	41.18	2.63
0.57	350.84	0.10	2.73	51.35	2.70

Tailwater Channel Data - TO.15 - 1+825

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 350.74 m

Roadway Data for Crossing: TO.15 - 1+825

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.50 m

Crest Elevation: 355.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.10. C.108.2 - Progr.2+000

Table 1 - Summary of Culvert Flows at Crossing: TO.16 - 2+000

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
359.34	TR=50	0.48	0.48	0.00	1
359.44	TR=100	0.74	0.74	0.00	1
359.55	TR=200	1.06	1.06	0.00	1
365.00	Overtopping	23.02	23.02	0.00	Overtopping

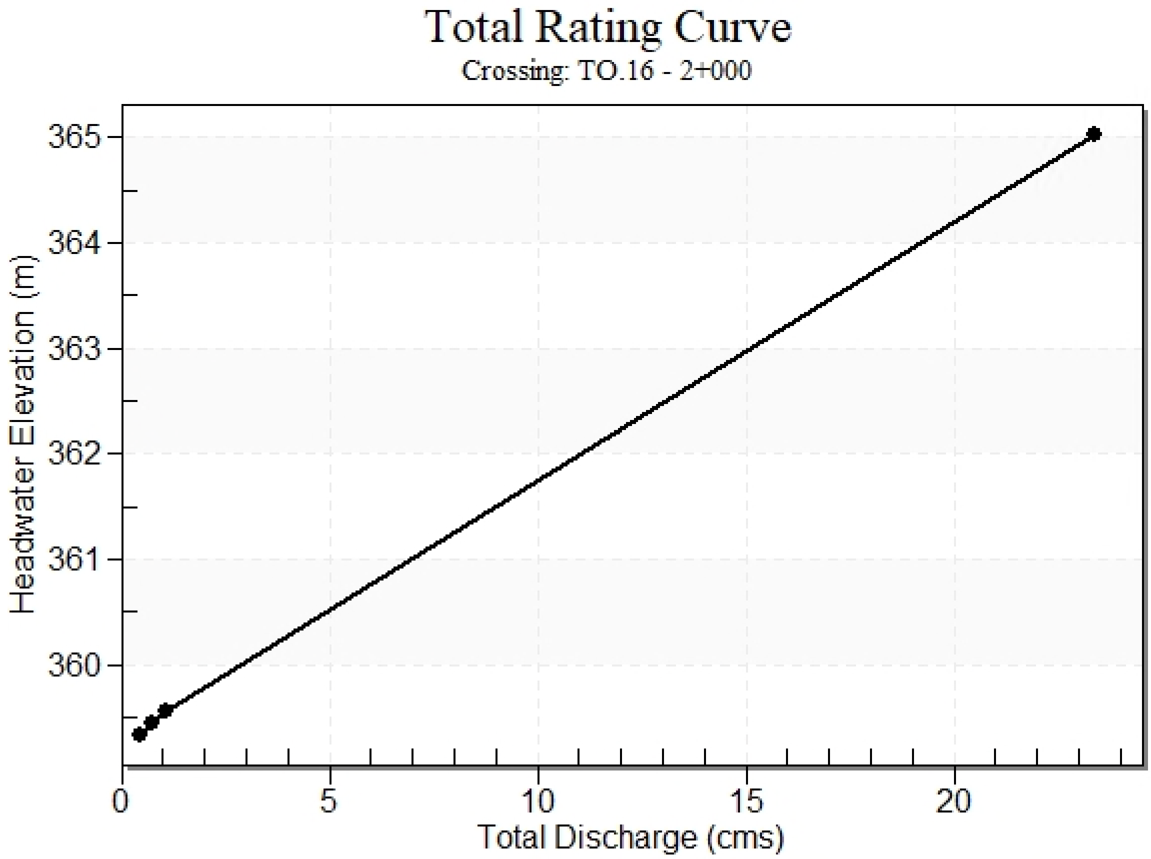


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.48	0.48	359.34	0.306	0.0*	1-S2n	0.156	0.180	0.156	0.094	1.535	2.554
TR=100	0.74	0.74	359.44	0.410	0.015	1-S2n	0.207	0.241	0.207	0.123	1.799	3.014
TR=200	1.06	1.06	359.55	0.521	0.083	1-S2n	0.260	0.306	0.260	0.154	2.040	3.440

* Full Flow Headwater elevation is below inlet invert.

****

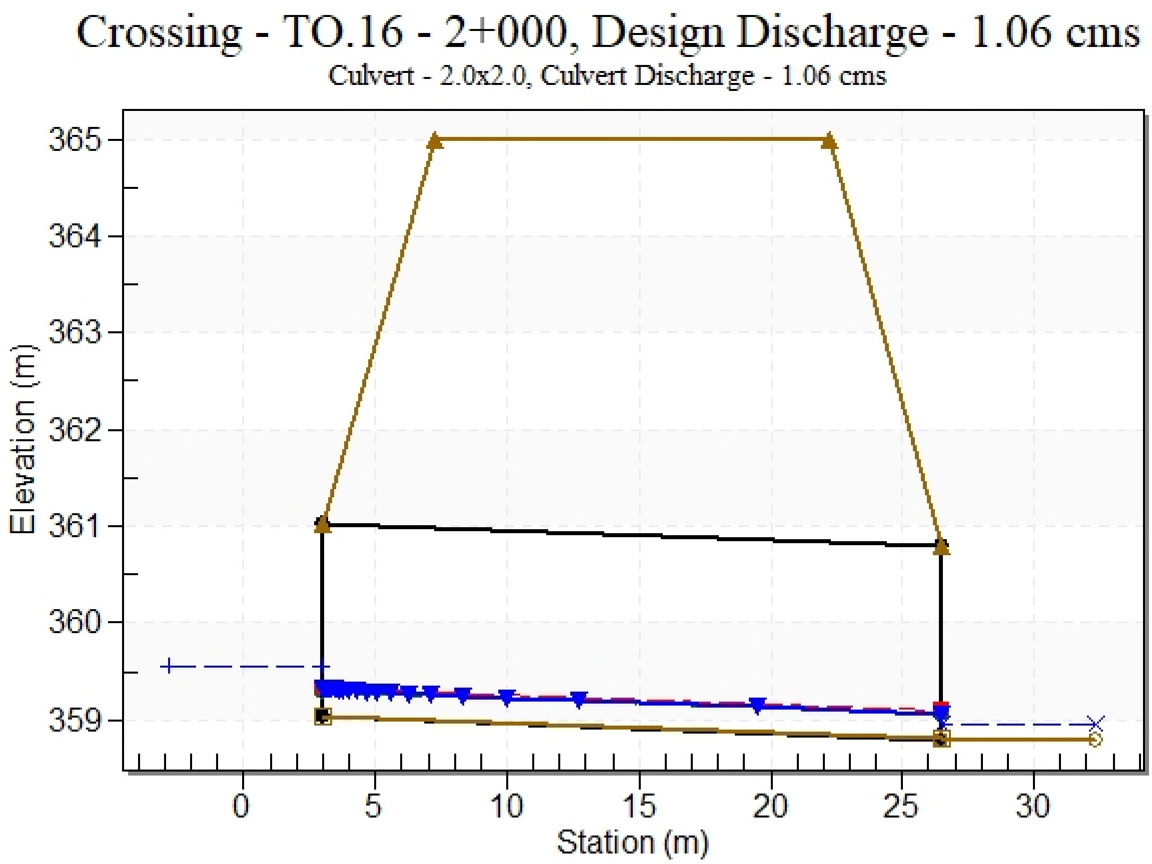
Straight Culvert

Inlet Elevation (invert): 359.03 m, Outlet Elevation (invert): 358.80 m

Culvert Length: 23.50 m, Culvert Slope: 0.0098

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 359.03 m

Outlet Station: 26.50 m

Outlet Elevation: 358.80 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.16 - 2+000)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.48	358.89	0.09	2.55	45.86	2.67
0.74	358.92	0.12	3.01	60.41	2.74
1.06	358.95	0.15	3.44	75.66	2.79

Tailwater Channel Data - TO.16 - 2+000

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 358.80 m

Roadway Data for Crossing: TO.16 - 2+000

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.50 m

Crest Elevation: 365.00 m

Roadway Surface: Paved

Roadway Top Width: 15.00 m

3.1.11. C.108.3 - Progr.2+325

Table 1 - Summary of Culvert Flows at Crossing: TO.17 - 2+325

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
373.60	TR=50	0.19	0.19	0.00	1
373.66	TR=100	0.29	0.29	0.00	1
373.73	TR=200	0.42	0.42	0.00	1
378.00	Overtopping	19.03	19.03	0.00	Overtopping

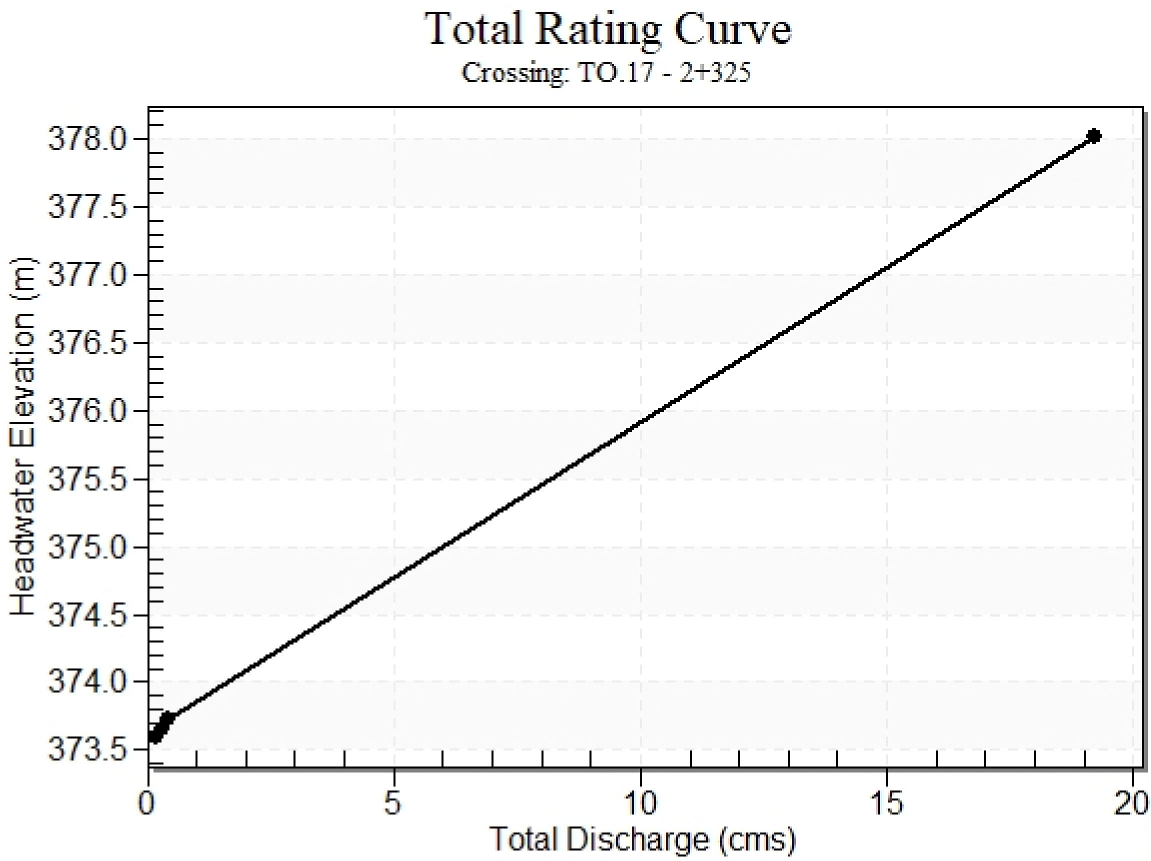


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.19	0.19	373.60	0.150	0.0*	1-S2n	0.084	0.096	0.084	0.052	1.117	1.782
TR=100	0.29	0.29	373.66	0.209	0.0*	1-S2n	0.113	0.130	0.113	0.069	1.302	2.121
TR=200	0.42	0.42	373.73	0.282	0.0*	1-S2n	0.142	0.166	0.143	0.087	1.478	2.440

* Full Flow Headwater elevation is below inlet invert.

****

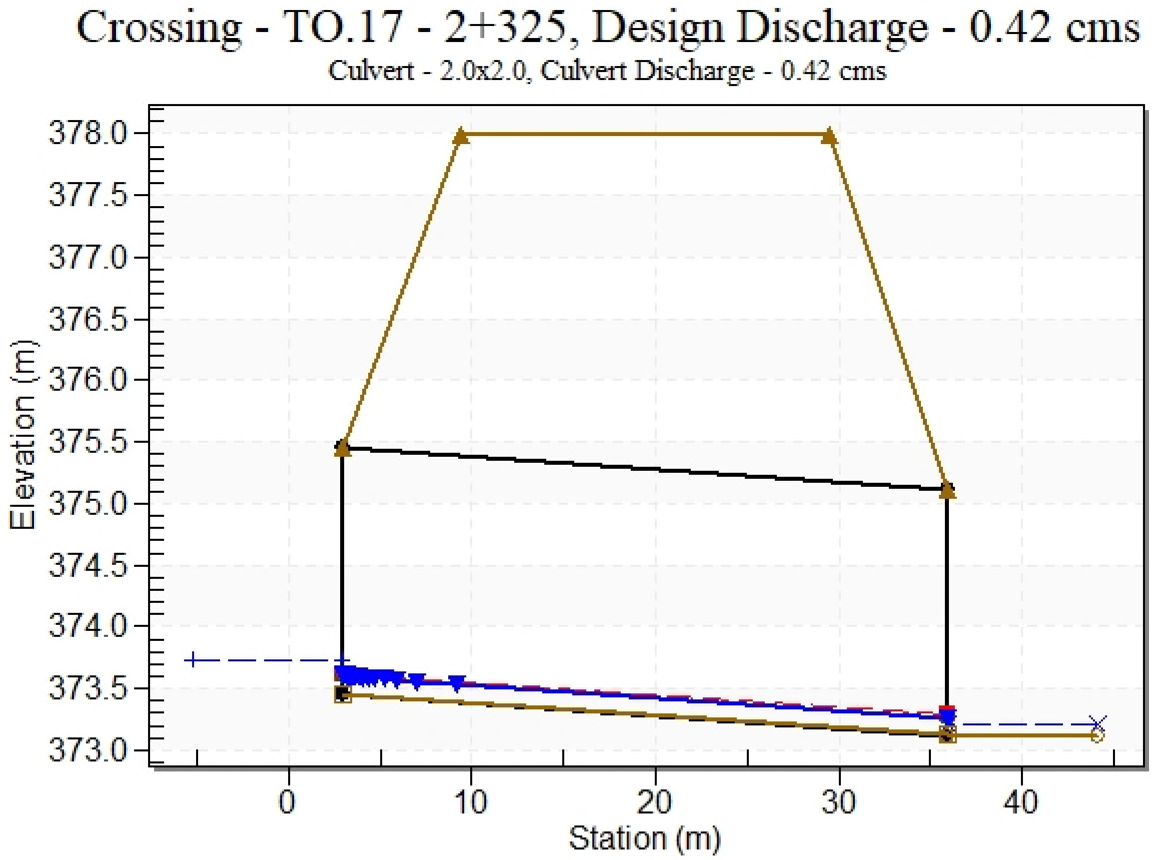
Straight Culvert

Inlet Elevation (invert): 373.45 m,   Outlet Elevation (invert): 373.12 m

Culvert Length: 32.90 m,   Culvert Slope: 0.0100

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 373.45 m

Outlet Station: 35.90 m

Outlet Elevation: 373.12 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.17 - 2+325)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.19	373.17	0.05	1.78	25.72	2.48
0.29	373.19	0.07	2.12	33.96	2.57
0.42	373.21	0.09	2.44	42.58	2.64

Tailwater Channel Data - TO.17 - 2+325

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 373.12 m

Roadway Data for Crossing: TO.17 - 2+325

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.50 m

Crest Elevation: 378.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.12. C.109.1 - Progr.2+610

Table 1 - Summary of Culvert Flows at Crossing: TO.19 - 2+610

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
385.34	TR=50	0.17	0.17	0.00	1
385.40	TR=100	0.27	0.27	0.00	1
385.47	TR=200	0.39	0.39	0.00	1
390.00	Overtopping	19.80	19.80	0.00	Overtopping

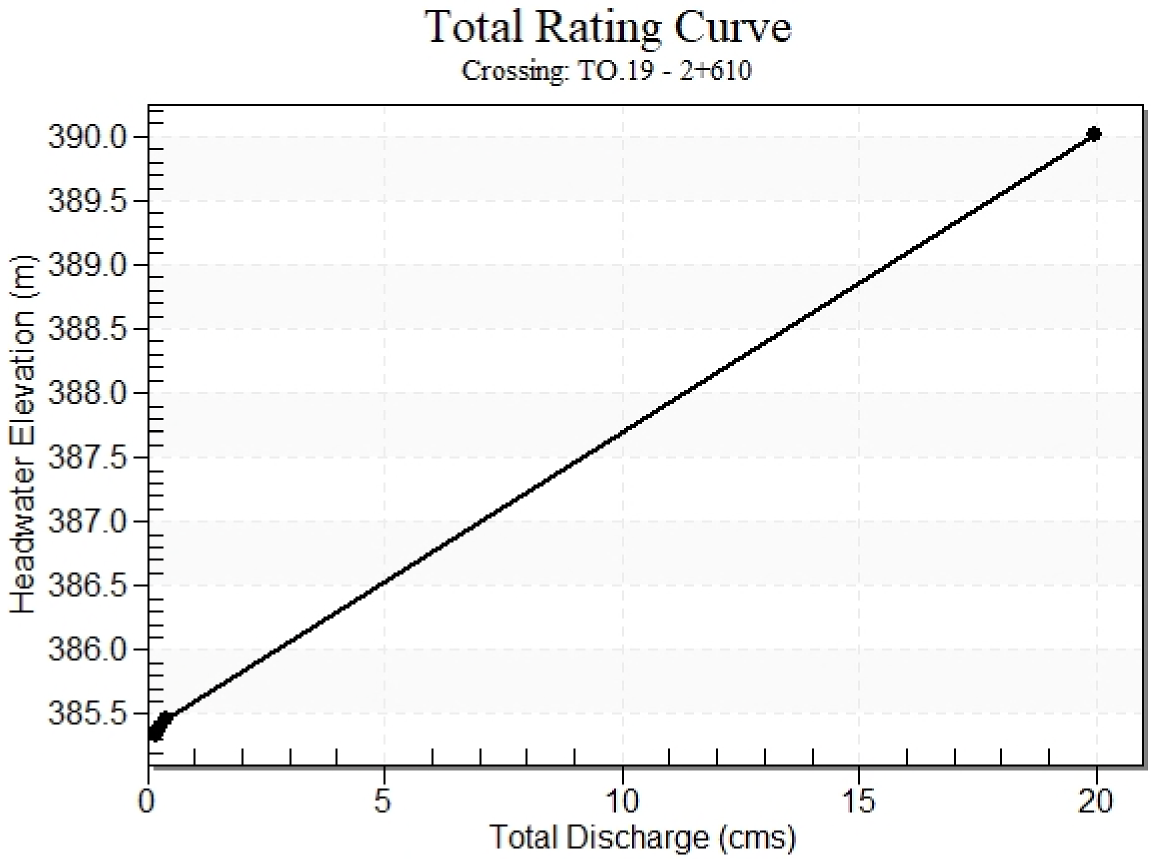


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.17	0.17	385.34	0.142	0.0*	1-S2n	0.079	0.091	0.079	0.050	1.089	1.729
TR=100	0.27	0.27	385.40	0.198	0.0*	1-S2n	0.108	0.124	0.109	0.066	1.253	2.063
TR=200	0.39	0.39	385.47	0.265	0.0*	1-S2n	0.136	0.158	0.136	0.083	1.453	2.373

* Full Flow Headwater elevation is below inlet invert.

****

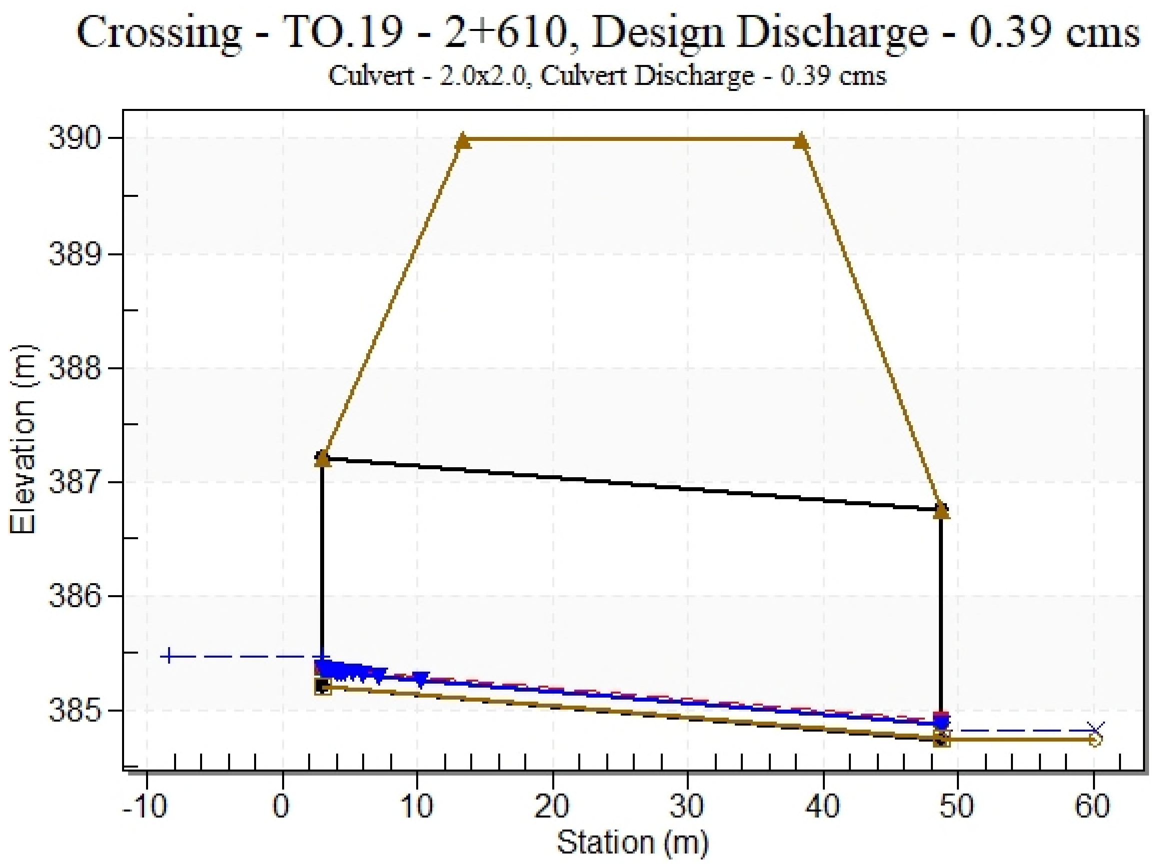
Straight Culvert

Inlet Elevation (invert): 385.20 m,   Outlet Elevation (invert): 384.74 m

Culvert Length: 45.80 m,   Culvert Slope: 0.0100

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 385.20 m

Outlet Station: 48.80 m

Outlet Elevation: 384.74 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.19 - 2+610)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.17	384.79	0.05	1.73	24.51	2.47
0.27	384.81	0.07	2.06	32.43	2.56
0.39	384.82	0.08	2.37	40.68	2.63

Tailwater Channel Data - TO.19 - 2+610

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 384.74 m

Roadway Data for Crossing: TO.19 - 2+610

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 m

Crest Elevation: 390.00 m

Roadway Surface: Paved

Roadway Top Width: 25.00 m

3.1.13. C.110.1 - Progr.Rampa (2+920)

Table 1 - Summary of Culvert Flows at Crossing: TO.21 - 2+920

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	DN1000 Discharge (cms)	Roadway Discharge (cms)	Iterations
405.45	TR=50	0.08	0.08	0.00	1
405.51	TR=100	0.12	0.12	0.00	1
405.58	TR=200	0.17	0.17	0.00	1
410.00	Overtopping	3.42	3.42	0.00	Overtopping

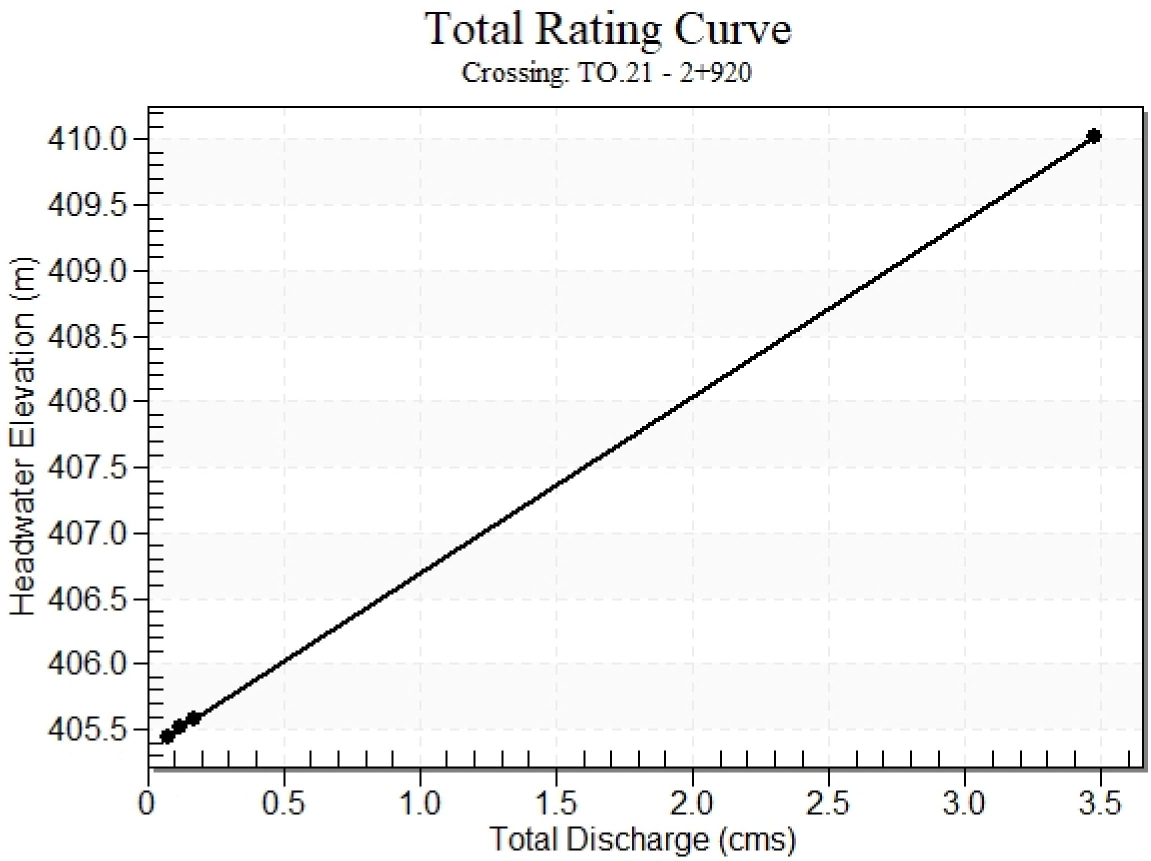


Table 2 - Culvert Summary Table: DN1000

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.08	0.08	405.45	0.189	0.246	2-M2c	0.168	0.152	0.152	0.047	1.014	1.616
TR=100	0.12	0.12	405.51	0.241	0.311	2-M2c	0.210	0.191	0.191	0.062	1.142	1.910
TR=200	0.17	0.17	405.58	0.300	0.377	2-M2c	0.252	0.230	0.230	0.078	1.260	2.185

****

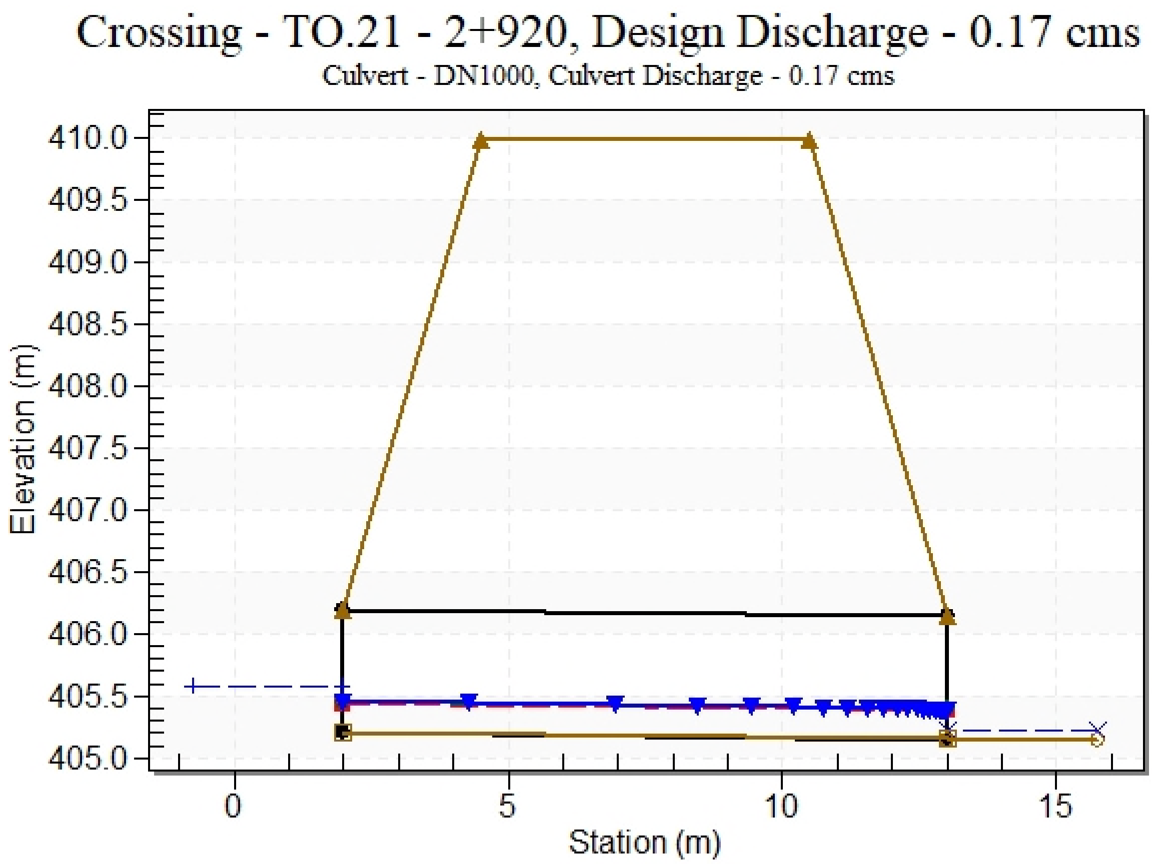
Straight Culvert

Inlet Elevation (invert): 405.20 m, Outlet Elevation (invert): 405.15 m

Culvert Length: 11.00 m, Culvert Slope: 0.0045

****

Water Surface Profile Plot for Culvert: DN1000



Site Data - DN1000

Site Data Option: Culvert Invert Data

Inlet Station: 2.00 m

Inlet Elevation: 405.20 m

Outlet Station: 13.00 m

Outlet Elevation: 405.15 m

Number of Barrels: 1

Culvert Data Summary - DN1000

Barrel Shape: Circular

Barrel Diameter: 1000.00 mm

Barrel Material: Corrugated Metal Riveted or Welded

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: TO.21 - 2+920)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.08	405.20	0.05	1.62	23.05	2.38
0.12	405.21	0.06	1.91	30.53	2.44
0.17	405.23	0.08	2.18	38.36	2.49

Tailwater Channel Data - TO.21 - 2+920

Tailwater Channel Option: Rectangular Channel

Bottom Width: 1.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 405.15 m

Roadway Data for Crossing: TO.21 - 2+920

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 10.00 m

Crest Elevation: 410.00 m

Roadway Surface: Paved

Roadway Top Width: 6.00 m

3.1.14. C.110.2 - Progr.3+100

Table 1 - Summary of Culvert Flows at Crossing: TO.22 - 3+100

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
410.59	TR=50	0.15	0.15	0.00	1
410.64	TR=100	0.23	0.23	0.00	1
410.69	TR=200	0.33	0.33	0.00	1
415.00	Overtopping	19.00	19.00	0.00	Overtopping

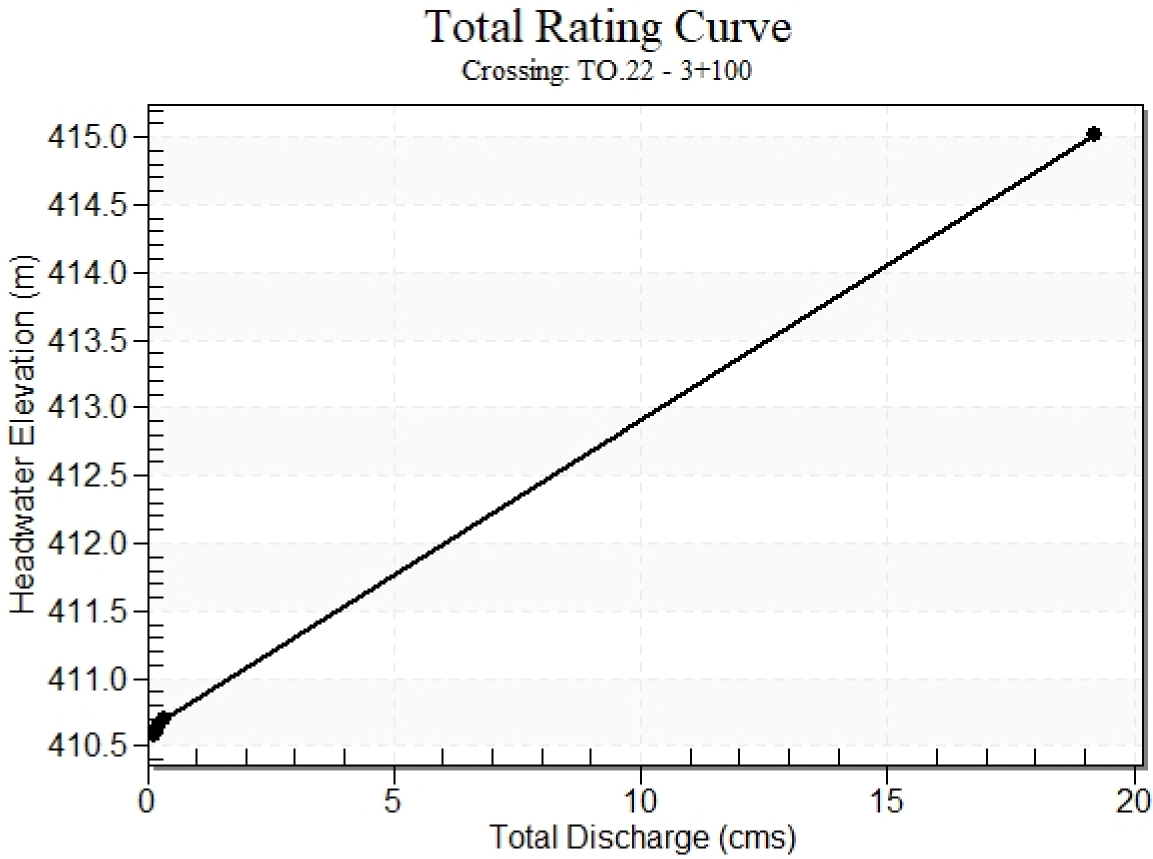


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.15	0.15	410.59	0.127	0.0*	1-S2n	0.072	0.082	0.072	0.045	1.022	1.623
TR=100	0.23	0.23	410.64	0.175	0.0*	1-S2n	0.098	0.111	0.098	0.060	1.181	1.934
TR=200	0.33	0.33	410.69	0.231	0.0*	1-S2n	0.122	0.141	0.122	0.075	1.360	2.226

* Full Flow Headwater elevation is below inlet invert.

****

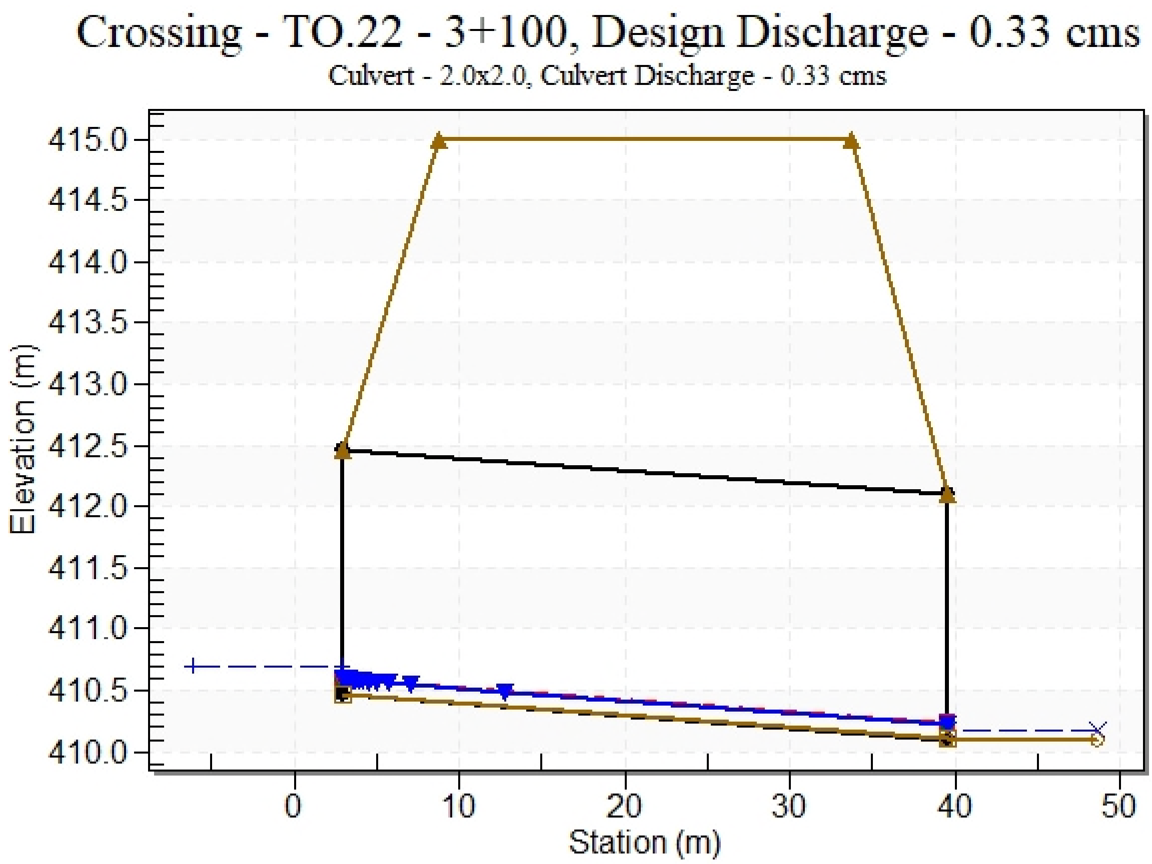
Straight Culvert

Inlet Elevation (invert): 410.46 m,   Outlet Elevation (invert): 410.10 m

Culvert Length: 36.50 m,   Culvert Slope: 0.0099

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 410.46 m

Outlet Station: 39.50 m

Outlet Elevation: 410.10 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.22 - 3+100)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.15	410.15	0.05	1.62	22.20	2.43
0.23	410.16	0.06	1.93	29.27	2.53
0.33	410.17	0.07	2.23	36.65	2.60

Tailwater Channel Data - TO.22 - 3+100

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 410.10 m

Roadway Data for Crossing: TO.22 - 3+100

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 m

Crest Elevation: 415.00 m

Roadway Surface: Paved

Roadway Top Width: 25.00 m

3.1.15. C.110.3 - Progr.3+190

Table 1 - Summary of Culvert Flows at Crossing: TO.23 - 3+190

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
413.95	TR=50	0.20	0.20	0.00	1
414.01	TR=100	0.31	0.31	0.00	1
414.08	TR=200	0.45	0.45	0.00	1
418.00	Overtopping	17.93	17.93	0.00	Overtopping

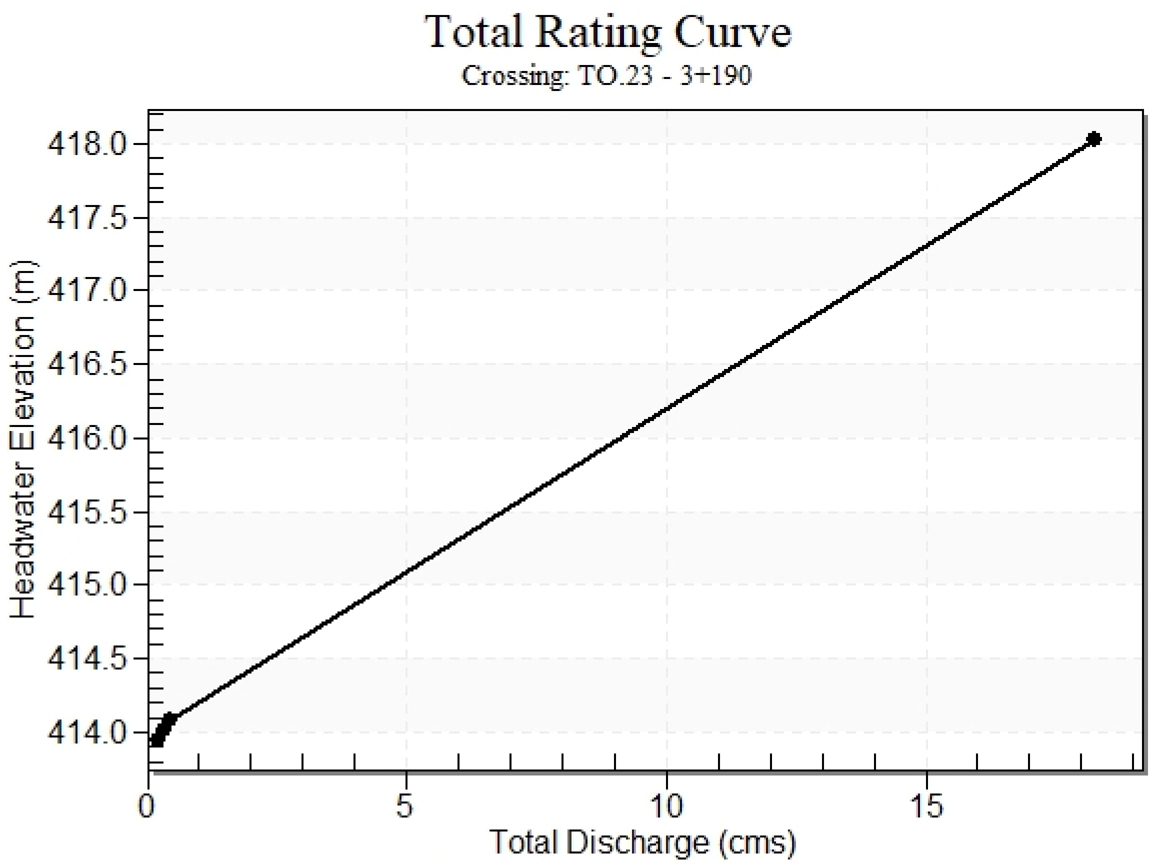


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.20	0.20	413.95	0.159	0.0*	1-S2n	0.088	0.102	0.090	0.055	1.127	1.839
TR=100	0.31	0.31	414.01	0.221	0.0*	1-S2n	0.117	0.136	0.117	0.072	1.344	2.179
TR=200	0.45	0.45	414.08	0.293	0.0*	1-S2n	0.147	0.172	0.147	0.090	1.523	2.495

* Full Flow Headwater elevation is below inlet invert.

****

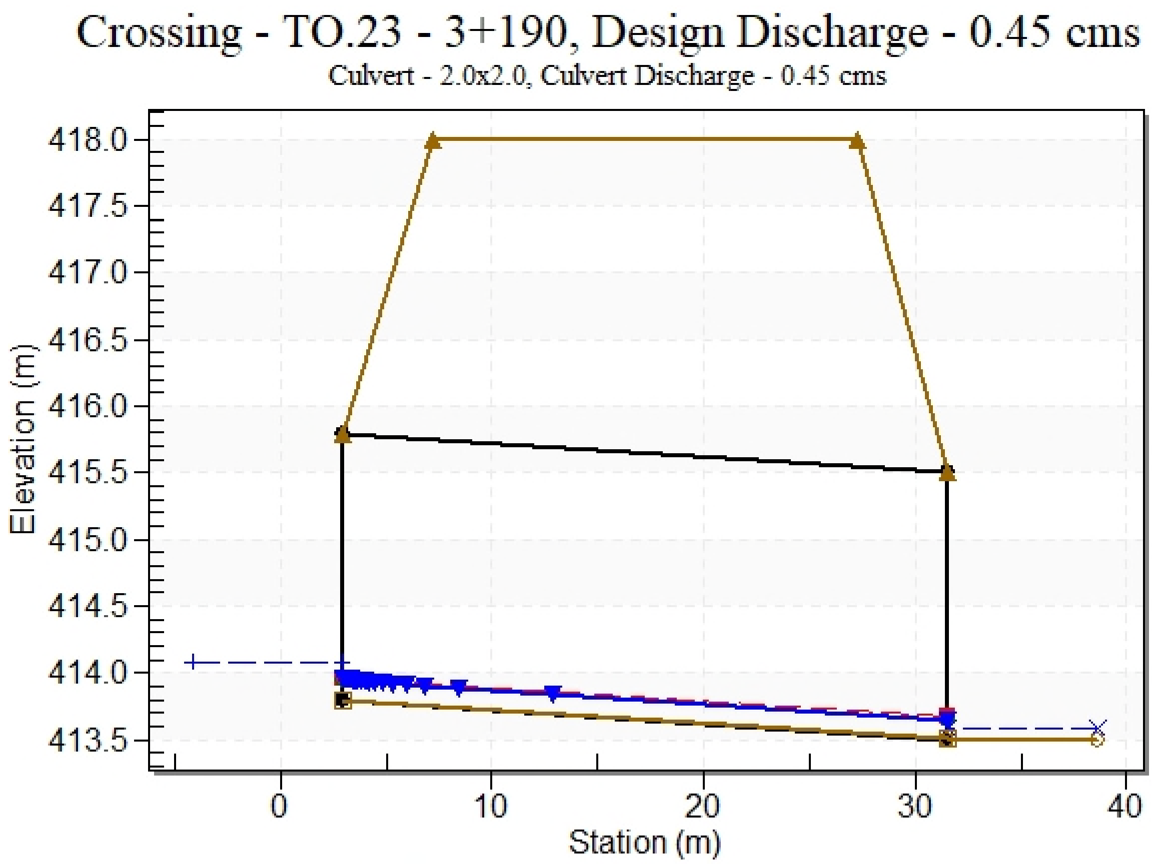
Straight Culvert

Inlet Elevation (invert): 413.79 m, Outlet Elevation (invert): 413.50 m

Culvert Length: 28.50 m, Culvert Slope: 0.0102

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 413.79 m

Outlet Station: 31.50 m

Outlet Elevation: 413.50 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.23 - 3+190)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.20	413.56	0.06	1.84	27.05	2.50
0.31	413.57	0.07	2.18	35.43	2.59
0.45	413.59	0.09	2.49	44.10	2.65

Tailwater Channel Data - TO.23 - 3+190

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 413.50 m

Roadway Data for Crossing: TO.23 - 3+190

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 m

Crest Elevation: 418.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.16. C.113/C.113b - Progr.3+695

Table 1 - Summary of Culvert Flows at Crossing: TO.26 - 3+695

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
435.60	TR=50	1.32	1.32	0.00	1
435.79	TR=100	1.98	1.98	0.00	1
435.99	TR=200	2.76	2.76	0.00	1
440.00	Overtopping	20.39	20.39	0.00	Overtopping

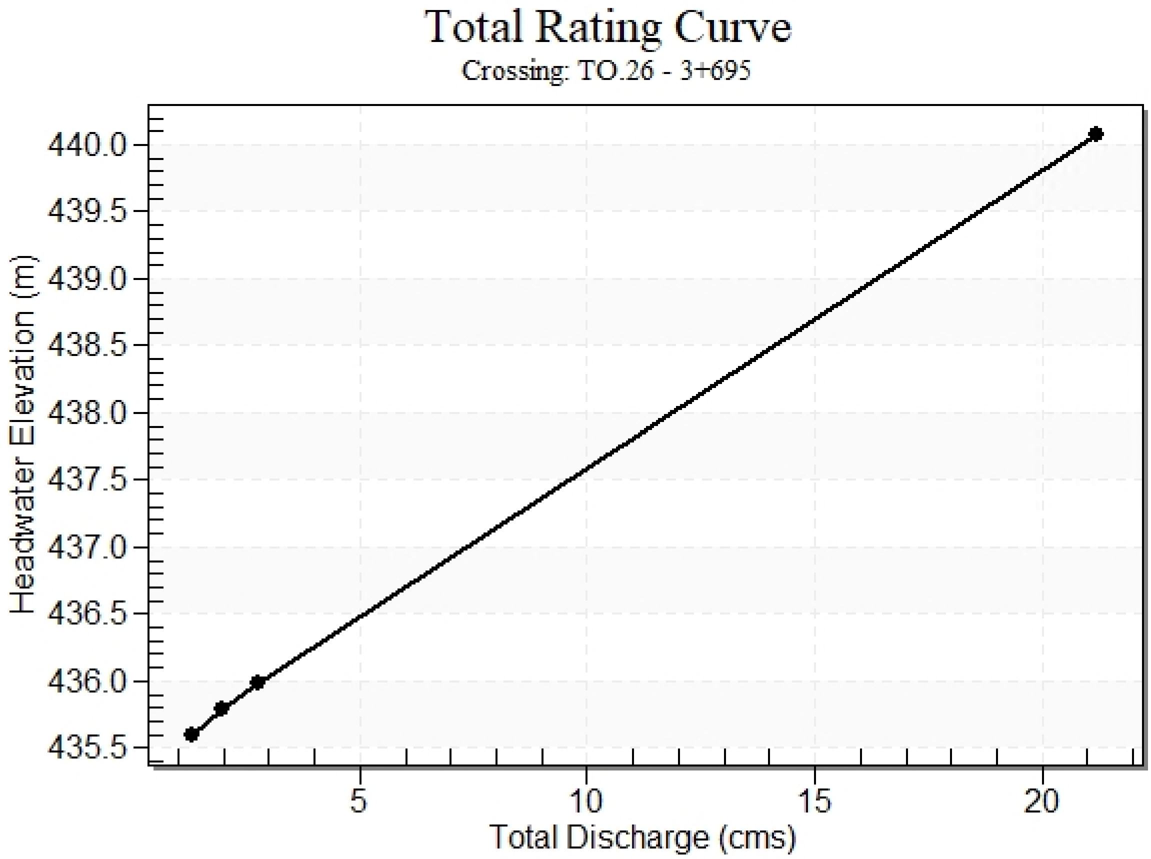


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	1.32	1.32	435.60	0.601	0.064	1-S2n	0.298	0.353	0.298	0.177	2.212	3.719
TR=100	1.98	1.98	435.79	0.789	0.188	1-S2n	0.391	0.464	0.391	0.230	2.532	4.303
TR=200	2.76	2.76	435.99	0.985	0.327	1-S2n	0.491	0.580	0.495	0.286	2.794	4.830

****

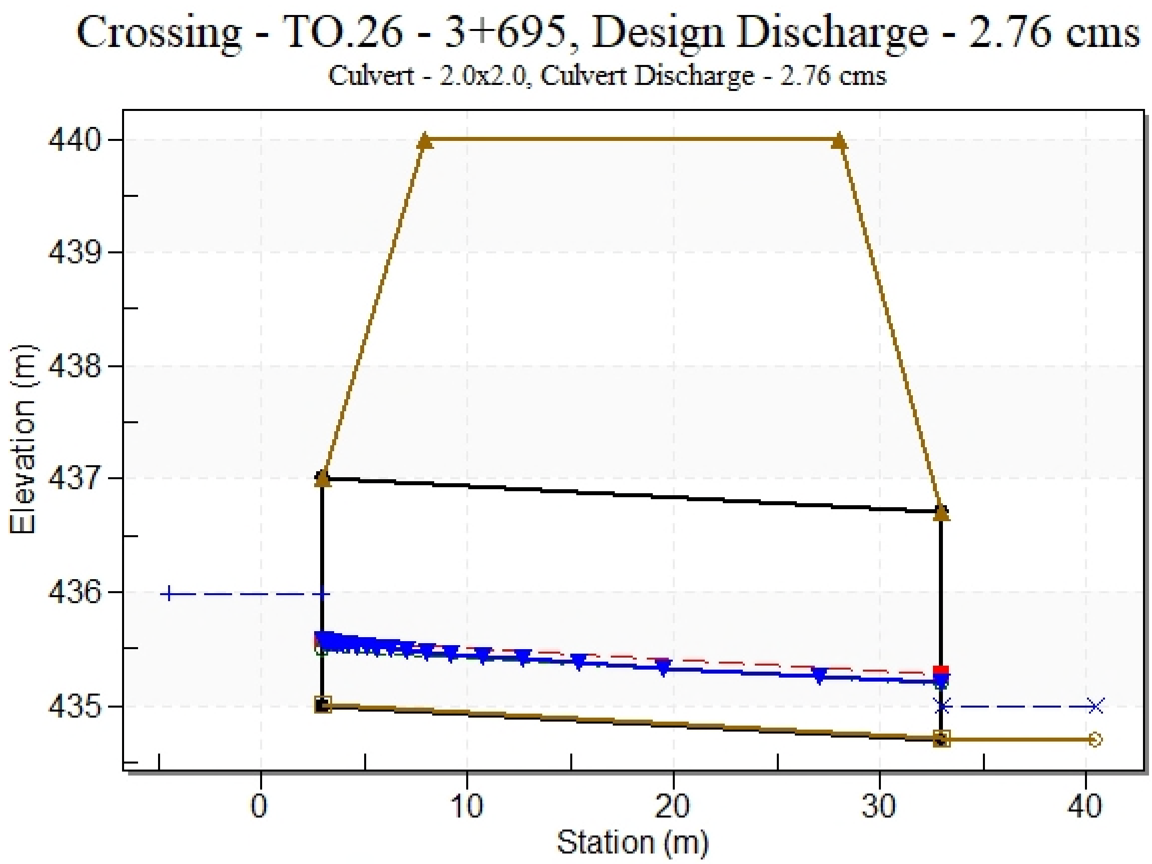
Straight Culvert

Inlet Elevation (invert): 435.00 m,   Outlet Elevation (invert): 434.70 m

Culvert Length: 30.00 m,   Culvert Slope: 0.0100

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 435.00 m

Outlet Station: 33.00 m

Outlet Elevation: 434.70 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.26 - 3+695)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
1.32	434.88	0.18	3.72	86.71	2.82
1.98	434.93	0.23	4.30	112.77	2.86
2.76	434.99	0.29	4.83	140.29	2.88

Tailwater Channel Data - TO.26 - 3+695

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 434.70 m

Roadway Data for Crossing: TO.26 - 3+695

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 20.00 m

Crest Elevation: 440.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.17. C.113.1 - Progr.4+173

Table 1 - Summary of Culvert Flows at Crossing: TO.27 - 4+175

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	DN1000 Discharge (cms)	Roadway Discharge (cms)	Iterations
459.93	TR=50	0.36	0.36	0.00	1
460.09	TR=100	0.56	0.56	0.00	1
460.26	TR=200	0.80	0.80	0.00	1
465.00	Overtopping	3.71	3.71	0.00	Overtopping

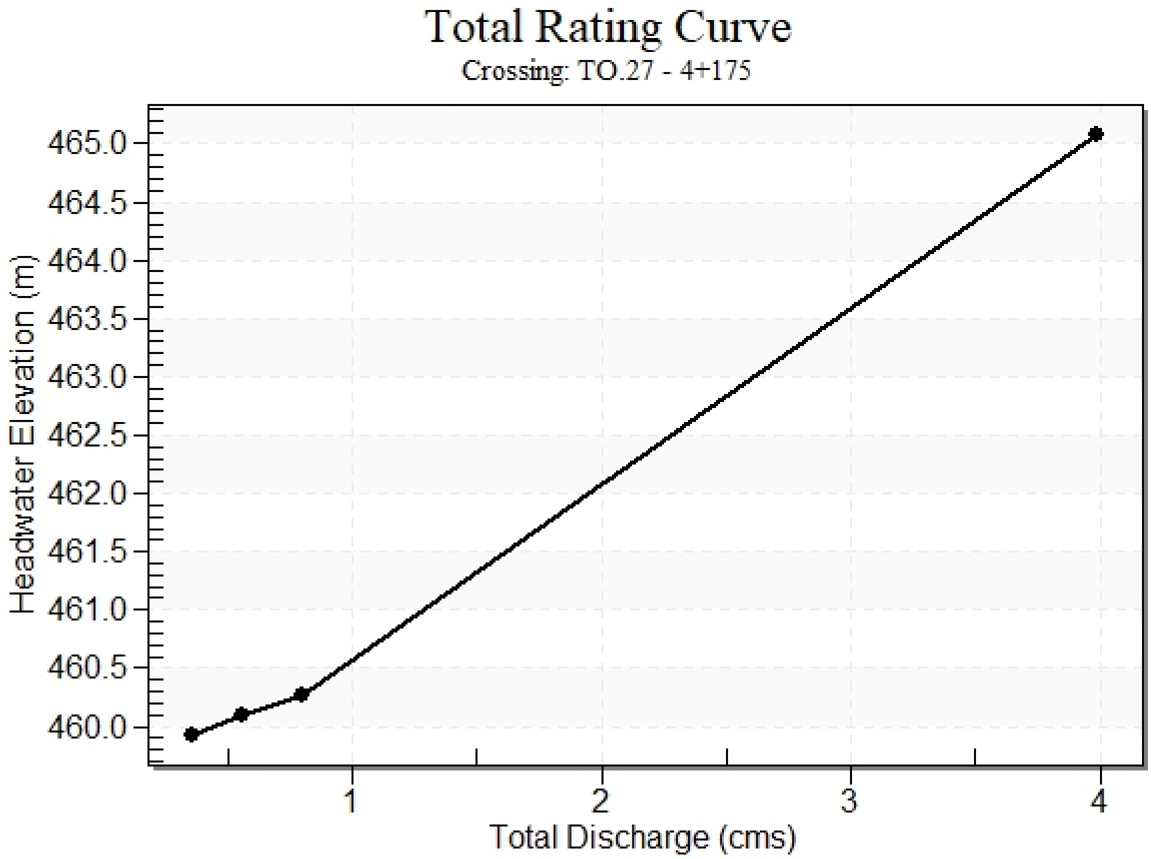


Table 2 - Culvert Summary Table: DN1000

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.36	0.36	459.93	0.481	0.184	1-S2n	0.289	0.336	0.289	0.126	1.915	2.848
TR=100	0.56	0.56	460.09	0.642	0.309	1-S2n	0.364	0.423	0.367	0.169	2.144	3.308
TR=200	0.80	0.80	460.26	0.812	0.465	1-S2n	0.442	0.510	0.447	0.214	2.355	3.716

****

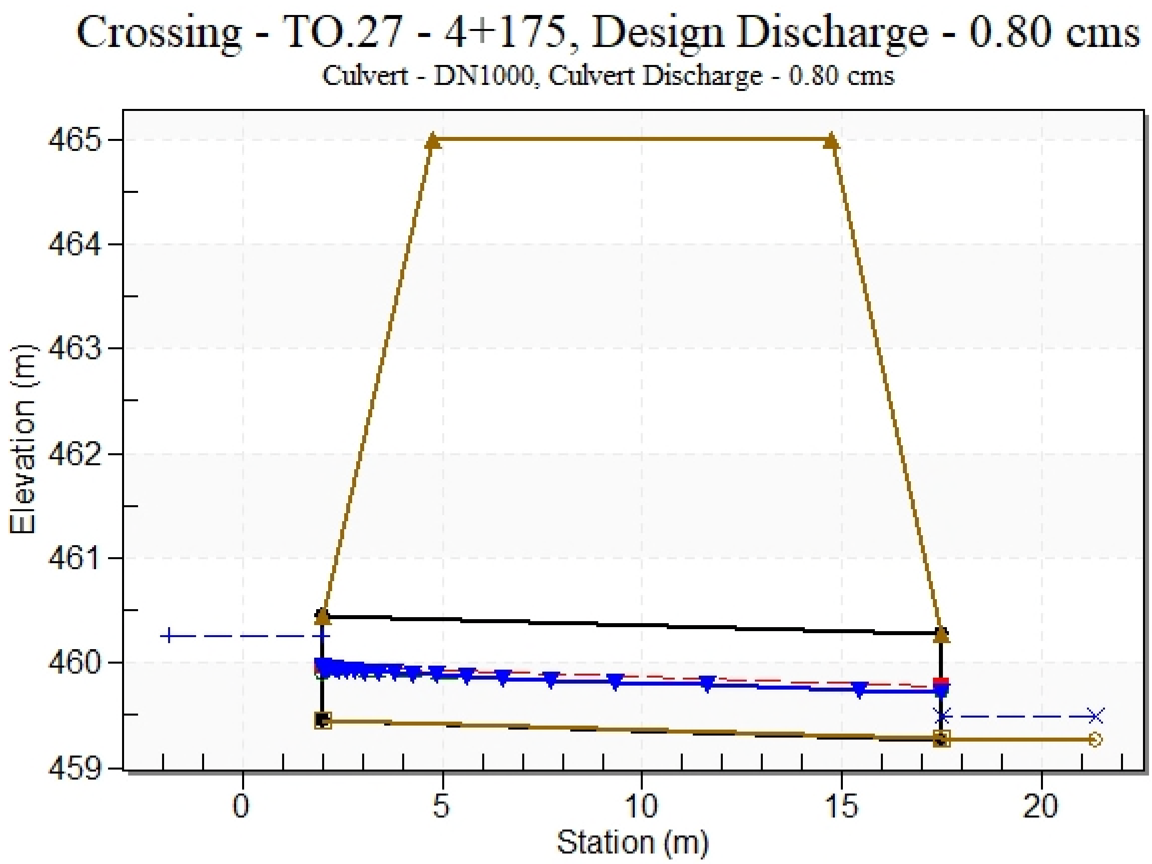
Straight Culvert

Inlet Elevation (invert): 459.45 m, Outlet Elevation (invert): 459.27 m

Culvert Length: 15.50 m, Culvert Slope: 0.0116

****

Water Surface Profile Plot for Culvert: DN1000



Site Data - DN1000

Site Data Option: Culvert Invert Data

Inlet Station: 2.00 m

Inlet Elevation: 459.45 m

Outlet Station: 17.50 m

Outlet Elevation: 459.27 m

Number of Barrels: 1

Culvert Data Summary - DN1000

Barrel Shape: Circular

Barrel Diameter: 1000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: TO.27 - 4+175)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.36	459.40	0.13	2.85	61.79	2.56
0.56	459.44	0.17	3.31	82.67	2.57
0.80	459.48	0.21	3.72	105.12	2.56

Tailwater Channel Data - TO.27 - 4+175

Tailwater Channel Option: Rectangular Channel

Bottom Width: 1.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 459.27 m

Roadway Data for Crossing: TO.27 - 4+175

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 10.00 m

Crest Elevation: 465.00 m

Roadway Surface: Paved

Roadway Top Width: 10.00 m

3.1.18. C.115.1 - Progr.4+860

Table 1 - Summary of Culvert Flows at Crossing: TO.30 - 4+860

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
488.83	TR=50	0.22	0.22	0.00	1
488.90	TR=100	0.34	0.34	0.00	1
488.97	TR=200	0.49	0.49	0.00	1
493.00	Overtopping	17.23	17.23	0.00	Overtopping

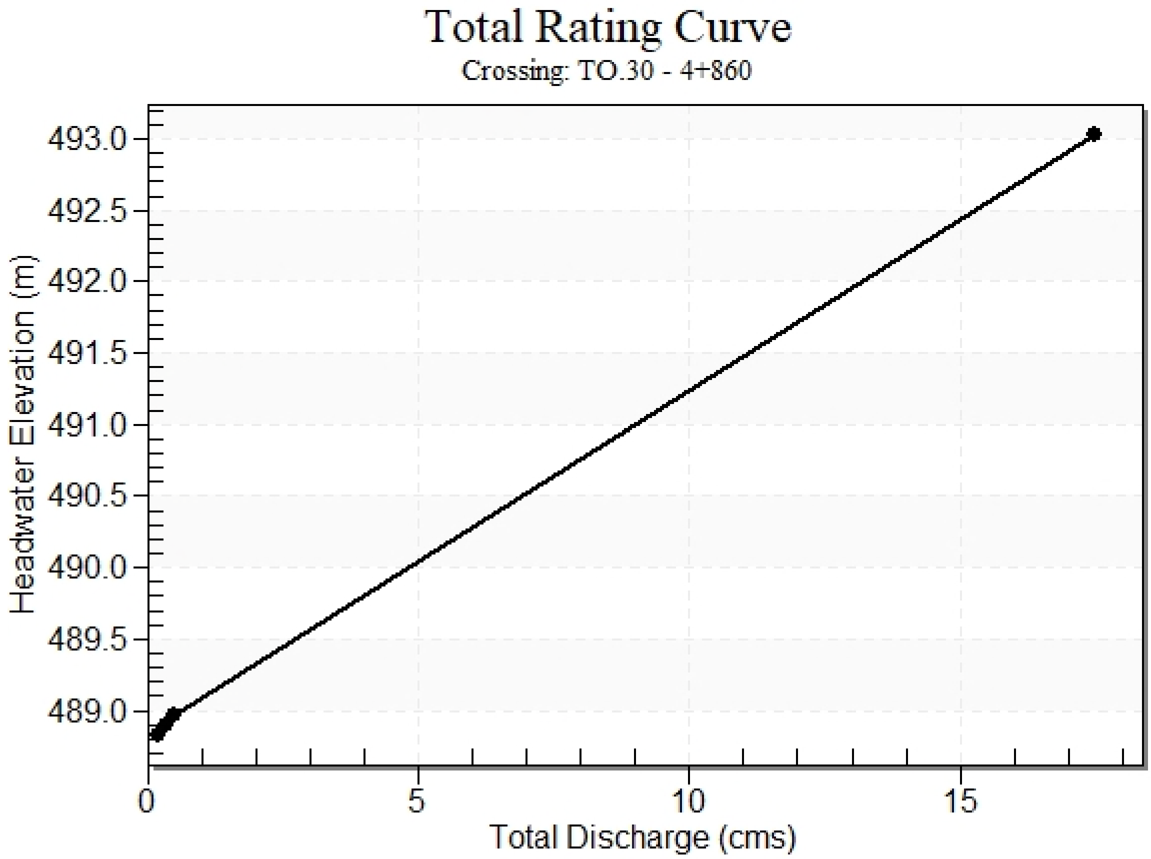


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.22	0.22	488.83	0.168	0.203	2-M2c	0.172	0.107	0.107	0.058	1.023	1.890
TR=100	0.34	0.34	488.90	0.236	0.271	2-M2c	0.227	0.144	0.144	0.076	1.190	2.250
TR=200	0.49	0.49	488.97	0.313	0.343	2-M2c	0.285	0.184	0.184	0.096	1.344	2.588

****

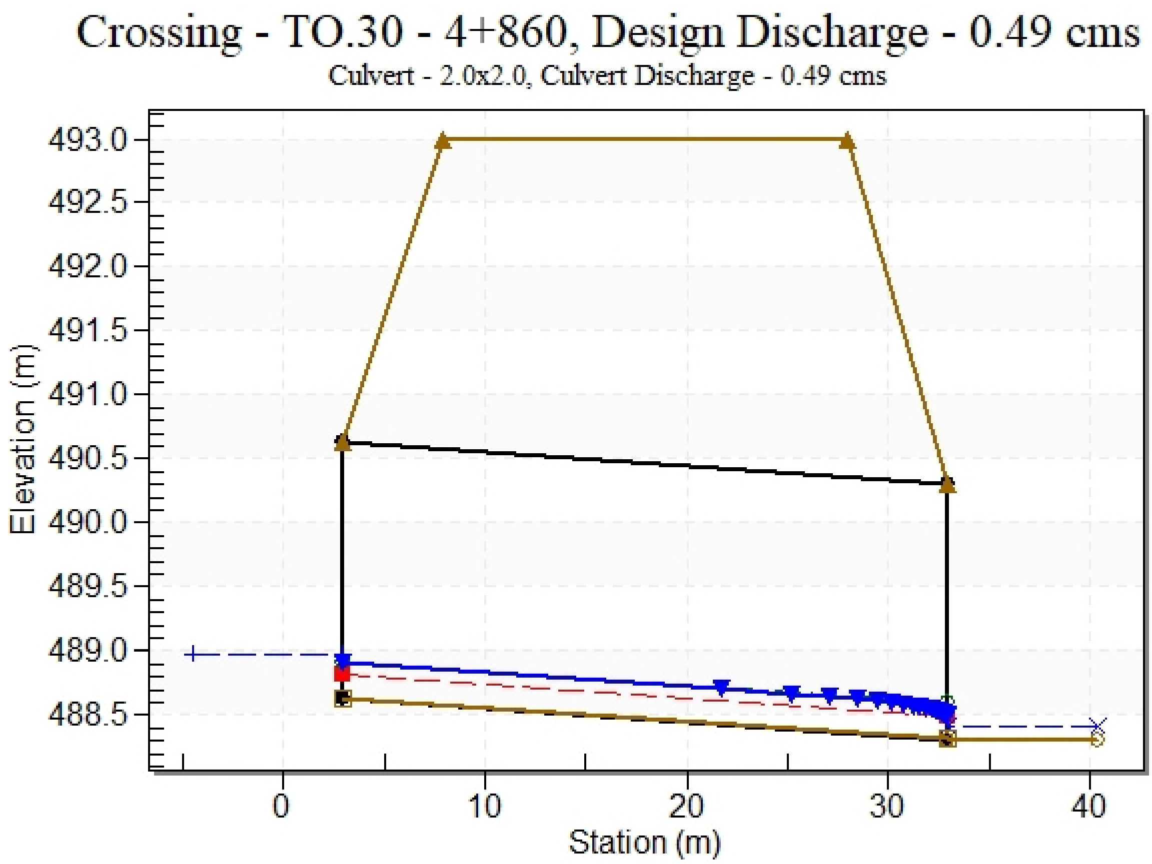
Straight Culvert

Inlet Elevation (invert): 488.63 m, Outlet Elevation (invert): 488.31 m

Culvert Length: 29.90 m, Culvert Slope: 0.0107

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 488.63 m

Outlet Station: 32.90 m

Outlet Elevation: 488.31 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0500 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.30 - 4+860)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.22	488.37	0.06	1.89	28.26	2.51
0.34	488.39	0.08	2.25	37.35	2.60
0.49	488.41	0.10	2.59	46.88	2.67

Tailwater Channel Data - TO.30 - 4+860

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 488.31 m

Roadway Data for Crossing: TO.30 - 4+860

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 20.00 m

Crest Elevation: 493.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.19. C.116 - Progr.4+950

Table 1 - Summary of Culvert Flows at Crossing: TO.31 - 4+950

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
492.98	TR=50	0.91	0.91	0.00	1
493.12	TR=100	1.35	1.35	0.00	1
493.27	TR=200	1.86	1.86	0.00	1
498.00	Overtopping	21.76	21.76	0.00	Overtopping

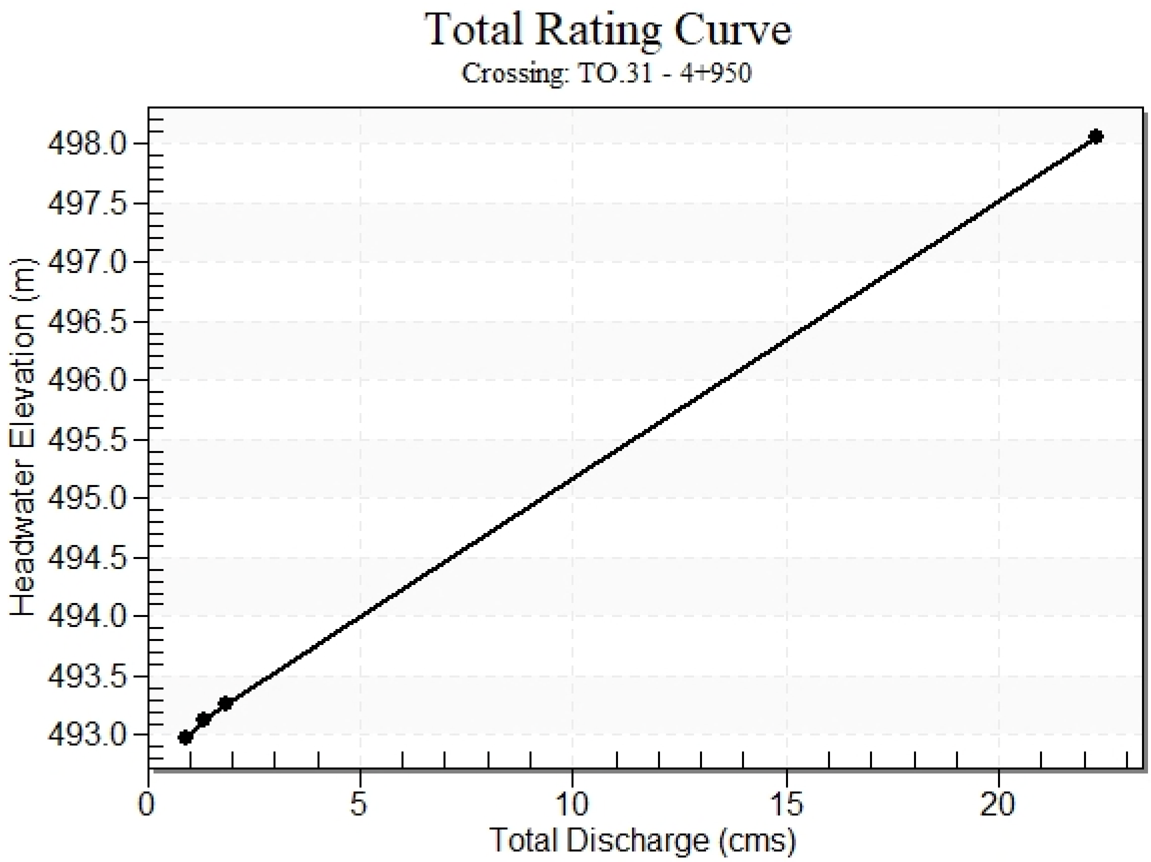


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.91	0.91	492.98	0.471	0.032	1-S2n	0.234	0.277	0.234	0.140	1.954	3.257
TR=100	1.35	1.35	493.12	0.611	0.120	1-S2n	0.303	0.359	0.304	0.180	2.217	3.752
TR=200	1.86	1.86	493.27	0.756	0.215	1-S2n	0.374	0.445	0.377	0.221	2.463	4.207

****

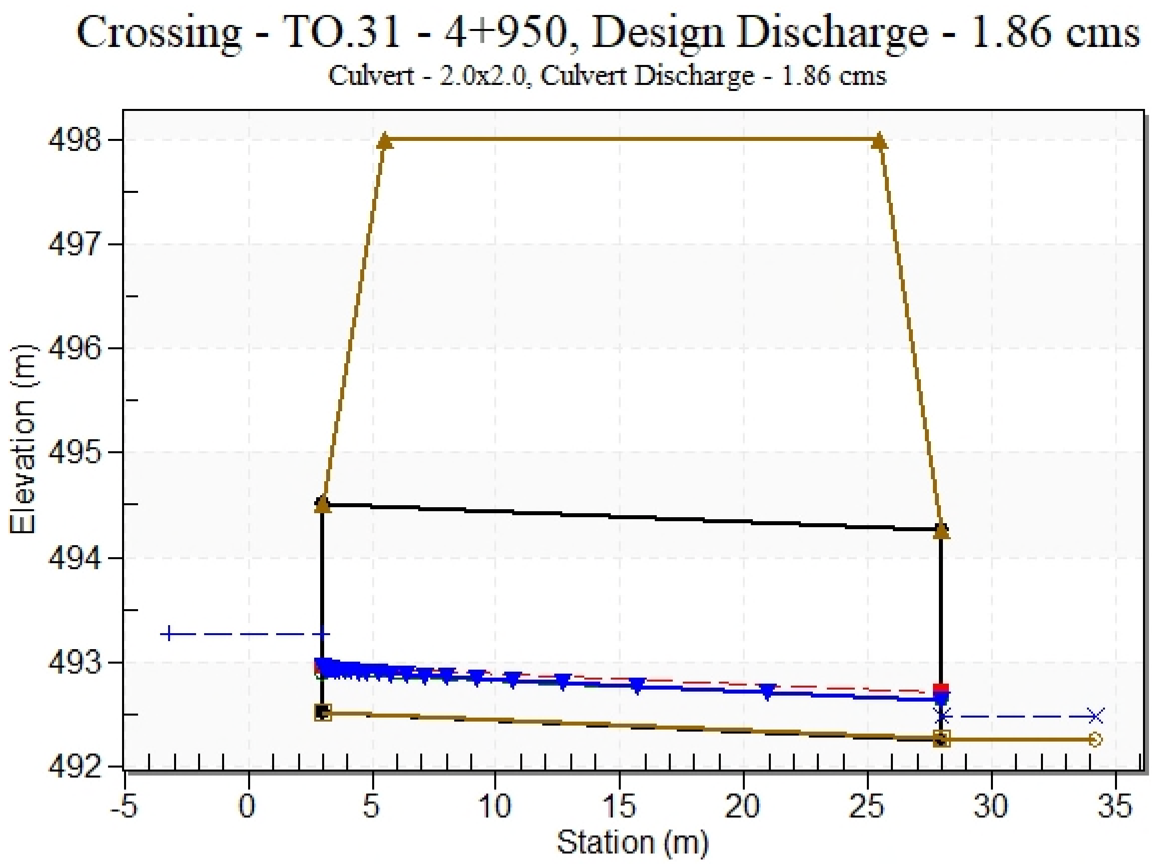
Straight Culvert

Inlet Elevation (invert): 492.51 m,   Outlet Elevation (invert): 492.26 m

Culvert Length: 25.00 m,   Culvert Slope: 0.0100

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 492.51 m

Outlet Station: 28.00 m

Outlet Elevation: 492.26 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.31 - 4+950)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.91	492.40	0.14	3.26	68.85	2.77
1.35	492.44	0.18	3.75	88.11	2.82
1.86	492.48	0.22	4.21	108.18	2.86

Tailwater Channel Data - TO.31 - 4+950

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 492.26 m

Roadway Data for Crossing: TO.31 - 4+950

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 20.00 m

Crest Elevation: 498.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.20. C.116.1 - Progr.5+125

Table 1 - Summary of Culvert Flows at Crossing: TO.32 - 5+125

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
500.79	TR=50	0.45	0.45	0.00	1
500.89	TR=100	0.72	0.72	0.00	1
501.00	TR=200	1.04	1.04	0.00	1
505.00	Overtopping	18.91	18.91	0.00	Overtopping

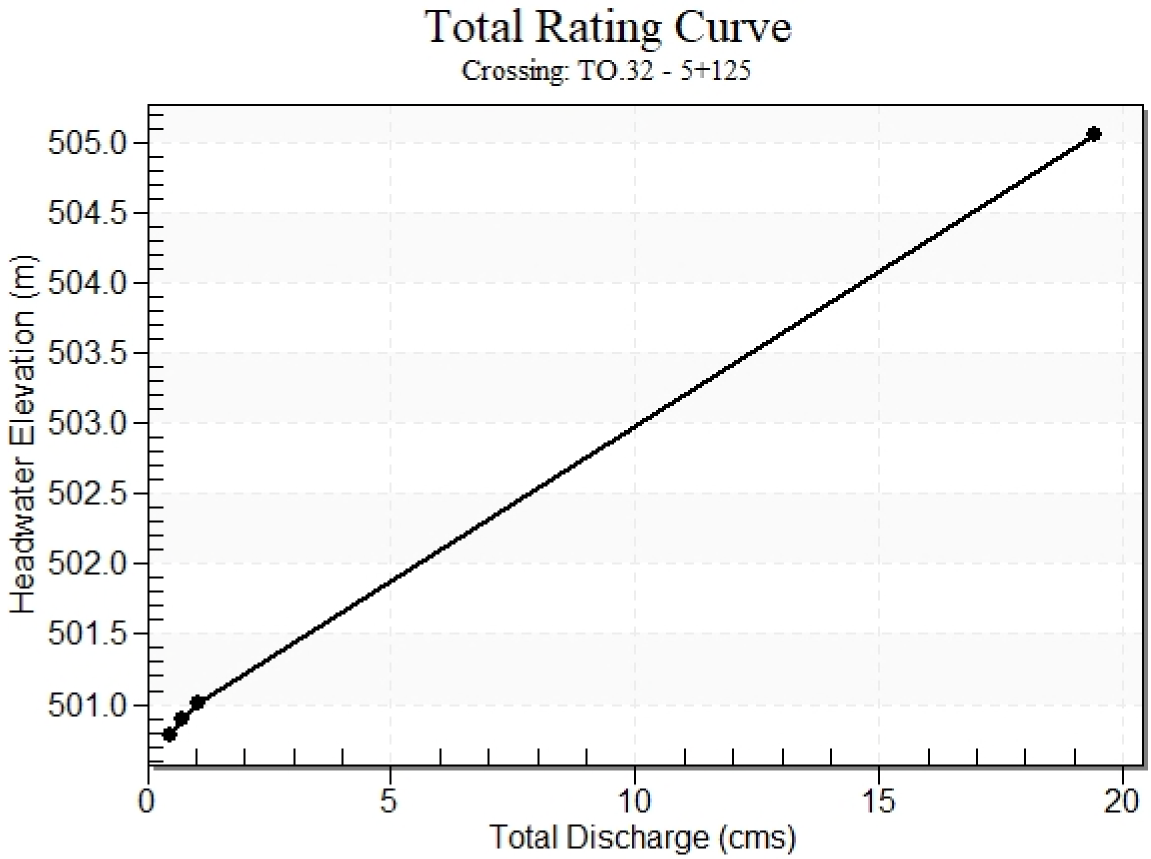


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.45	0.45	500.79	0.296	0.0*	1-S2n	0.149	0.174	0.149	0.091	1.531	2.507
TR=100	0.72	0.72	500.89	0.402	0.0*	1-S2n	0.199	0.236	0.199	0.121	1.805	2.980
TR=200	1.04	1.04	501.00	0.514	0.059	1-S2n	0.254	0.302	0.254	0.152	2.053	3.415

* Full Flow Headwater elevation is below inlet invert.

****

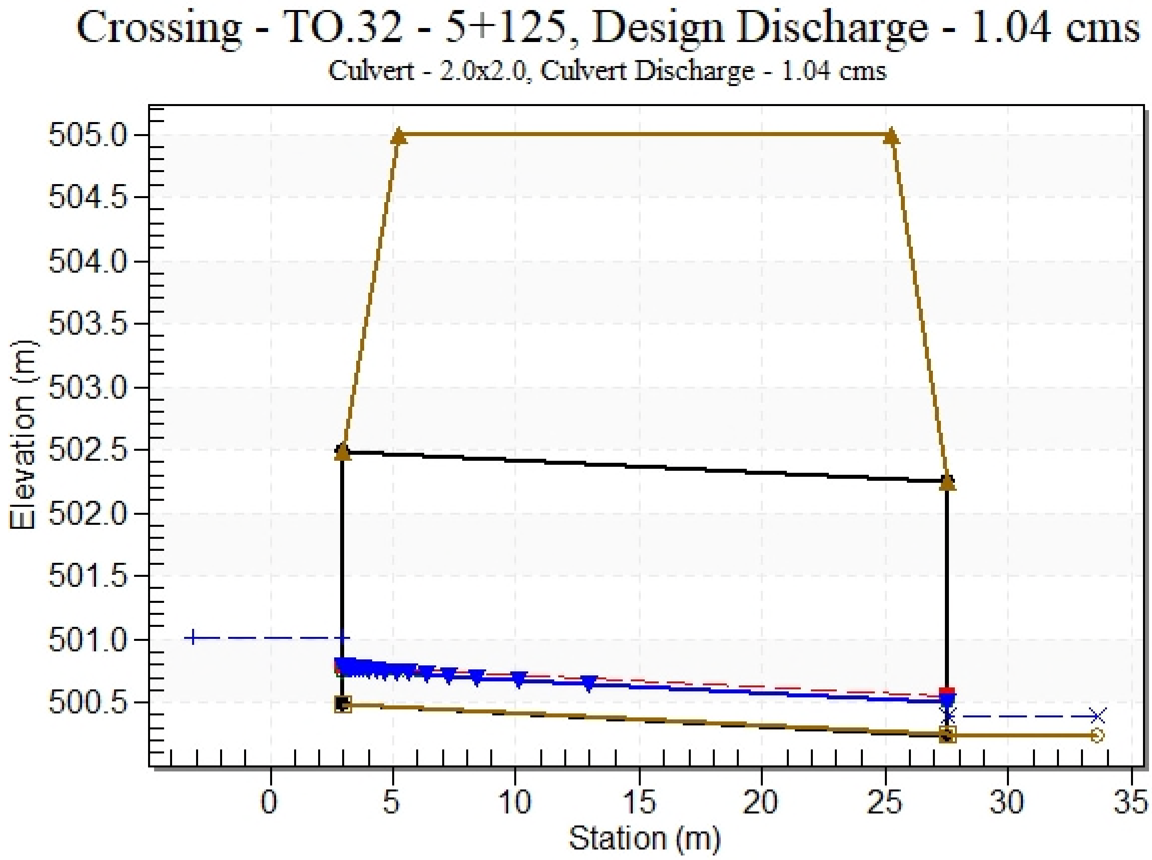
Straight Culvert

Inlet Elevation (invert): 500.49 m,   Outlet Elevation (invert): 500.24 m

Culvert Length: 24.50 m,   Culvert Slope: 0.0102

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 500.49 m

Outlet Station: 27.50 m

Outlet Elevation: 500.24 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.32 - 5+125)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.45	500.33	0.09	2.51	44.48	2.66
0.72	500.36	0.12	2.98	59.21	2.74
1.04	500.39	0.15	3.42	74.70	2.79

Tailwater Channel Data - TO.32 - 5+125

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 500.24 m

Roadway Data for Crossing: TO.32 - 5+125

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 20.00 m

Crest Elevation: 505.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.21. C.116.2 - Progr.5+317

Table 1 - Summary of Culvert Flows at Crossing: TO.33 - 5+325

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
509.39	TR=50	0.21	0.21	0.00	1
509.46	TR=100	0.33	0.33	0.00	1
509.53	TR=200	0.47	0.47	0.00	1
513.00	Overtopping	16.39	16.39	0.00	Overtopping

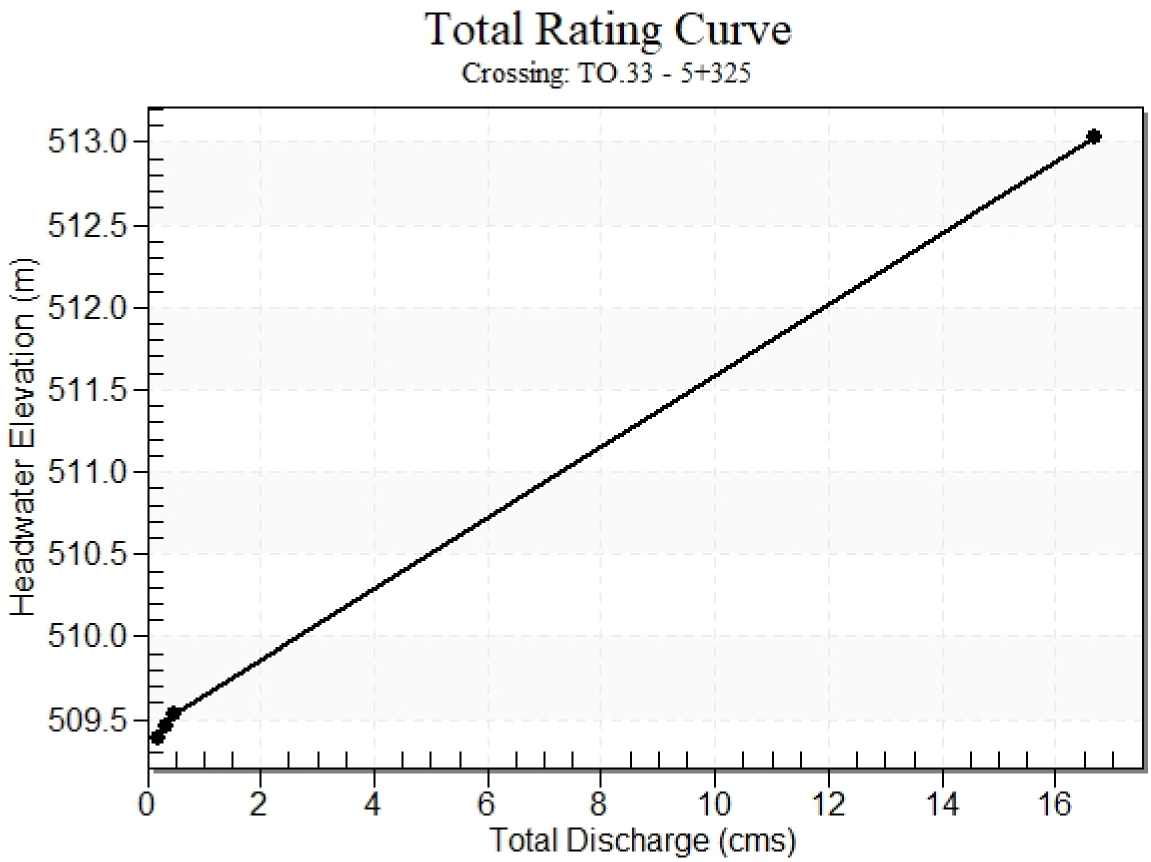


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.21	0.21	509.39	0.161	0.0*	1-S2n	0.089	0.103	0.089	0.056	1.156	1.849
TR=100	0.33	0.33	509.46	0.226	0.0*	1-S2n	0.119	0.139	0.119	0.074	1.360	2.205
TR=200	0.47	0.47	509.53	0.301	0.0*	1-S2n	0.152	0.177	0.152	0.092	1.542	2.533

* Full Flow Headwater elevation is below inlet invert.

****

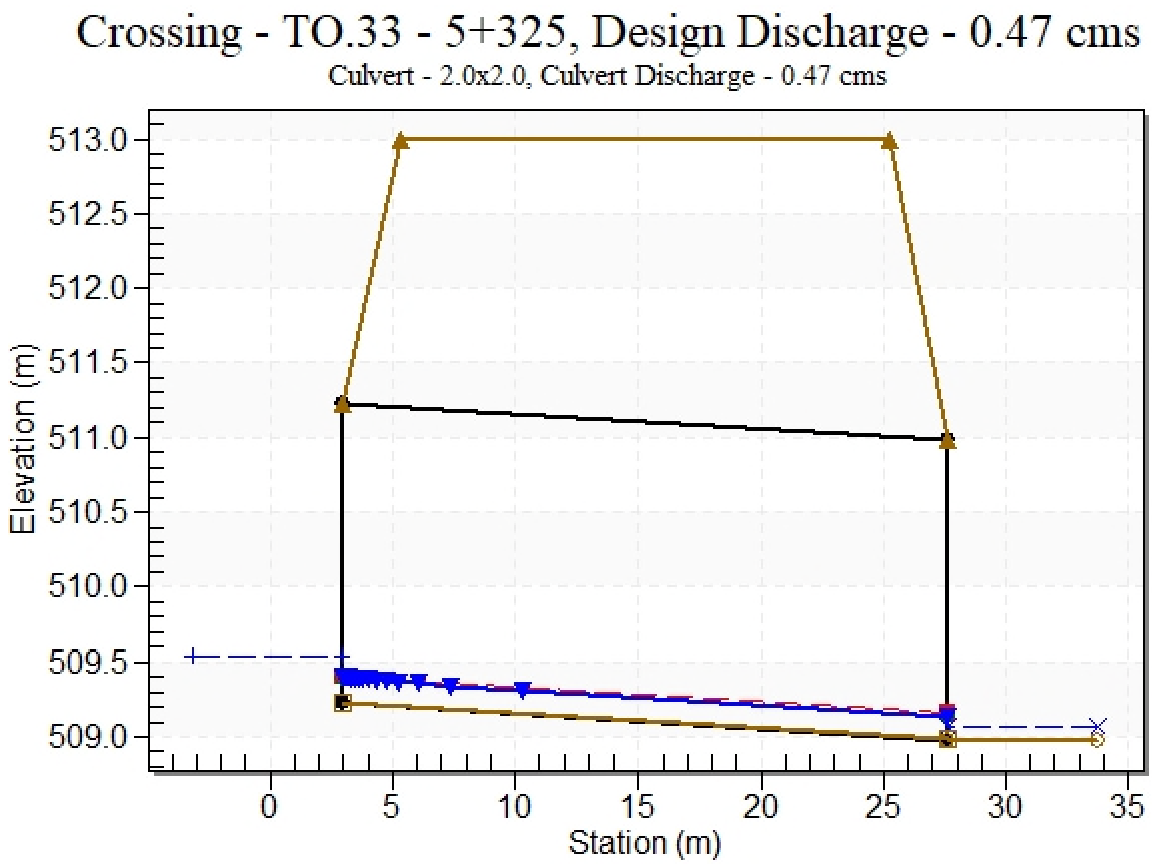
Straight Culvert

Inlet Elevation (invert): 509.23 m, Outlet Elevation (invert): 508.98 m

Culvert Length: 24.60 m, Culvert Slope: 0.0102

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 509.23 m

Outlet Station: 27.60 m

Outlet Elevation: 508.98 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.33 - 5+325)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.21	509.04	0.06	1.85	27.29	2.50
0.33	509.05	0.07	2.20	36.13	2.59
0.47	509.07	0.09	2.53	45.27	2.66

Tailwater Channel Data - TO.33 - 5+325

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 508.98 m

Roadway Data for Crossing: TO.33 - 5+325

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 20.00 m

Crest Elevation: 513.00 m

Roadway Surface: Paved

Roadway Top Width: 20.00 m

3.1.22. C.119.1 - Progr.5+915

Table 1 - Summary of Culvert Flows at Crossing: TO.36 - 5+915

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
531.98	TR=50	0.46	0.46	0.00	1
532.06	TR=100	0.65	0.65	0.00	1
532.13	TR=200	0.86	0.86	0.00	1
535.00	Overtopping	14.64	14.64	0.00	Overtopping

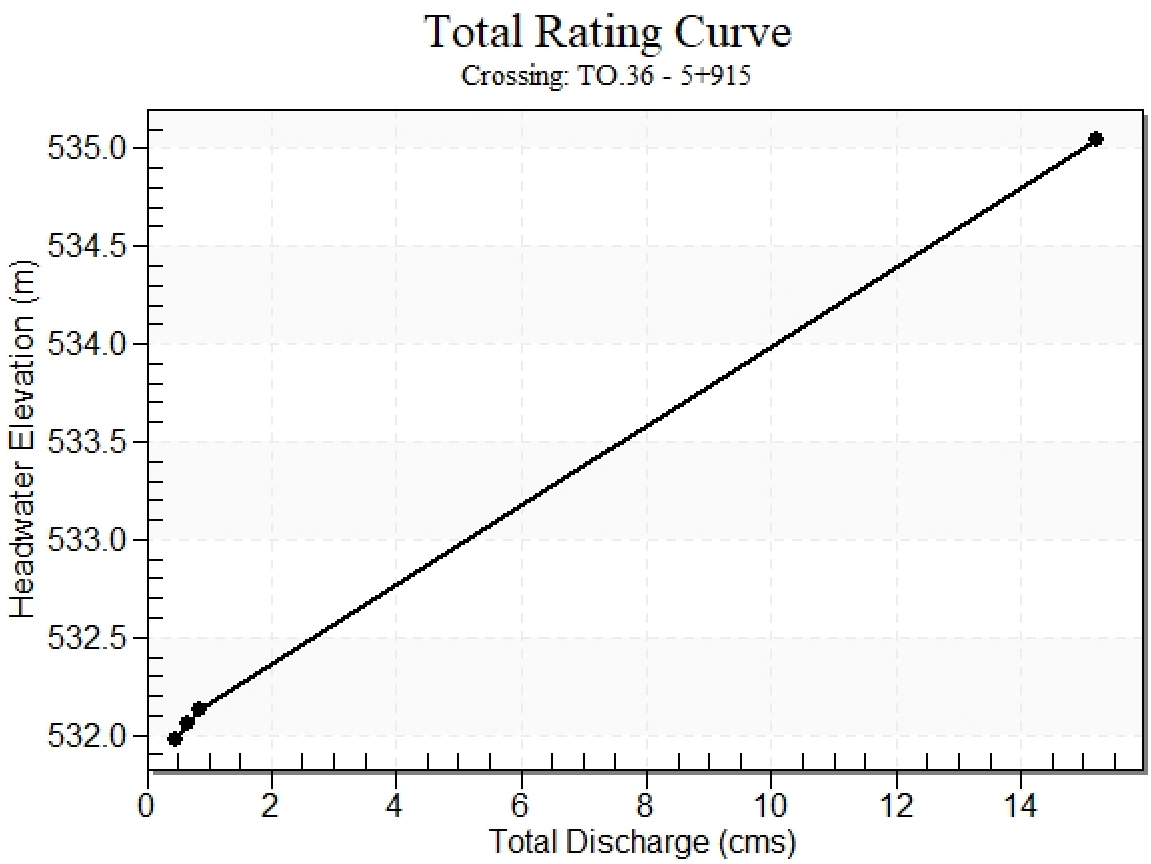


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.46	0.46	531.98	0.300	0.0*	1-S2n	0.152	0.177	0.152	0.092	1.529	2.528
TR=100	0.65	0.65	532.06	0.375	0.0*	1-S2n	0.188	0.221	0.188	0.113	1.732	2.867
TR=200	0.86	0.86	532.13	0.452	0.0*	1-S2n	0.225	0.266	0.225	0.135	1.911	3.182

* Full Flow Headwater elevation is below inlet invert.

****

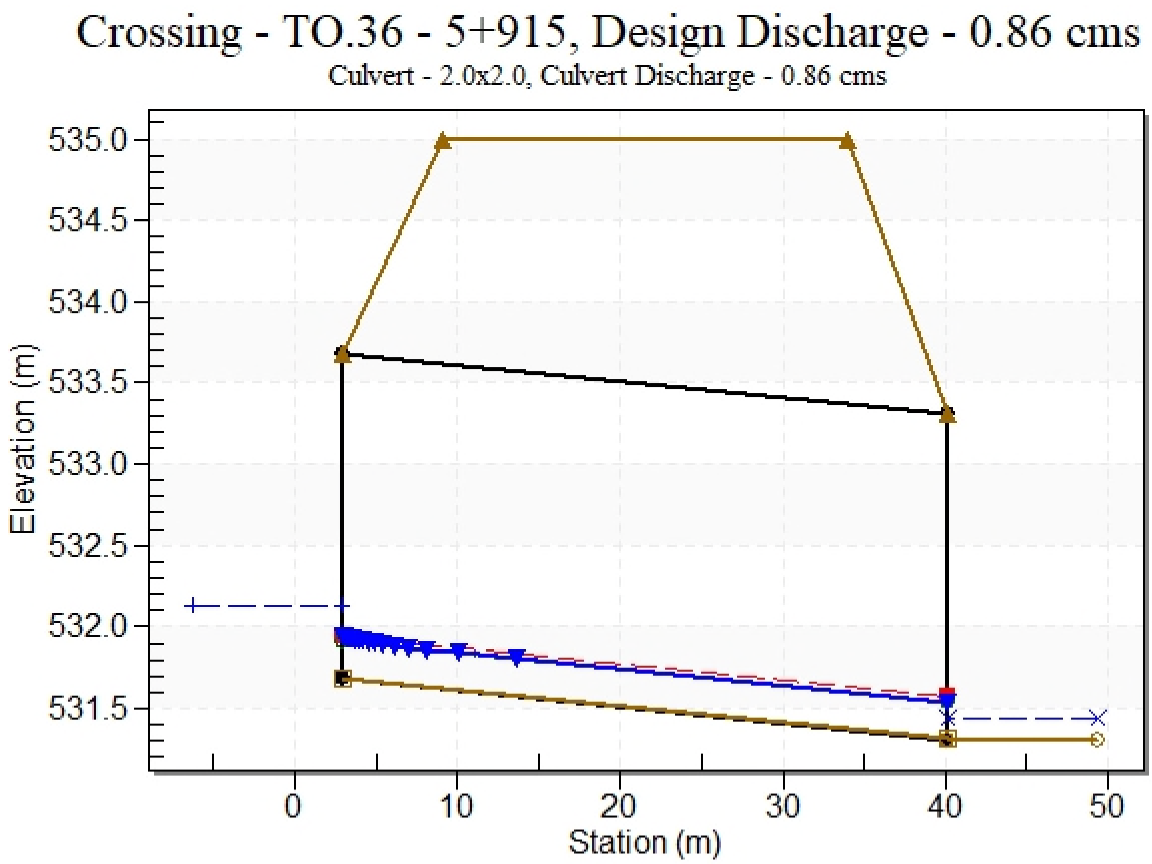
Straight Culvert

Inlet Elevation (invert): 531.68 m,   Outlet Elevation (invert): 531.31 m

Culvert Length: 37.10 m,   Culvert Slope: 0.0100

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 531.68 m

Outlet Station: 40.10 m

Outlet Elevation: 531.31 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.36 - 5+915)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.46	531.40	0.09	2.53	45.07	2.66
0.65	531.42	0.11	2.87	55.56	2.72
0.86	531.45	0.14	3.18	66.22	2.76

Tailwater Channel Data - TO.36 - 5+915

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 531.31 m

Roadway Data for Crossing: TO.36 - 5+915

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 m

Crest Elevation: 535.00 m

Roadway Surface: Paved

Roadway Top Width: 25.00 m

3.1.23. C.120.1 - Progr.Rampa (6+140)

Table 1 - Summary of Culvert Flows at Crossing: TO.38 - 6+140

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	DN1000 Discharge (cms)	Roadway Discharge (cms)	Iterations
548.74	TR=50	0.04	0.04	0.00	1
548.77	TR=100	0.06	0.06	0.00	1
548.81	TR=200	0.09	0.09	0.00	1
552.00	Overtopping	2.81	2.81	0.00	Overtopping

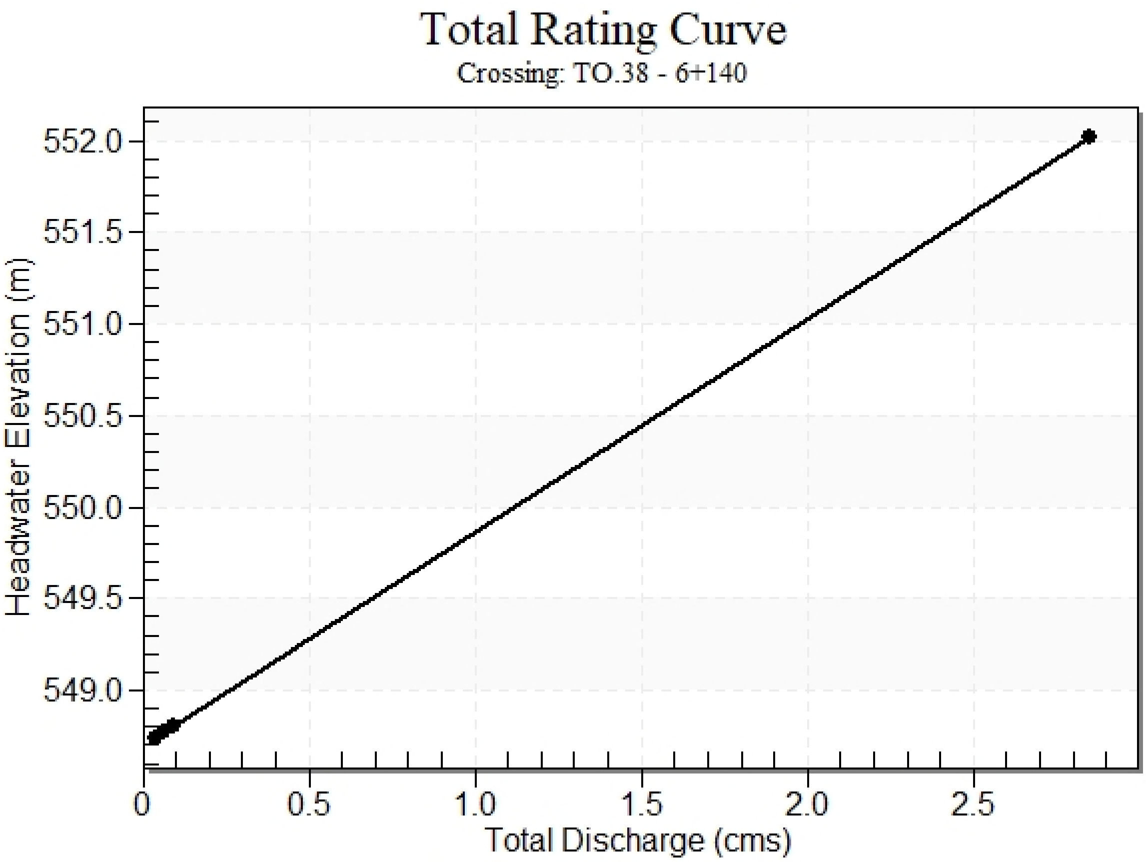


Table 2 - Culvert Summary Table: DN1000

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.04	0.04	548.74	0.142	0.0*	1-S2n	0.108	0.110	0.108	0.032	0.873	1.263
TR=100	0.06	0.06	548.77	0.173	0.020	1-S2n	0.136	0.139	0.136	0.042	1.004	1.512
TR=200	0.09	0.09	548.81	0.206	0.048	1-S2n	0.161	0.167	0.161	0.053	1.113	1.729

* Full Flow Headwater elevation is below inlet invert.

****

Straight Culvert

Inlet Elevation (invert): 548.60 m,   Outlet Elevation (invert): 548.48 m

Culvert Length: 15.50 m,   Culvert Slope: 0.0077

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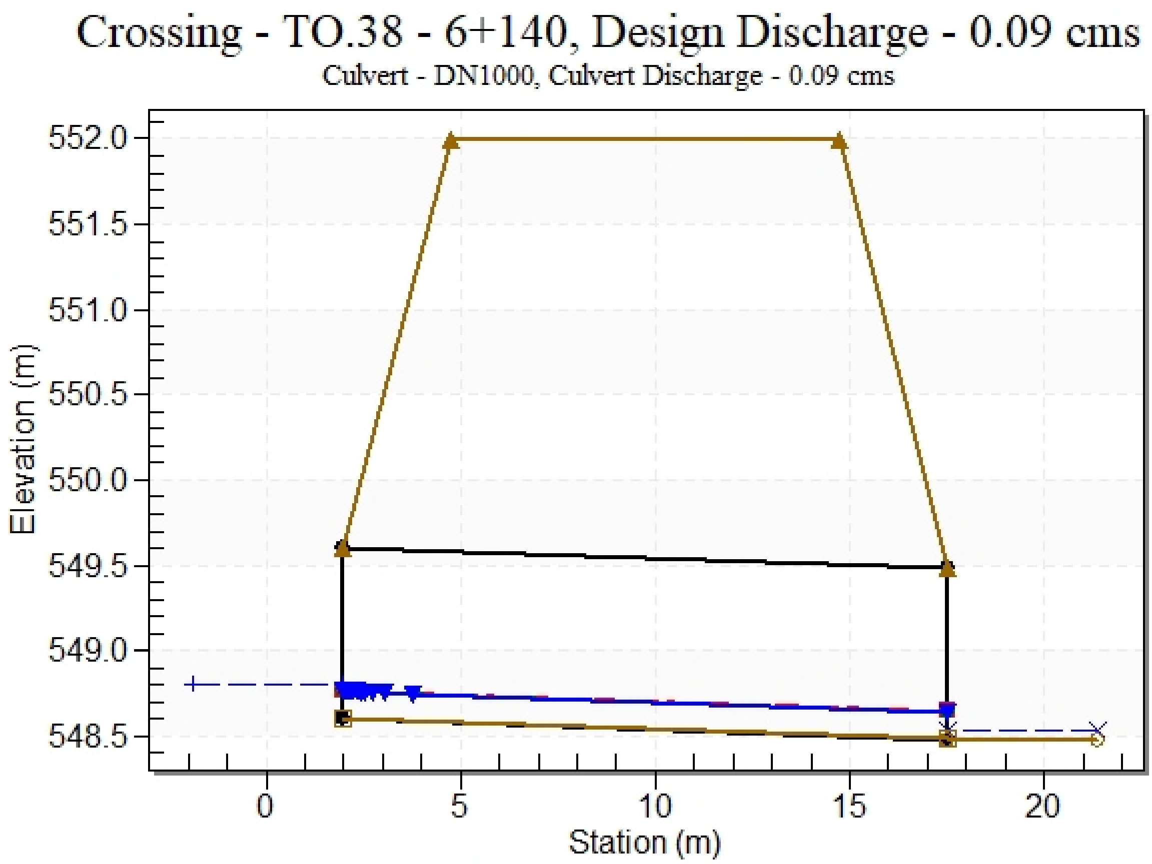
Water Surface Profile Plot for Culvert: DN1000



Site Data - DN1000

Site Data Option: Culvert Invert Data

Inlet Station: 2.00 m

Inlet Elevation: 548.60 m

Outlet Station: 17.50 m

Outlet Elevation: 548.48 m

Number of Barrels: 1

Culvert Data Summary - DN1000

Barrel Shape: Circular

Barrel Diameter: 1000.00 mm

Barrel Material: Corrugated Metal Riveted or Welded

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: TO.38 - 6+140)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.04	548.51	0.03	1.26	15.52	2.27
0.06	548.52	0.04	1.51	20.74	2.35
0.09	548.53	0.05	1.73	25.80	2.41

Tailwater Channel Data - TO.38 - 6+140

Tailwater Channel Option: Rectangular Channel

Bottom Width: 1.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 548.48 m

Roadway Data for Crossing: TO.38 - 6+140

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 10.00 m

Crest Elevation: 552.00 m

Roadway Surface: Paved

Roadway Top Width: 10.00 m

3.1.24. C.123.1 - Progr.6+530

Table 1 - Summary of Culvert Flows at Crossing: TO.41 - 6+530

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
557.12	TR=50	0.30	0.30	0.00	1
557.21	TR=100	0.47	0.47	0.00	1
557.30	TR=200	0.68	0.68	0.00	1
570.00	Overtopping	35.92	35.92	0.00	Overtopping

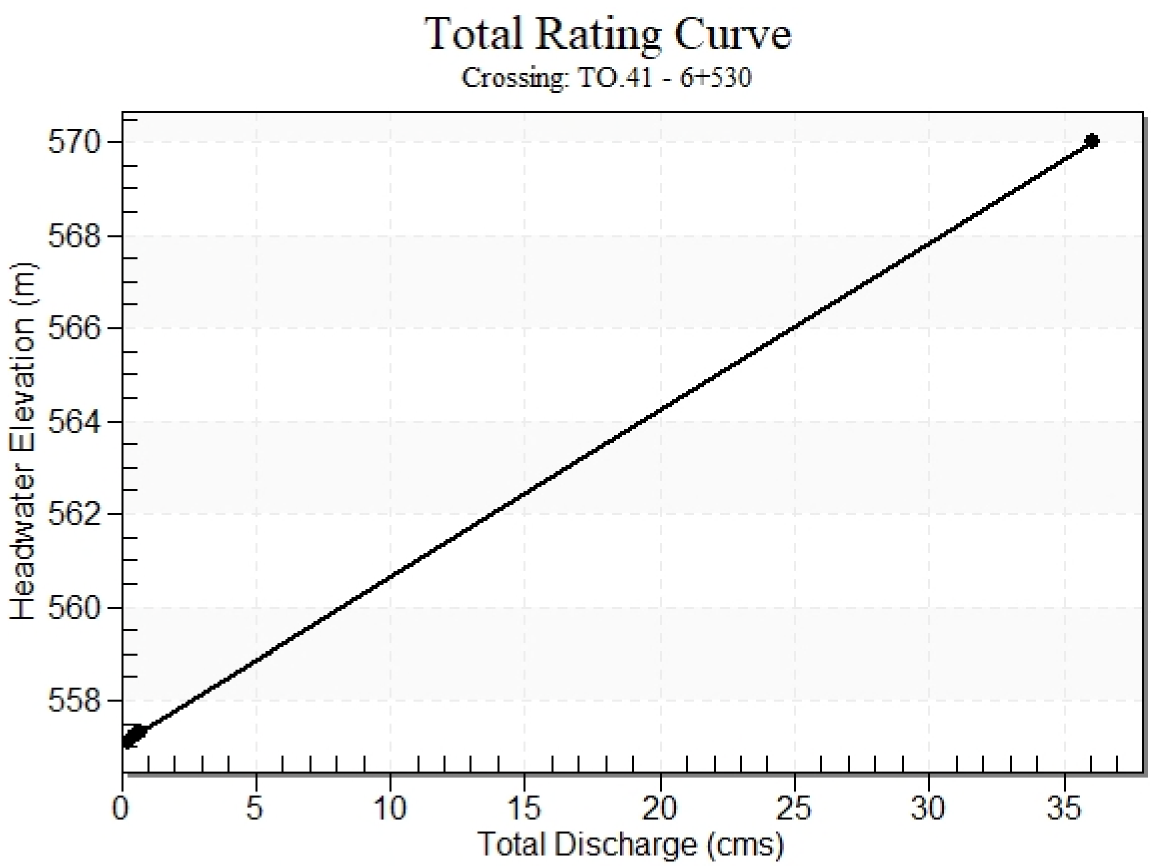


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.30	0.30	557.12	0.211	0.0*	1-S2n	0.113	0.131	0.113	0.070	1.309	2.130
TR=100	0.47	0.47	557.21	0.302	0.0*	1-S2n	0.152	0.178	0.152	0.092	1.538	2.535
TR=200	0.68	0.68	557.30	0.386	0.0*	1-S2n	0.192	0.227	0.192	0.116	1.761	2.911

* Full Flow Headwater elevation is below inlet invert.

****

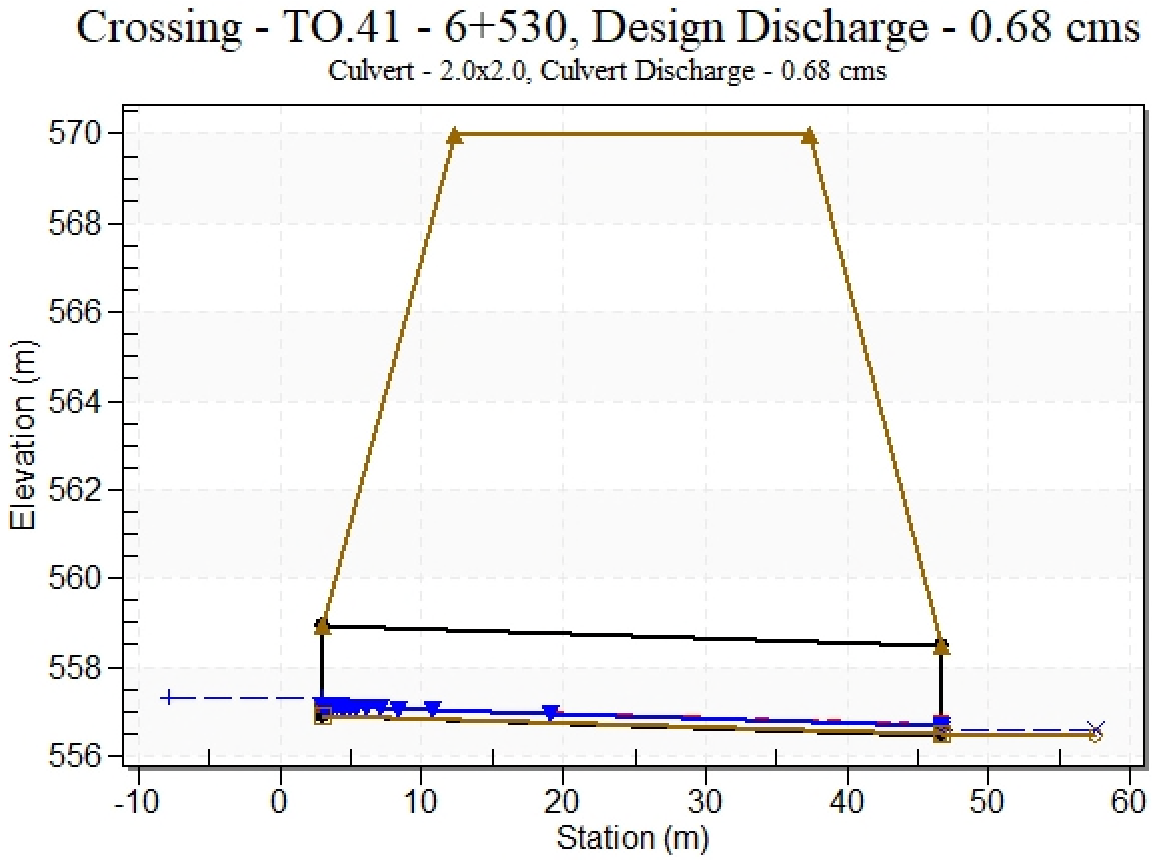
Straight Culvert

Inlet Elevation (invert): 556.91 m, Outlet Elevation (invert): 556.47 m

Culvert Length: 43.70 m, Culvert Slope: 0.0101

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 556.91 m

Outlet Station: 46.70 m

Outlet Elevation: 556.47 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.41 - 6+530)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.30	556.54	0.07	2.13	34.17	2.58
0.47	556.56	0.09	2.54	45.33	2.66
0.68	556.59	0.12	2.91	56.99	2.73

Tailwater Channel Data - TO.41 - 6+530

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 556.47 m

Roadway Data for Crossing: TO.41 - 6+530

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 m

Crest Elevation: 570.00 m

Roadway Surface: Paved

Roadway Top Width: 25.00 m

3.1.25. C.124 - Progr.6+760

Table 1 - Summary of Culvert Flows at Crossing: TO.42 - 6+760

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
566.98	TR=50	1.00	1.00	0.00	1
567.15	TR=100	1.55	1.55	0.00	1
567.33	TR=200	2.21	2.21	0.00	1
570.00	Overtopping	15.44	15.44	0.00	Overtopping

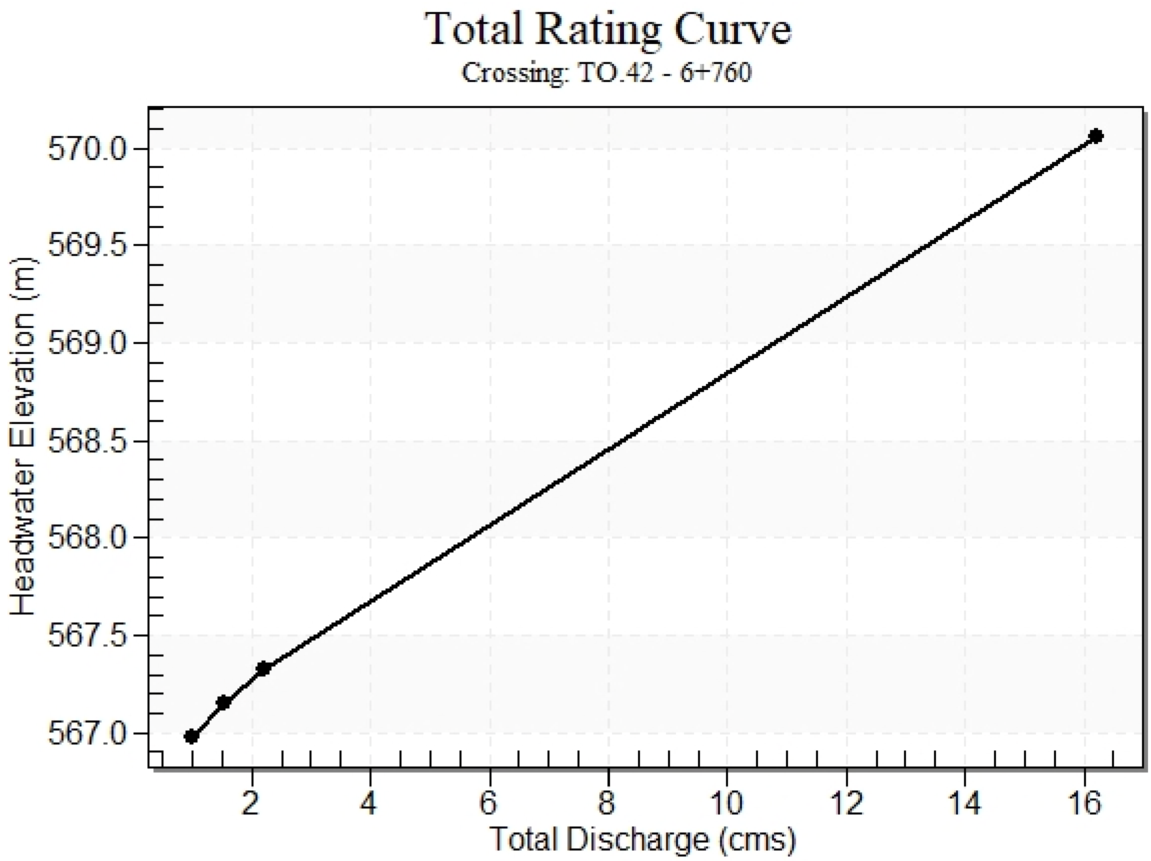


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	1.00	1.00	566.98	0.501	0.0*	1-S2n	0.250	0.294	0.250	0.149	2.004	3.366
TR=100	1.55	1.55	567.15	0.670	0.070	1-S2n	0.333	0.394	0.333	0.197	2.327	3.946
TR=200	2.21	2.21	567.33	0.849	0.190	1-S2n	0.424	0.499	0.424	0.247	2.610	4.471

* Full Flow Headwater elevation is below inlet invert.

****

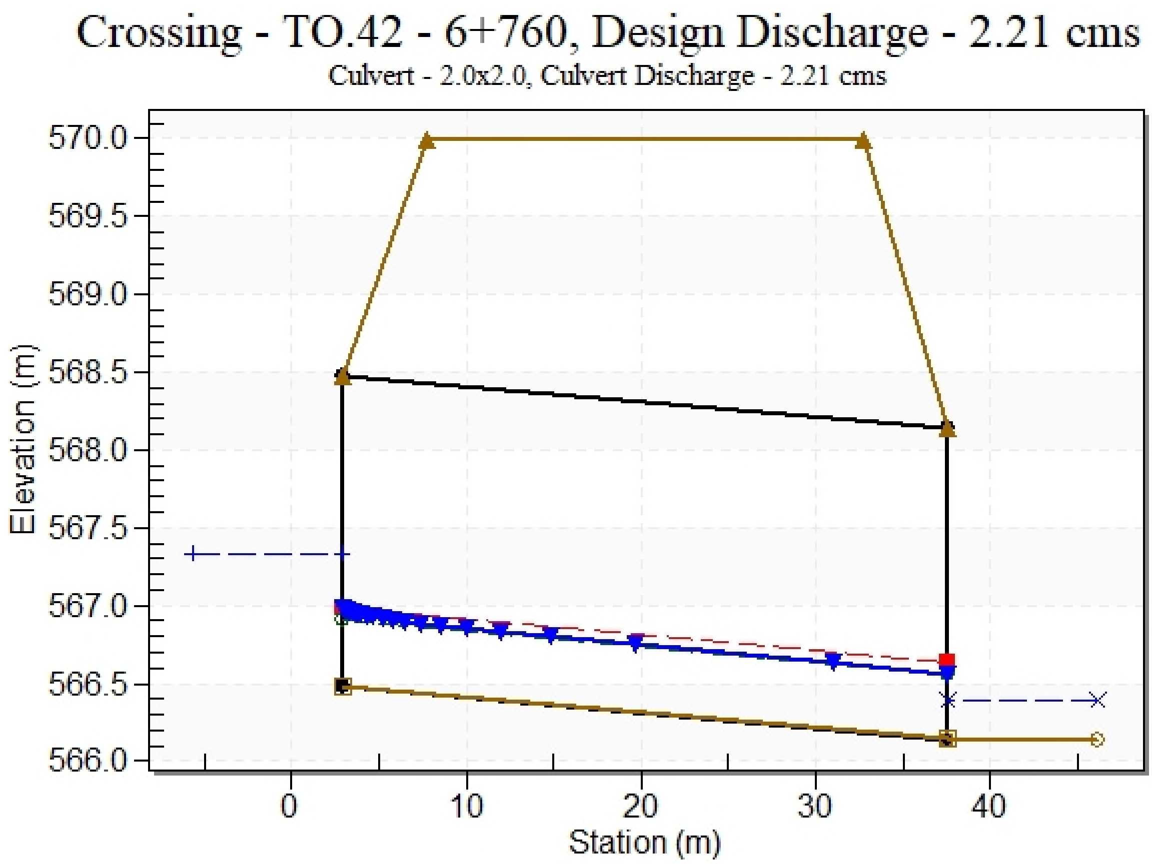
Straight Culvert

Inlet Elevation (invert): 566.48 m,   Outlet Elevation (invert): 566.14 m

Culvert Length: 34.50 m,   Culvert Slope: 0.0099

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 566.48 m

Outlet Station: 37.50 m

Outlet Elevation: 566.14 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.42 - 6+760)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
1.00	566.29	0.15	3.37	72.88	2.79
1.55	566.34	0.20	3.95	96.33	2.84
2.21	566.39	0.25	4.47	121.17	2.87

Tailwater Channel Data - TO.42 - 6+760

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 566.14 m

Roadway Data for Crossing: TO.42 - 6+760

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 m

Crest Elevation: 570.00 m

Roadway Surface: Paved

Roadway Top Width: 25.00 m

3.1.26. C.124.1 - Progr.6+850

Table 1 - Summary of Culvert Flows at Crossing: TO.43 - 6+850

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
570.94	TR=50	0.17	0.17	0.00	1
571.00	TR=100	0.27	0.27	0.00	1
571.06	TR=200	0.39	0.39	0.00	1
575.00	Overtopping	17.90	17.90	0.00	Overtopping

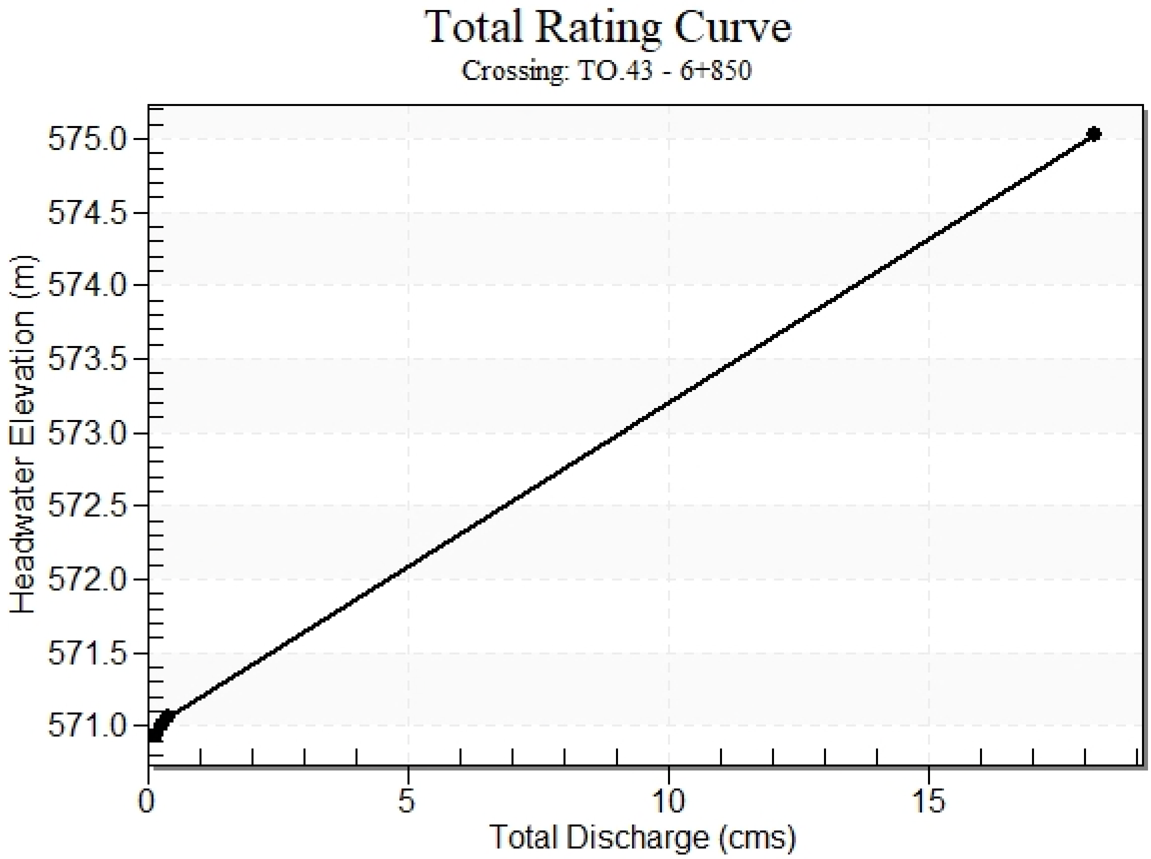


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.17	0.17	570.94	0.142	0.0*	1-S2n	0.080	0.091	0.080	0.050	1.080	1.725
TR=100	0.27	0.27	571.00	0.197	0.0*	1-S2n	0.108	0.123	0.108	0.066	1.252	2.057
TR=200	0.39	0.39	571.06	0.263	0.0*	1-S2n	0.136	0.157	0.136	0.082	1.439	2.364

* Full Flow Headwater elevation is below inlet invert.

****

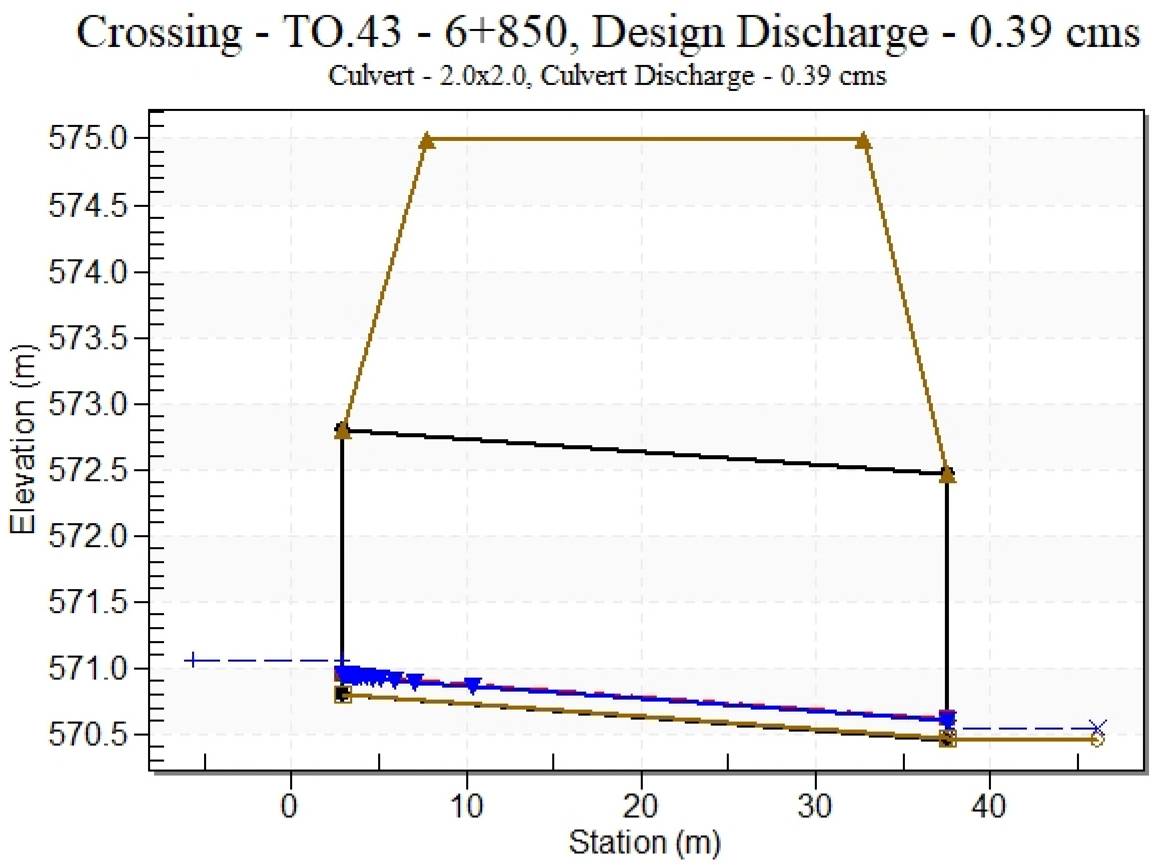
Straight Culvert

Inlet Elevation (invert): 570.80 m,   Outlet Elevation (invert): 570.46 m

Culvert Length: 34.50 m,   Culvert Slope: 0.0099

****

Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 570.80 m

Outlet Station: 37.50 m

Outlet Elevation: 570.46 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.43 - 6+850)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.17	570.51	0.05	1.73	24.43	2.47
0.27	570.53	0.07	2.06	32.29	2.56
0.39	570.54	0.08	2.36	40.42	2.63

Tailwater Channel Data - TO.43 - 6+850

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 570.46 m

Roadway Data for Crossing: TO.43 - 6+850

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 m

Crest Elevation: 575.00 m

Roadway Surface: Paved

Roadway Top Width: 25.00 m

3.1.27. C.125 - Progr.6+960

Table 1 - Summary of Culvert Flows at Crossing: TO.44 - 6+960

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	2.0x2.0 Discharge (cms)	Roadway Discharge (cms)	Iterations
572.89	TR=50	1.23	1.23	0.00	1
573.08	TR=100	1.86	1.86	0.00	1
573.27	TR=200	2.60	2.60	0.00	1
577.00	Overtopping	19.44	19.44	0.00	Overtopping

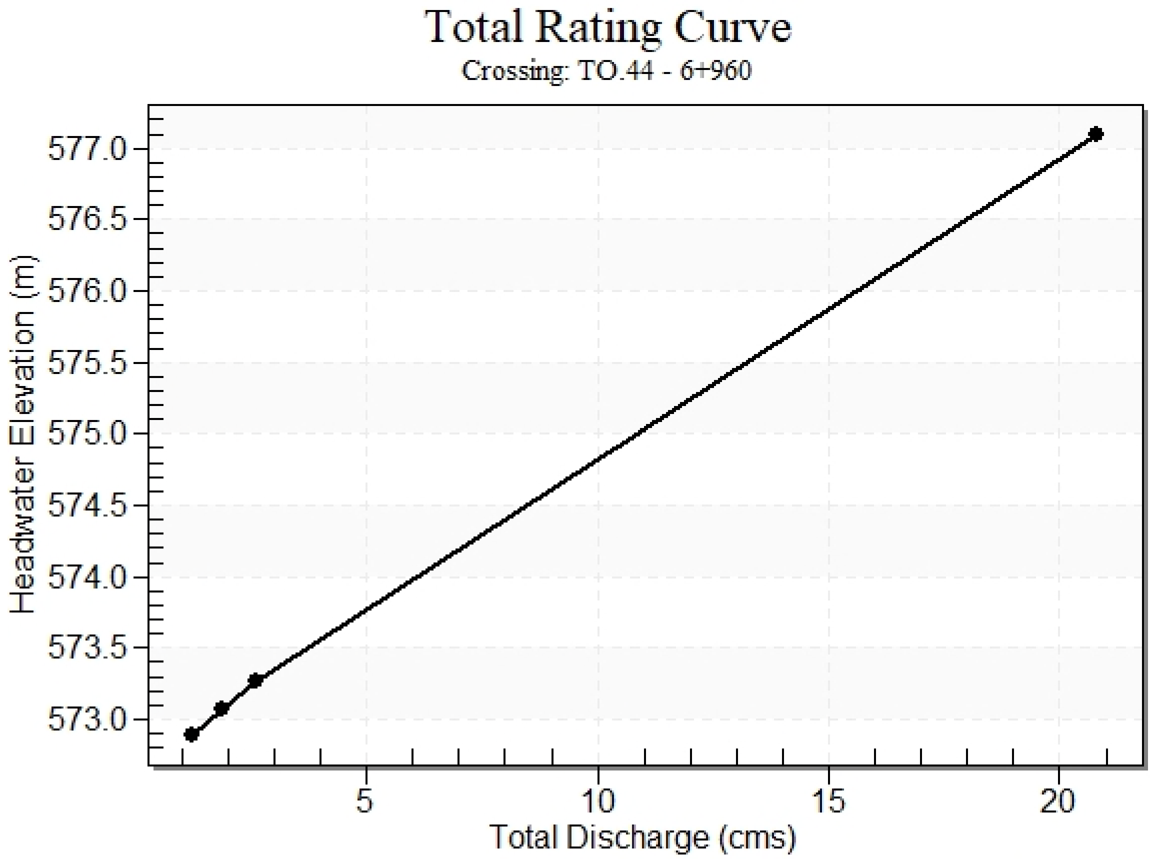


Table 2 - Culvert Summary Table: 2.0x2.0

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	1.23	1.23	572.89	0.574	0.017	1-S2n	0.285	0.337	0.285	0.169	2.158	3.627
TR=100	1.86	1.86	573.08	0.755	0.136	1-S2n	0.375	0.444	0.375	0.221	2.474	4.204
TR=200	2.60	2.60	573.27	0.946	0.269	1-S2n	0.472	0.556	0.472	0.275	2.754	4.730

****

Straight Culvert

Inlet Elevation (invert): 572.32 m,   Outlet Elevation (invert): 571.99 m

Culvert Length: 33.20 m,   Culvert Slope: 0.0099

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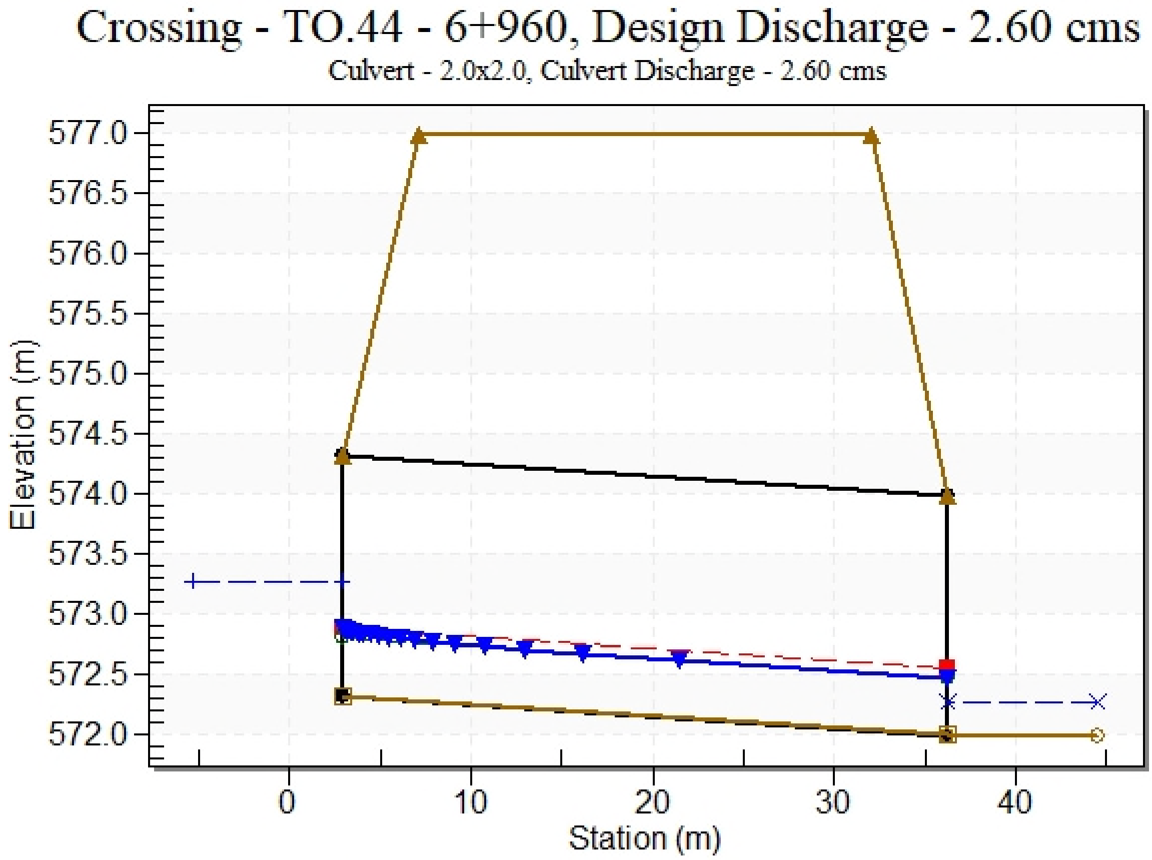
Water Surface Profile Plot for Culvert: 2.0x2.0



Site Data - 2.0x2.0

Site Data Option: Culvert Invert Data

Inlet Station: 3.00 m

Inlet Elevation: 572.32 m

Outlet Station: 36.20 m

Outlet Elevation: 571.99 m

Number of Barrels: 1

Culvert Data Summary - 2.0x2.0

Barrel Shape: Concrete Box

Barrel Span: 2000.00 mm

Barrel Rise: 2000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Table 3 - Downstream Channel Rating Curve (Crossing: TO.44 - 6+960)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
1.23	572.16	0.17	3.63	82.97	2.81
1.86	572.21	0.22	4.20	108.12	2.86
2.60	572.26	0.27	4.73	134.70	2.88

Tailwater Channel Data - TO.44 - 6+960

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 571.99 m

Roadway Data for Crossing: TO.44 - 6+960

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 m

Crest Elevation: 577.00 m

Roadway Surface: Paved

Roadway Top Width: 25.00 m

3.1.28. C.126.1 - Progr.Rampa (7+225)

Table 1 - Summary of Culvert Flows at Crossing: TO.46 - 7+225

Headwater Elevation (m)	Discharge Names	Total Discharge (cms)	DN1000 Discharge (cms)	Roadway Discharge (cms)	Iterations
596.00	TR=50	0.17	0.17	0.00	1
596.05	TR=100	0.22	0.22	0.00	1
596.10	TR=200	0.27	0.27	0.00	1
600.00	Overtopping	3.21	3.21	0.00	Overtopping

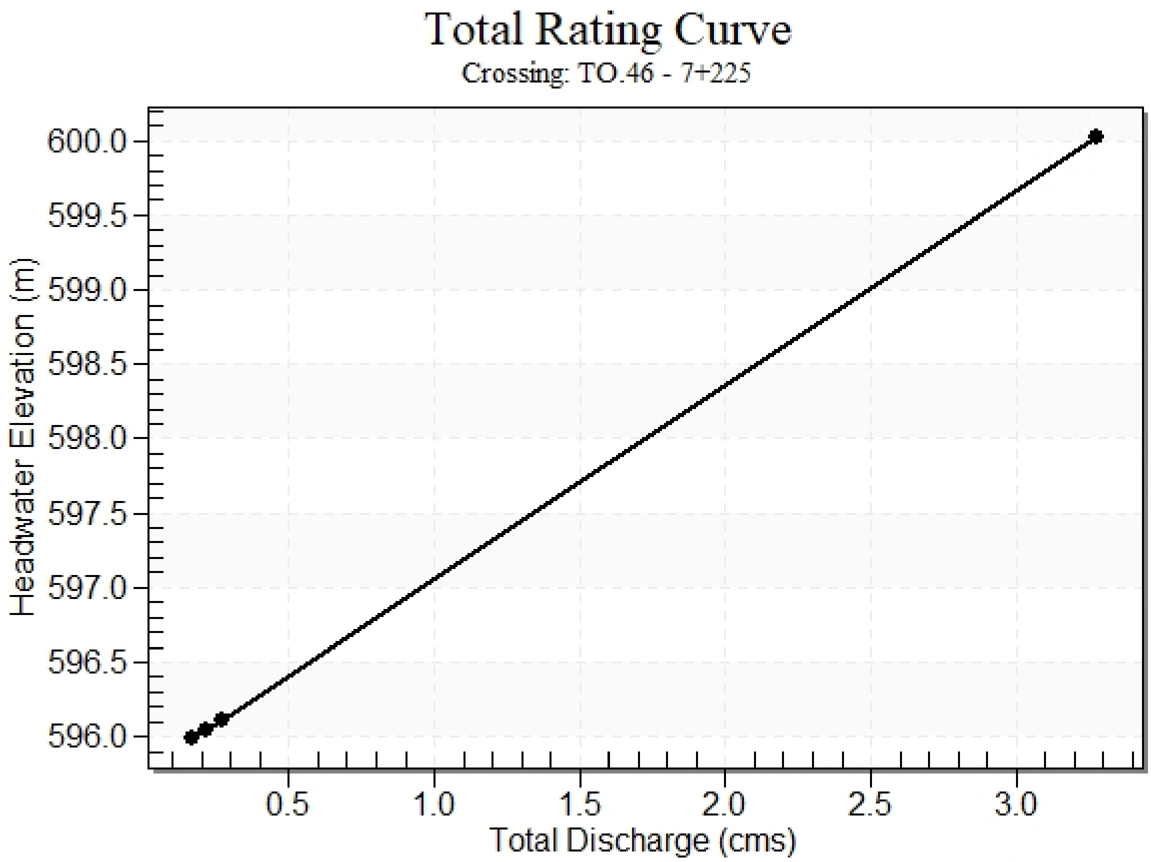


Table 2 - Culvert Summary Table: DN1000

Discharge Names	Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth (m)	Outlet Control Depth (m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
TR=50	0.17	0.17	596.00	0.294	0.0*	1-S2n	0.205	0.228	0.205	0.077	1.457	2.171
TR=100	0.22	0.22	596.05	0.348	0.0*	1-S2n	0.233	0.260	0.233	0.091	1.572	2.385
TR=200	0.27	0.27	596.10	0.403	0.031	1-S2n	0.261	0.292	0.261	0.106	1.678	2.586

* Full Flow Headwater elevation is below inlet invert.

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Straight Culvert

Inlet Elevation (invert): 595.70 m, Outlet Elevation (invert): 595.42 m

Culvert Length: 28.00 m, Culvert Slope: 0.0100

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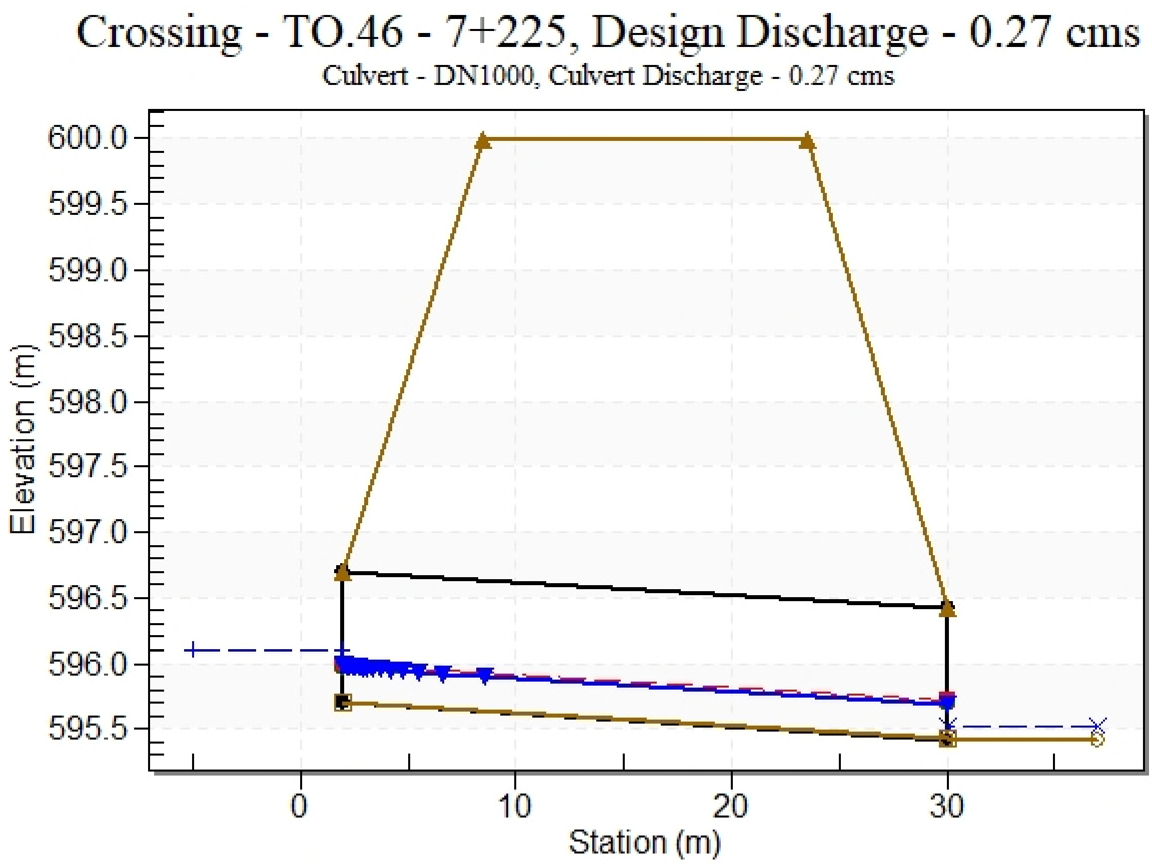
Water Surface Profile Plot for Culvert: DN1000



Site Data - DN1000

Site Data Option: Culvert Invert Data

Inlet Station: 2.00 m

Inlet Elevation: 595.70 m

Outlet Station: 30.00 m

Outlet Elevation: 595.42 m

Number of Barrels: 1

Culvert Data Summary - DN1000

Barrel Shape: Circular

Barrel Diameter: 1000.00 mm

Barrel Material: Concrete

Embedment: 1.00 mm

Barrel Manning's n: 0.0170 (top and sides)

Manning's n: 0.0170 (bottom)

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: TO.46 - 7+225)

Flow (cms)	Water Surface Elev (m)	Depth (m)	Velocity (m/s)	Shear (Pa)	Froude Number
0.17	595.50	0.08	2.17	37.93	2.49
0.22	595.51	0.09	2.39	44.79	2.52
0.27	595.53	0.11	2.59	51.73	2.54

Tailwater Channel Data - TO.46 - 7+225

Tailwater Channel Option: Rectangular Channel

Bottom Width: 1.00 m

Channel Slope: 0.0500

Channel Manning's n: 0.0170

Channel Invert Elevation: 595.42 m

Roadway Data for Crossing: TO.46 - 7+225

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 10.00 m

Crest Elevation: 600.00 m

Roadway Surface: Paved

Roadway Top Width: 15.00 m