

DIREZIONE CENTRALE PROGRAMMAZIONE PROGETTAZIONE

PA 12/09

CORRIDOIO PLURIMODALE TIRRENICO - NORD EUROPA

ITINERARIO AGRIGENTO - CALTANISSETTA - A19

S.S. N° 640 "DI PORTO EMPEDOCLE"

AMMODERNAMENTO E ADEGUAMENTO ALLA CAT. B DEL D.M. 5.11.2001

Dal km 44+000 allo svincolo con l'A19

PROGETTO ESECUTIVO

Contraente Generale:



SISTEMAZIONI IDRAULICHE

VALLONE SALSO - VIADOTTO SALSO

Relazione di calcolo ed elaborati grafici moto permanente del Vallone

Codice Unico Progetto (CUP) : F91B09000070001

Codice Elaborato:

PA12_09 - E 1 9 4 O I 2 1 2 V A 1 2 I C L 0 1 2 A

Scala:

-

F																			
E																			
D																			
C																			
B																			
A	Aprile 2011	EMISSIONE				A. SALVAGO	A. TURSO	M. LITI	P. PAGLINI										
REV.	DATA	DESCRIZIONE				REDATTO	VERIFICATO	APPROVATO	AUTORIZZATO										
Responsabile del procedimento:		Ing. MAURIZIO ARAMINI																	

Il Progettista:



Il Consulente Specialista:



Il Coordinatore per la sicurezza in fase di progetto:



Il Direttore dei lavori:



Premessa

La verifica idraulica del Vallone Salso con il viadotto in progetto, valuta il rispetto di un adeguato franco tra la quota del pelo libero dell'acqua e la quota sottotrave dei manufatti. Tale verifica è stata eseguita effettuando delle simulazioni in moto permanente, di un tratto significativo di asta. La verifica contempla lo stato ante e post operam, per la portata valutata con tempo di ritorno di 200 anni.

La descrizione geometrica dell'alveo, funzionale alle valutazioni idrauliche, è stata effettuata integrando alle informazioni assunte da un supporto planimetrico a scala 1: 1.000 un rilievo di dettaglio delle sezioni trasversali. Tutte le sezioni in alveo vengono segnate in pianta nelle planimetrie idrauliche ANTE e POST OPERAM e riportate qui di seguito in dettaglio.

Nella definizione delle sezioni si è cercato rispettare le seguenti linee guida:

- giacitura planimetrica ubicata in modo tale da rappresentare le singolarità dell'alveo e le variazioni delle dimensioni dello stesso lungo il tratto di indagine;
- devono essere estese per l'intero alveo di piena, sino al limite della fascia interessata dalle piene con tempo di ritorno > 200 anni;
- devono essere utilizzate e, se necessario, aggiornate, le sezioni di rilievo costituenti punti di calcolo per la delimitazione delle fasce fluviali; gli infittimenti eventuali devono essere collegati agli stessi capisaldi;
- numero e interasse delle sezioni necessarie per la rappresentazione della geometria dell'alveo vanno commisurati alle esigenze di dettaglio delle analisi idrauliche.

Il codice di calcolo utilizzato per il profilo idrico in piena della corrente nel tratto di corso d'acqua fa riferimento alle condizioni di moto stazionario monodimensionale (portata costante e geometria dell'alveo variabile). Tale schema che tiene conto della variazione delle dimensioni dell'alveo e delle singolarità localizzate (rappresentate da manufatti, bruschi restringimenti o allargamenti, variazioni di scabrezza, salti di fondo), ed è generalmente adatto ad affrontare tutte le situazioni in cui la valutazione degli effetti degli interventi in progetto sulle condizioni di deflusso è rappresentabile in termini di modificazione del profilo idrico. A tal proposito ci si è avvalsi del programma di calcolo Hec-Ras (messo a punto dal Hec-Usace), nel quale è implementata una procedura di calcolo nota in letteratura con il nome di Standard Step Method.

River: SALSO Reach: SALSO

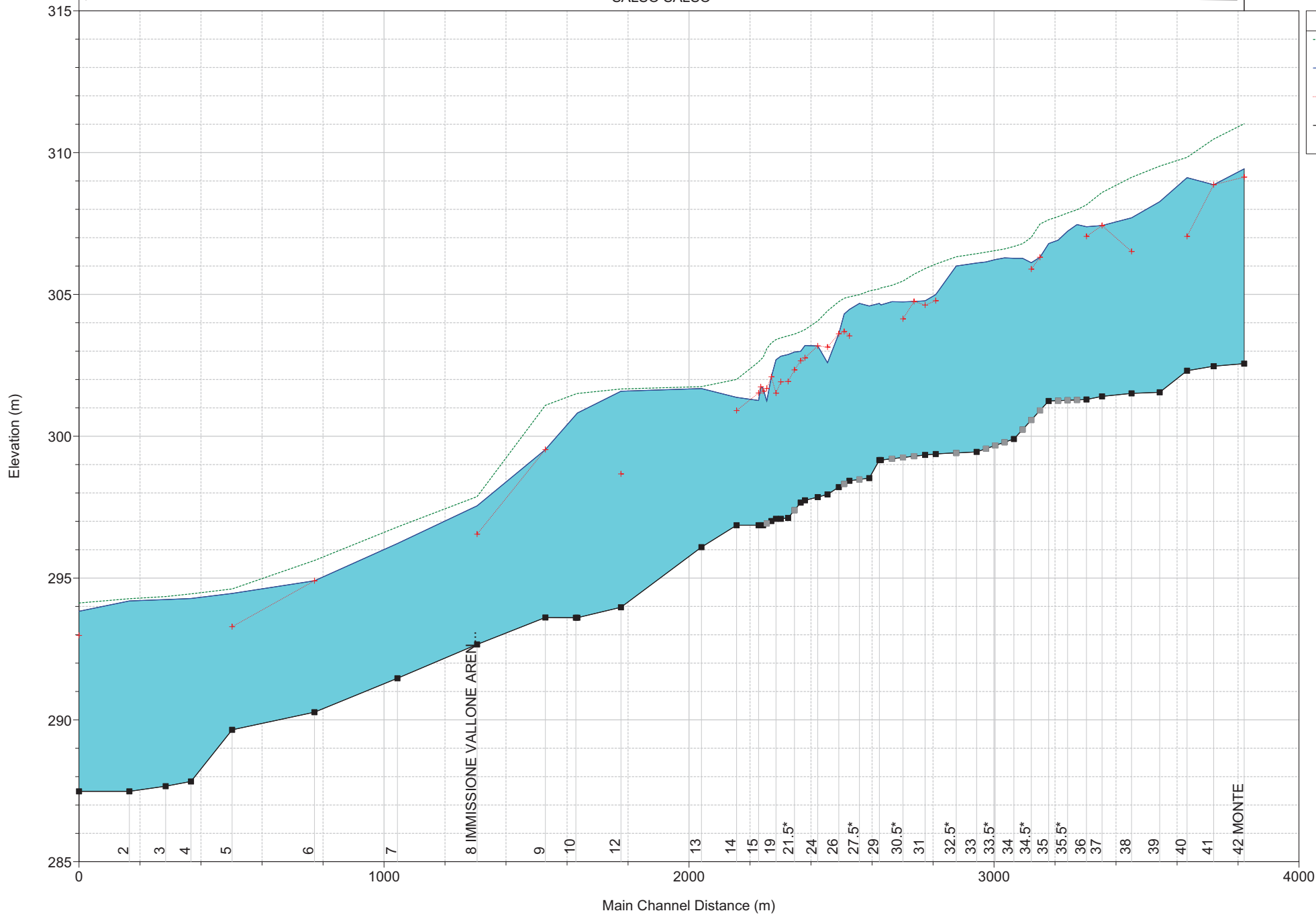
Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Hydr Radius C (m)	Hydr Radius (m)
SALSO	42	1690.24	302.56	309.43	309.14	311.02	0.004792	6.97	352.22	91.64	0.86	6.61	3.73
SALSO	41	1690.24	302.47	308.87	308.87	310.47	0.006152	7.64	340.53	94.77	0.97	6.29	3.52
SALSO	40	1690.24	302.31	309.12	307.05	309.83	0.002348	4.93	475.92	98.39	0.61	6.72	4.67
SALSO	39	1690.24	301.55	308.27		309.52	0.003604	6.06	380.62	86.46	0.75	6.64	4.19
SALSO	38	1690.24	301.51	307.70	306.51	309.13	0.004673	6.52	393.03	128.72	0.84	6.10	2.96
SALSO	37	1690.24	301.40	307.43	307.43	308.59	0.004717	6.41	463.14	195.72	0.84	5.90	2.34
SALSO	36	1690.24	301.29	307.39	307.05	308.16	0.003282	5.36	538.49	201.87	0.70	5.93	2.63
SALSO	35.75*	1690.24	301.28	307.46		307.98	0.002997	4.63	562.83	201.50	0.60	5.99	2.77
SALSO	35.5*	1690.24	301.27	307.23		307.87	0.003478	5.05	531.54	193.28	0.66	5.87	2.73
SALSO	35.25*	1690.24	301.25	306.91		307.74	0.003799	5.38	495.12	182.28	0.72	5.57	2.69
SALSO	35	1690.24	301.24	306.79		307.63	0.003101	4.89	503.06	177.25	0.67	5.38	2.80
SALSO	34.75*	1690.24	300.91	306.31	306.31	307.48	0.005223	6.32	439.93	179.73	0.87	5.36	2.42
SALSO	34.5*	1690.24	300.57	306.12	305.89	307.01	0.004800	6.19	488.24	201.68	0.84	5.53	2.40
SALSO	34.25*	1690.24	300.24	306.28		306.79	0.003089	5.26	604.97	231.22	0.68	6.02	2.59
SALSO	34	1690.24	299.90	306.27		306.69	0.001961	4.34	706.65	253.50	0.55	6.36	2.76
SALSO	33.75*	1690.24	299.79	306.29		306.60	0.001879	4.29	754.46	270.63	0.54	6.45	2.77
SALSO	33.5*	1690.24	299.67	306.23		306.55	0.001728	4.13	780.06	284.51	0.52	6.49	2.73
SALSO	33.25*	1690.24	299.56	306.14		306.49	0.001731	4.15	782.04	297.13	0.52	6.53	2.62
SALSO	33	1690.24	299.45	306.11		306.44	0.001484	3.85	819.52	306.96	0.48	6.55	2.65
SALSO	32.5*	1690.24	299.41	306.00		306.32	0.001858	3.93	759.94	300.03	0.49	6.44	2.52
SALSO	32	1690.24	299.37	304.99	304.78	306.07	0.004290	5.86	472.95	198.05	0.79	5.53	2.37
SALSO	31	1690.24	299.34	304.77	304.62	305.91	0.004118	5.62	453.60	186.80	0.77	5.36	2.40
SALSO	30.75*	1690.24	299.30	304.75	304.75	305.71	0.003823	5.44	515.04	243.33	0.75	5.40	2.10
SALSO	30.5*	1690.24	299.25	304.74	304.14	305.47	0.003219	5.02	557.64	228.64	0.69	5.45	2.42
SALSO	30.25*	1690.24	299.21	304.74		305.32	0.002596	4.55	580.72	202.90	0.62	5.52	2.84
SALSO	30	1690.24	299.16	304.63		305.23	0.002188	4.06	565.79	175.60	0.56	5.30	3.19
SALSO	29	1690.24	299.16	304.68		305.19	0.001889	3.82	672.87	281.43	0.52	5.40	2.37
SALSO	28	1690.24	298.52	304.59		305.12	0.002174	4.05	656.01	265.64	0.55	5.31	2.44
SALSO	27.5*	1690.24	298.48	304.68		304.99	0.001806	4.01	783.15	294.04	0.52	6.00	2.64
SALSO	27	1690.24	298.43	304.47	303.53	304.91	0.001883	3.99	665.73	319.78	0.53	5.77	2.99
SALSO	26.5*	1690.24	298.32	304.31	303.69	304.86	0.002610	4.75	594.62	308.63	0.62	5.88	2.73
SALSO	26	1690.24	298.21	303.61	303.61	304.74	0.005255	6.15	421.24	254.69	0.86	5.12	2.09
SALSO	25	1690.24	297.95	302.59	303.14	304.42	0.009680	7.48	328.52	154.84	1.14	4.34	2.06
SALSO	24	1690.24	297.85	303.18	303.18	304.06	0.005117	5.87	497.96	242.93	0.82	4.87	2.01
SALSO	23	1690.24	297.74	303.20	302.76	303.76	0.003852	5.11	620.46	304.80	0.72	4.89	2.01
SALSO	22	1690.24	297.66	302.99	302.66	303.69	0.003660	4.81	534.59	280.30	0.71	4.64	2.45
SALSO	21.5*	1690.24	297.39	302.97	302.34	303.60	0.003206	4.92	543.98	257.52	0.68	5.30	2.85
SALSO	21	1690.24	297.12	302.88	301.93	303.54	0.002496	4.46	539.24	234.53	0.60	5.52	3.28
SALSO	20	1690.24	297.09	302.82	301.92	303.47	0.003128	4.72	550.17	244.18	0.66	5.07	2.22
SALSO	19	1690.24	297.09	302.69	301.52	303.41	0.003362	4.94	530.68	227.79	0.69	5.15	2.29
SALSO	18	1690.24	297.01	302.10	302.10	303.29	0.006279	5.91	391.13	158.40	0.91	4.22	2.43
SALSO	17.5*	1690.24	296.93	301.24	301.69	303.08	0.015196	8.02	295.59	140.51	1.25	4.20	2.09

River: SALSO Reach: SALSO

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Hydr Radius C (m)	Hydr Radius (m)
SALSO	17	1690.24	296.86	301.69	301.59	302.78	0.005314	5.75	417.46	149.44	0.85	4.58	2.72
SALSO	16	1690.24	296.86	301.74	301.74	302.70	0.004595	5.57	470.39	193.66	0.80	4.87	2.37
SALSO	15	1690.24	296.86	301.26	301.52	302.62	0.007175	6.49	397.44	193.98	0.99	4.39	2.09
SALSO	14	1690.24	296.86	301.37	300.91	302.00	0.003241	4.44	550.99	241.28	0.67	4.50	2.54
SALSO	13	1690.24	296.09	301.68		301.75	0.000307	1.51	1525.03	429.21	0.21	5.24	3.52
SALSO	12	1690.24	293.97	301.59	298.67	301.66	0.000331	1.88	1484.34	405.06	0.23	6.88	3.63
SALSO	11	1690.24	293.60	300.82		301.51	0.002069	4.83	466.13	73.00	0.58	7.16	5.56
SALSO	10	1690.24	293.60	300.76		301.49	0.001993	4.66	461.77	73.00	0.56	6.98	5.52
SALSO	9	1690.24	293.61	299.53	299.53	301.09	0.005991	6.58	350.53	216.60	0.92	5.13	3.10
SALSO	8	1690.24	292.66	297.55	296.55	297.87	0.003218	4.60	694.11	313.39	0.67	4.78	2.20
SALSO	7	1690.24	291.47	296.22		296.80	0.005124	5.71	580.45	305.64	0.84	4.67	1.89
SALSO	6	1769.19	290.27	294.91	294.91	295.62	0.003682	4.38	622.53	401.82	0.70	4.02	1.54
SALSO	5	1769.19	289.65	294.46	293.28	294.62	0.001423	2.73	1058.93	470.08	0.43	4.03	2.24
SALSO	4	1769.19	287.83	294.28		294.44	0.001162	2.82	1075.47	457.13	0.40	4.92	2.34
SALSO	3	1769.19	287.66	294.24		294.35	0.000768	2.67	1268.50	478.16	0.34	6.19	2.64
SALSO	2	1769.19	287.48	294.19		294.27	0.000457	2.11	1448.46	443.57	0.26	6.43	3.24
SALSO	1	1769.19	287.48	293.83	292.98	294.12	0.001592	3.46	862.91	335.92	0.47	5.28	2.55

ANTE OPERAM_SALSO

SALSO SALSO

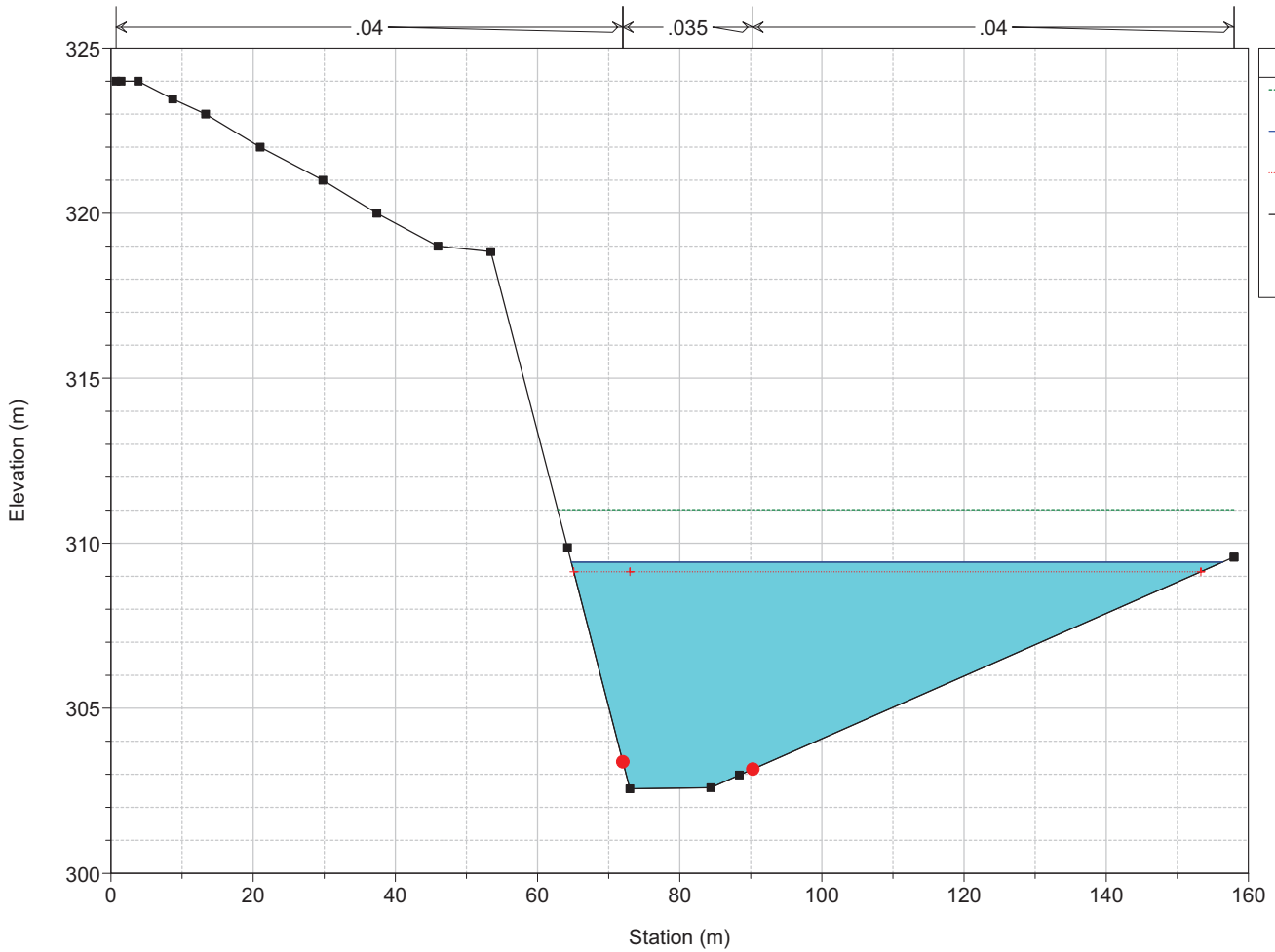


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 42 MONTE

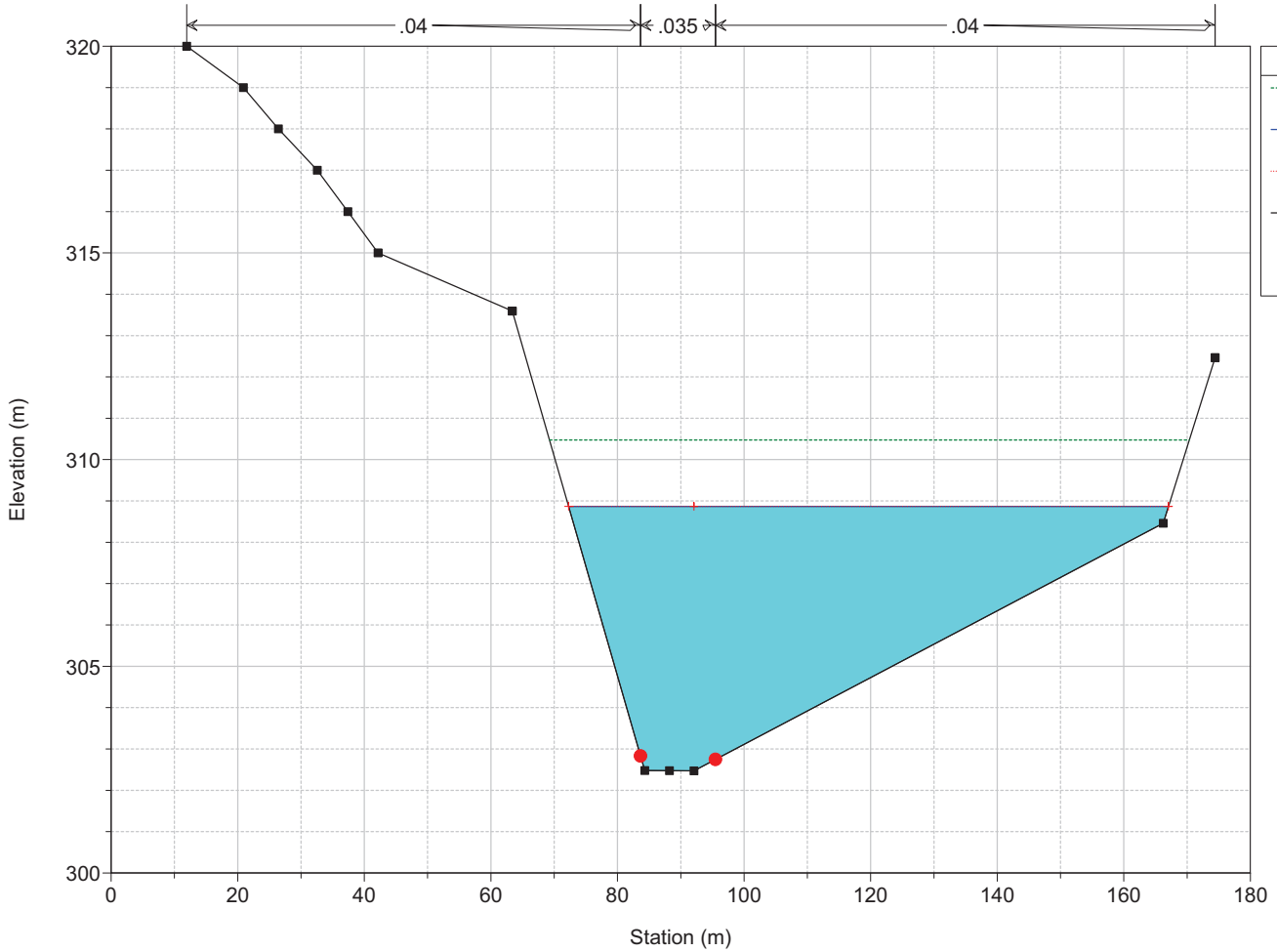


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 41

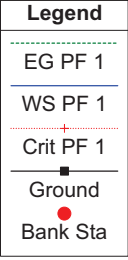
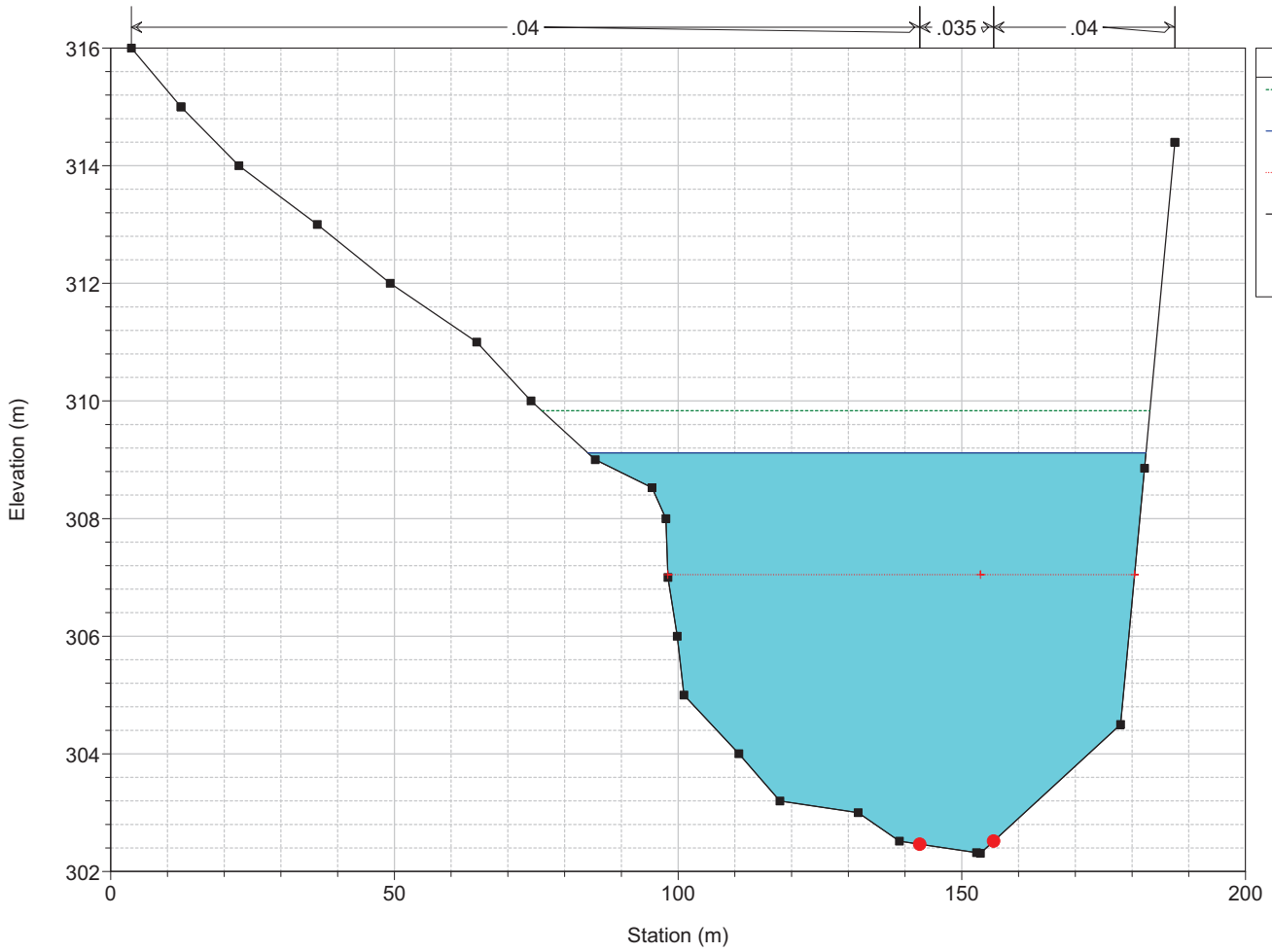


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

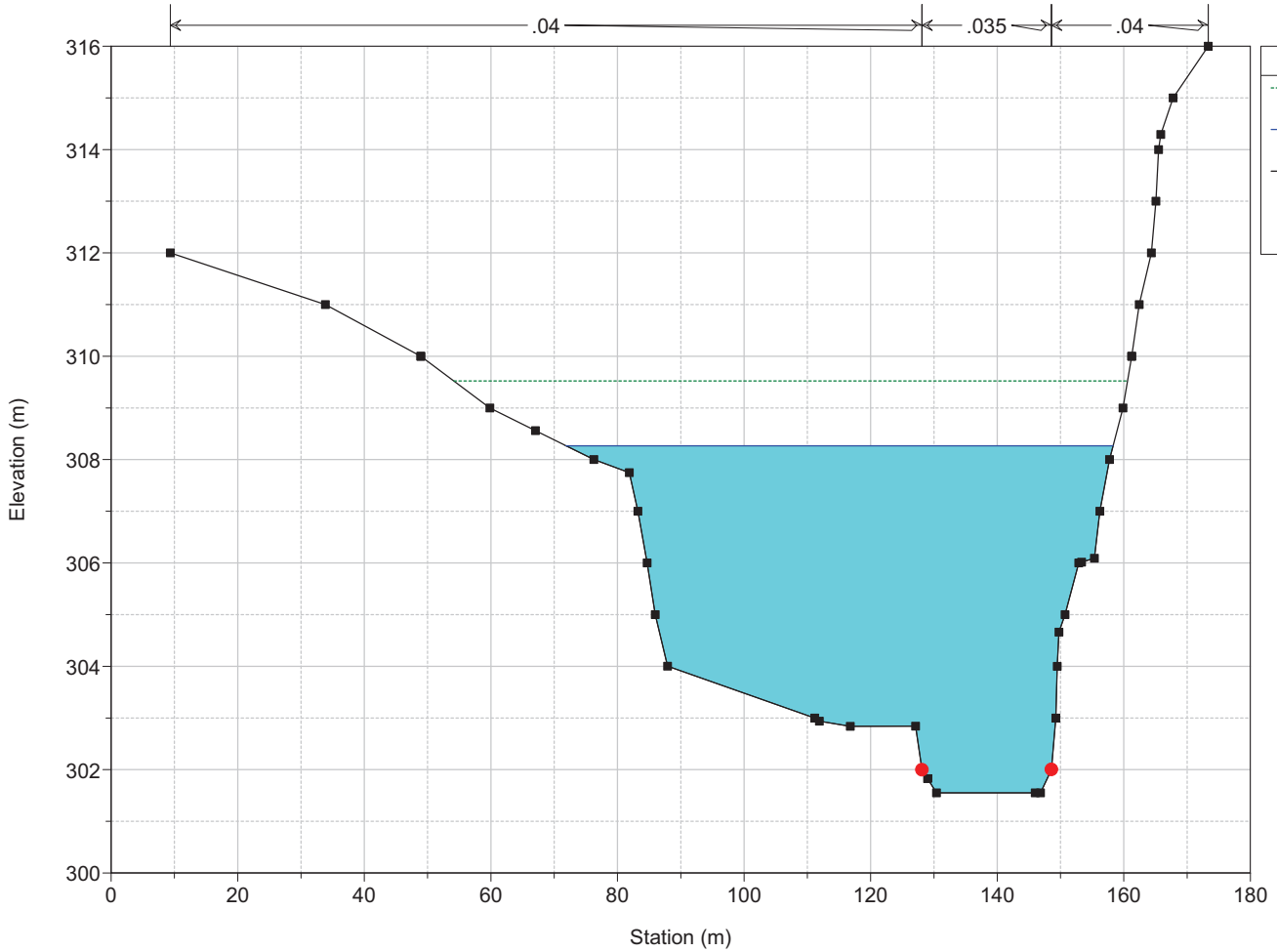
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 40



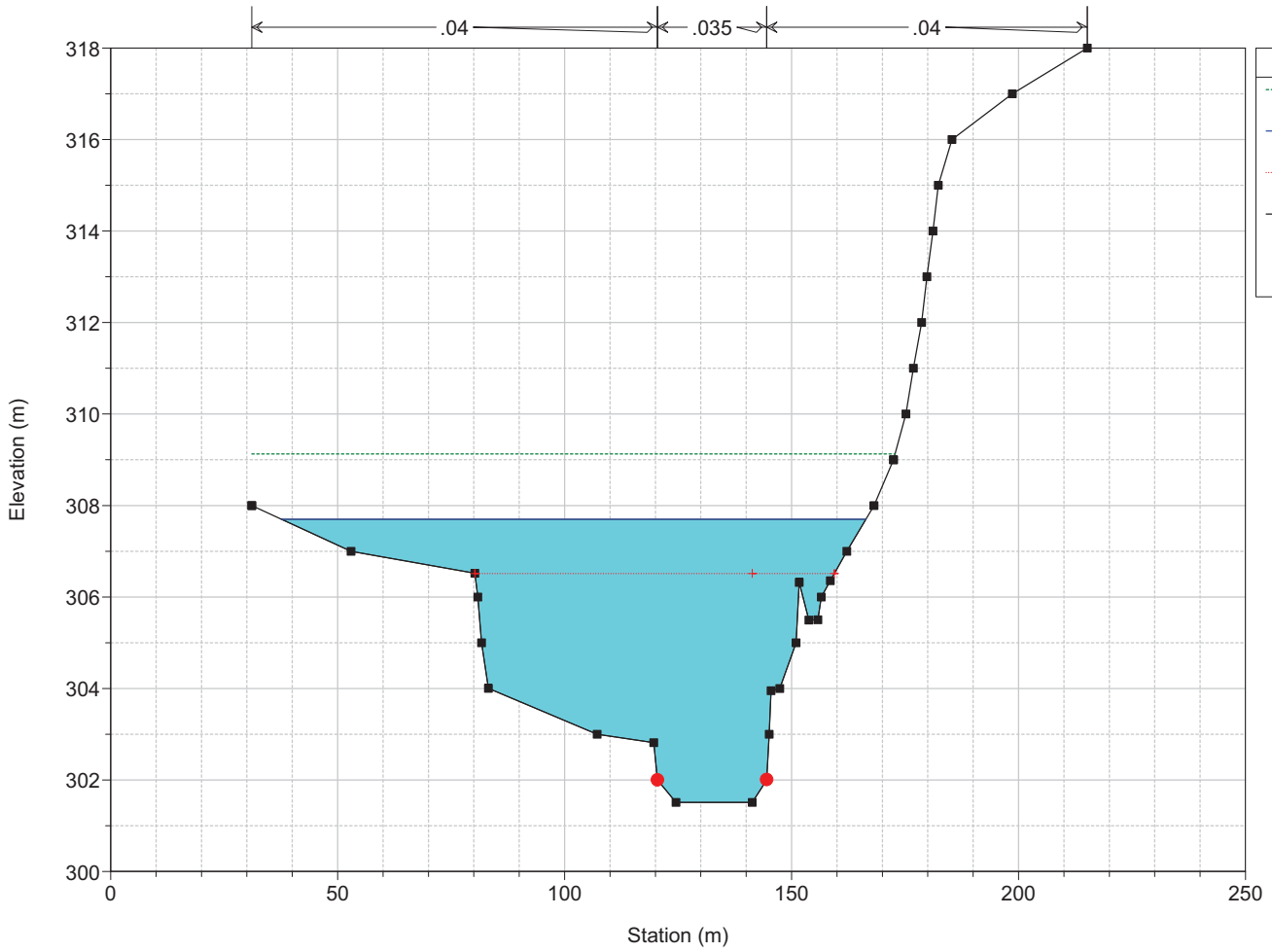
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 39



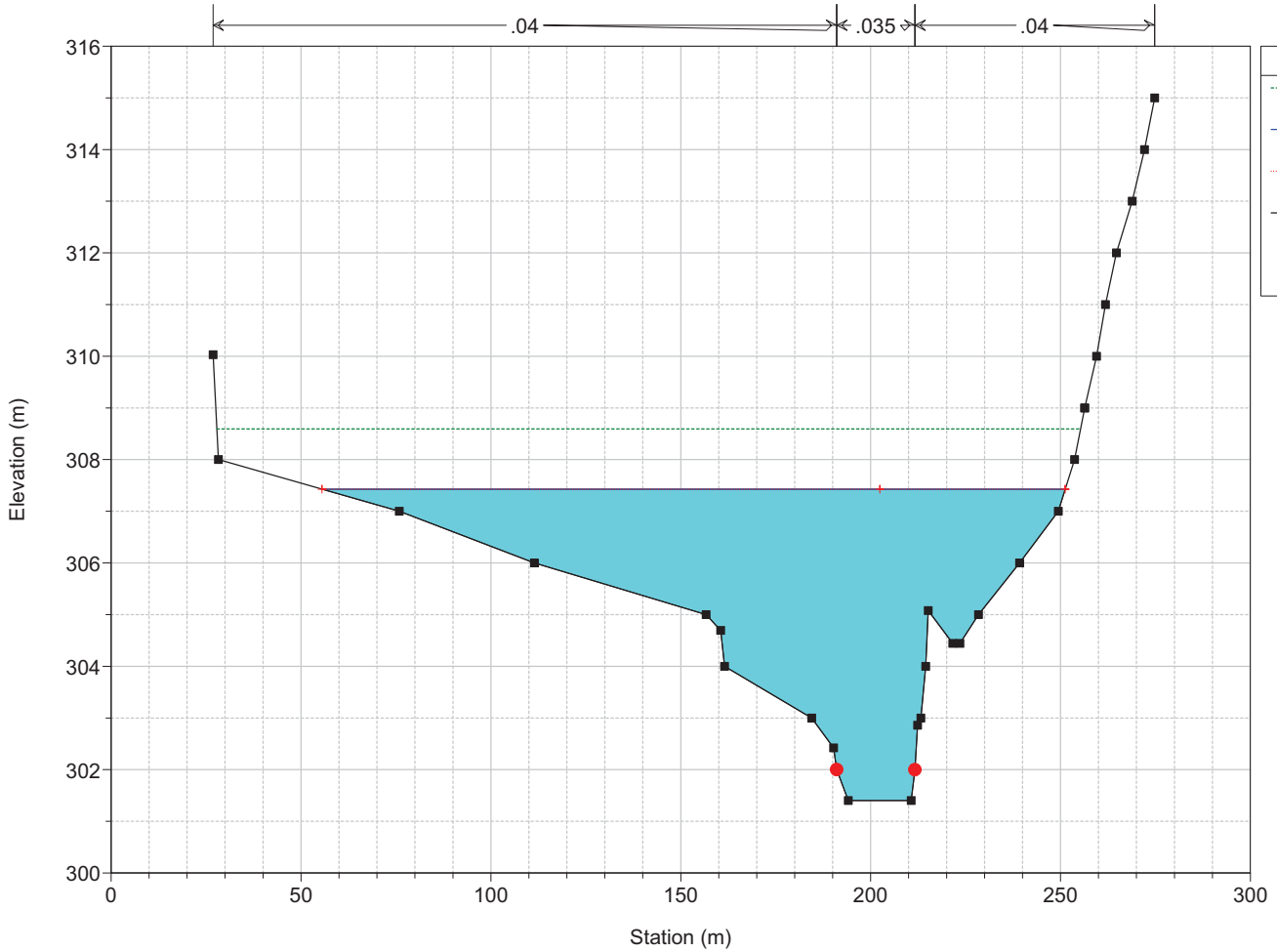
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 38



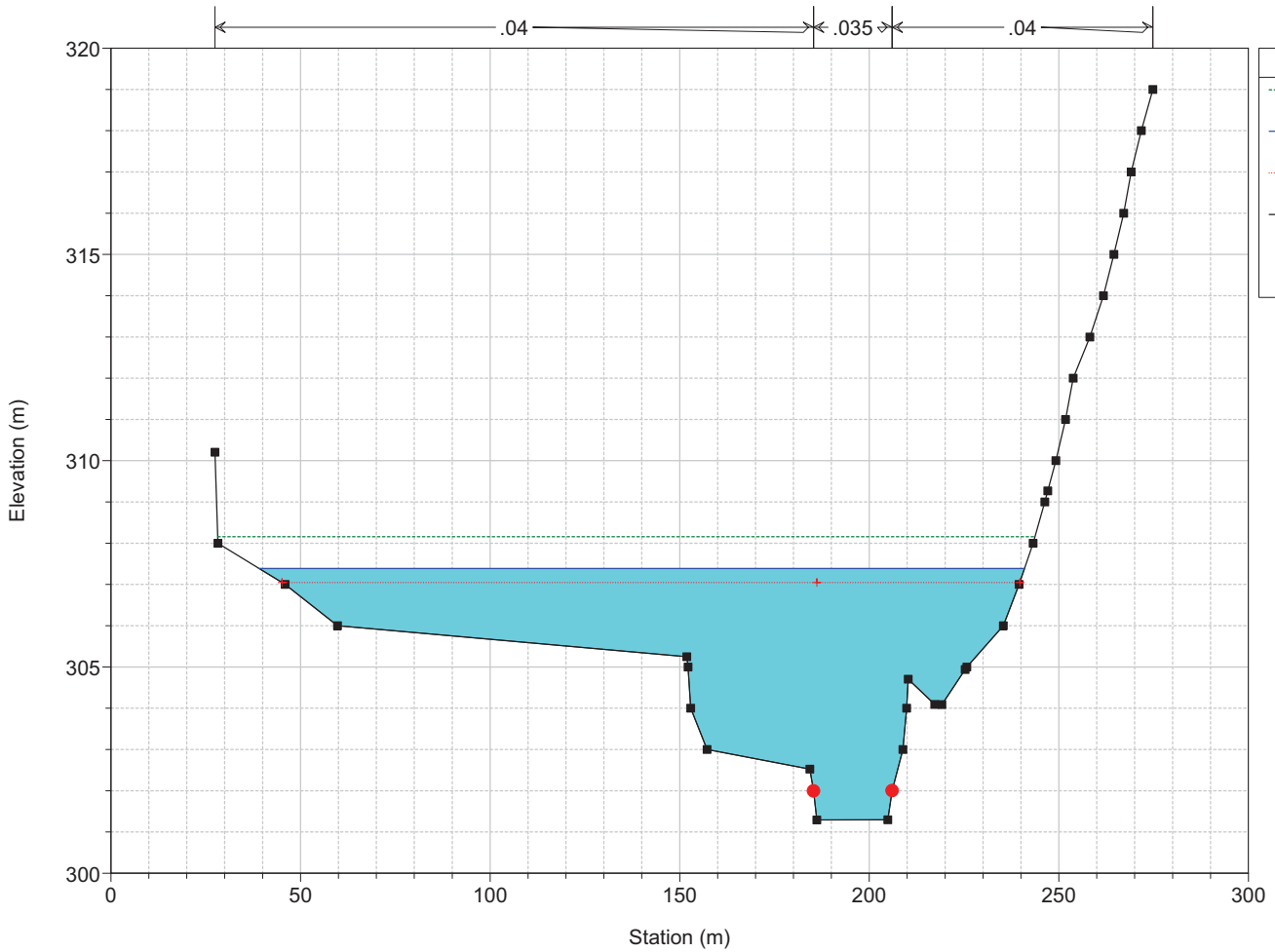
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 37



ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 36

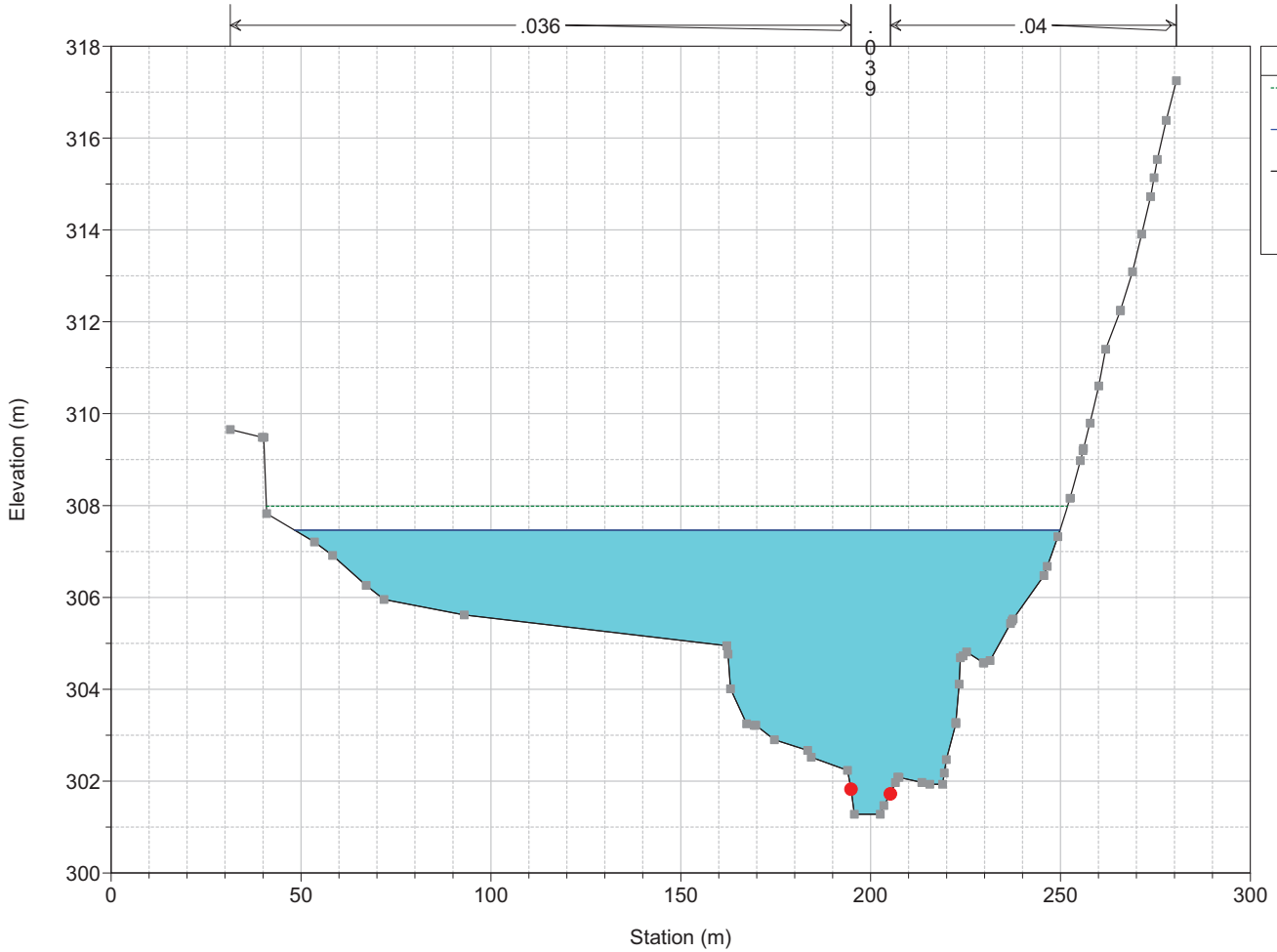


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.75*

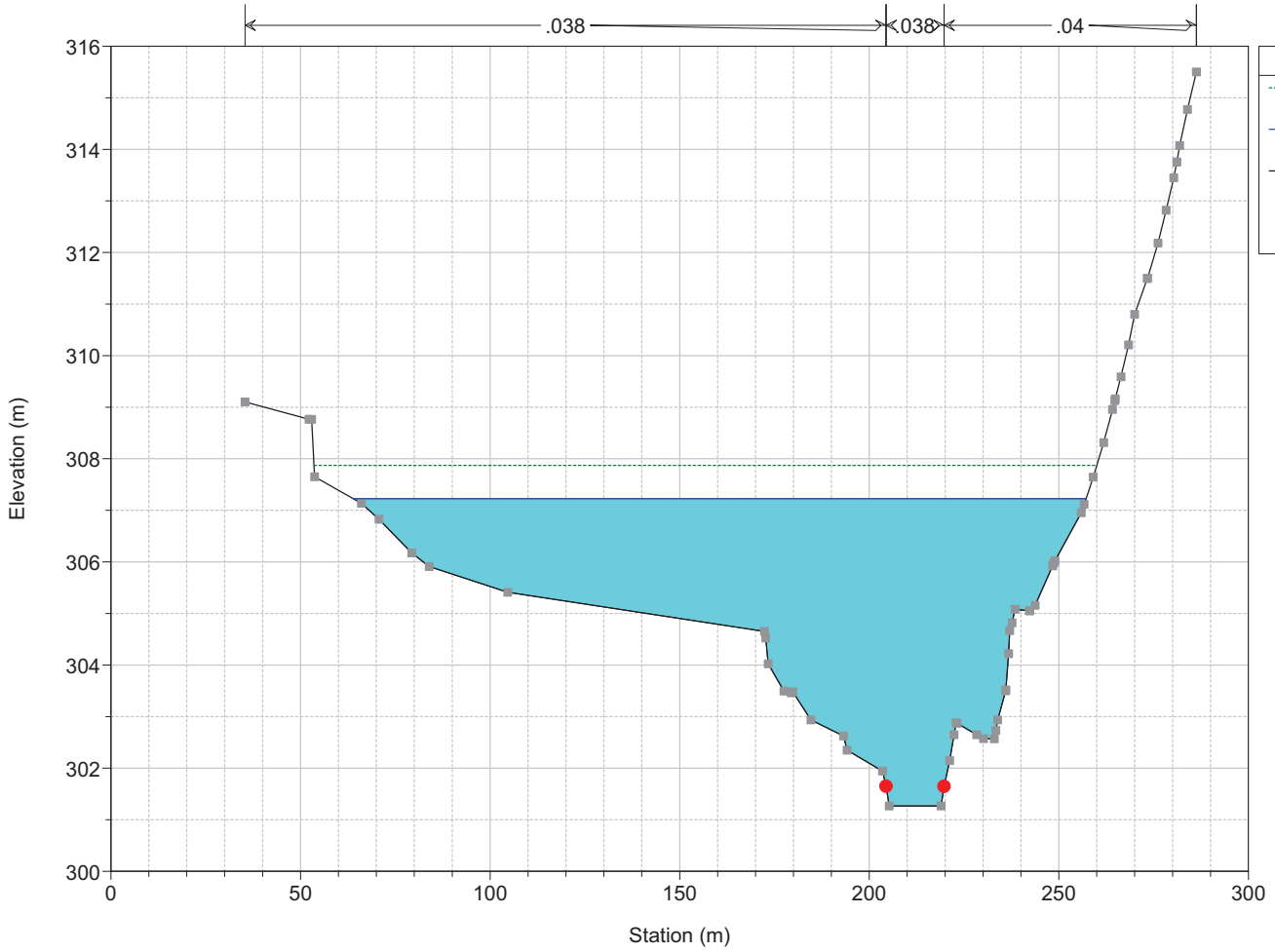


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.5*



Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.25*

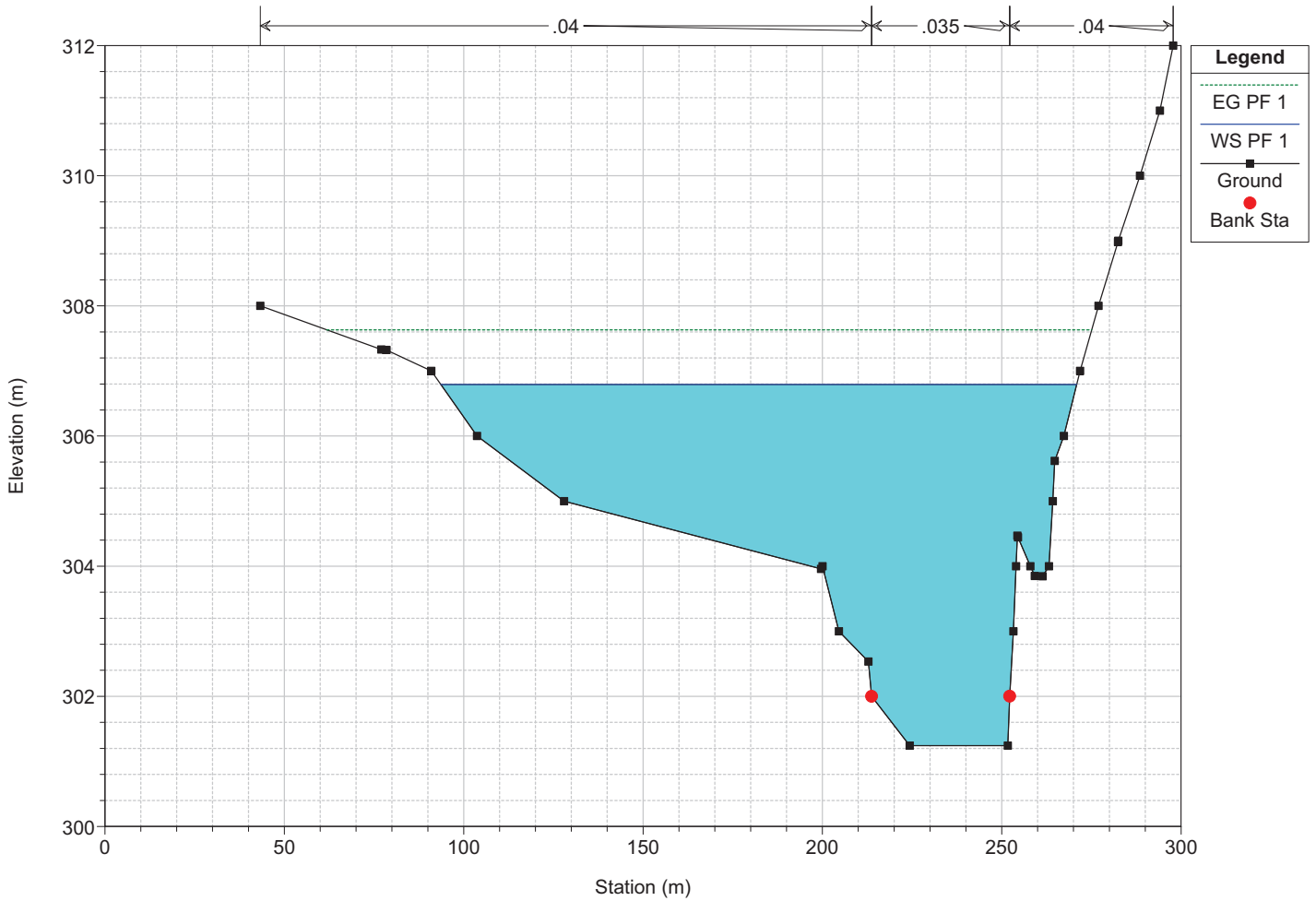


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

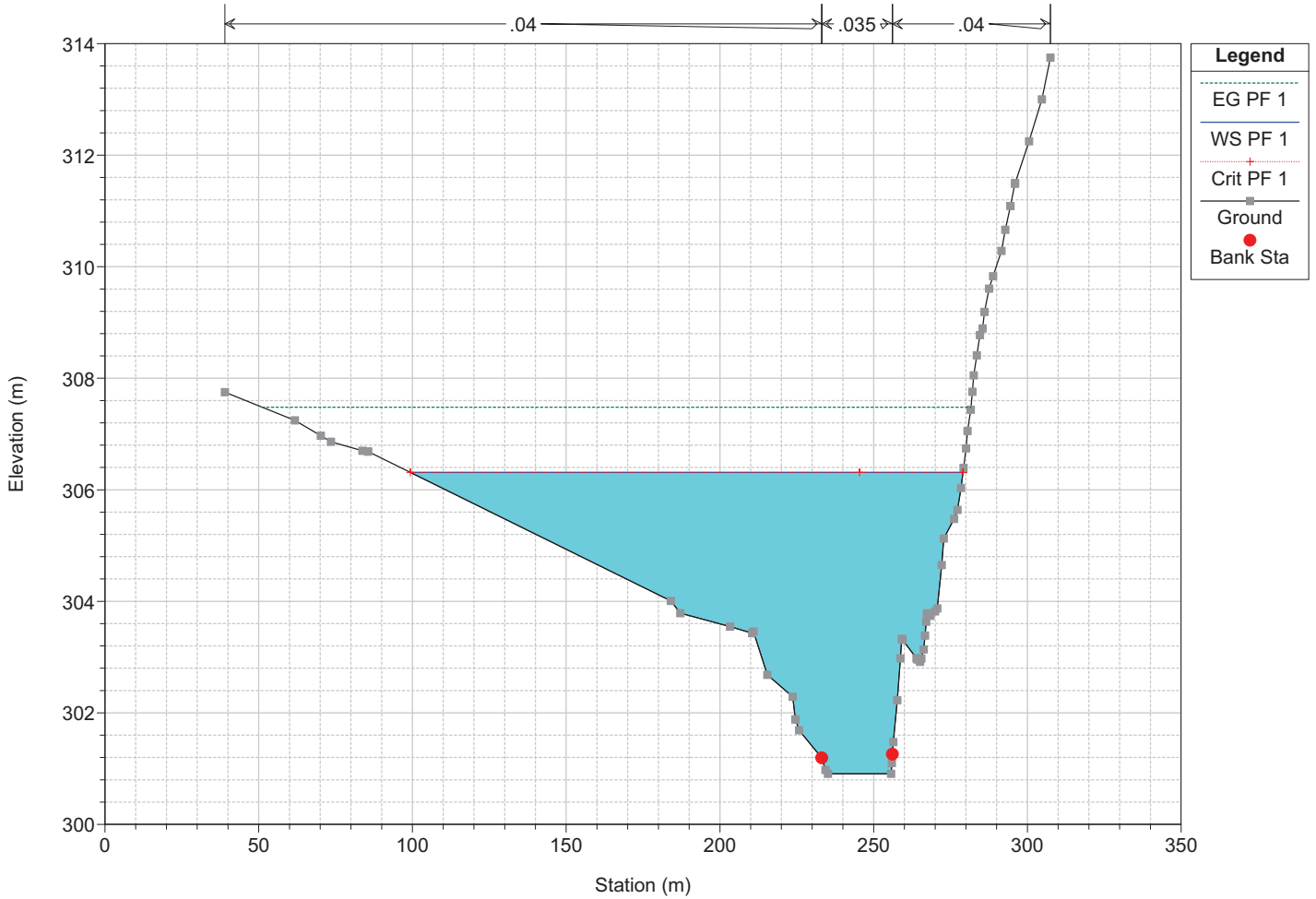
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River = SALSO Reach = SALSO RS = 35



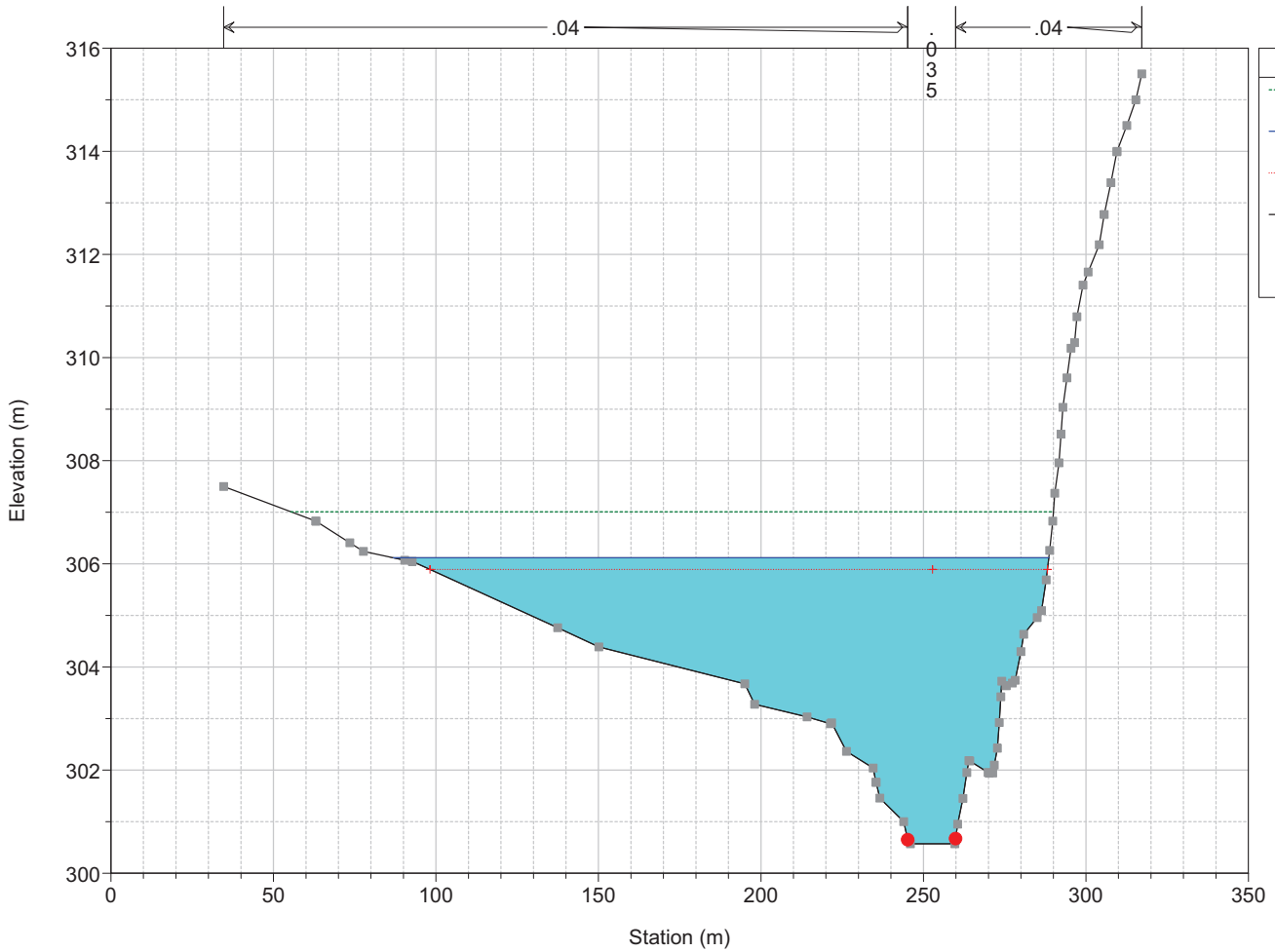
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.75*



ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.5*

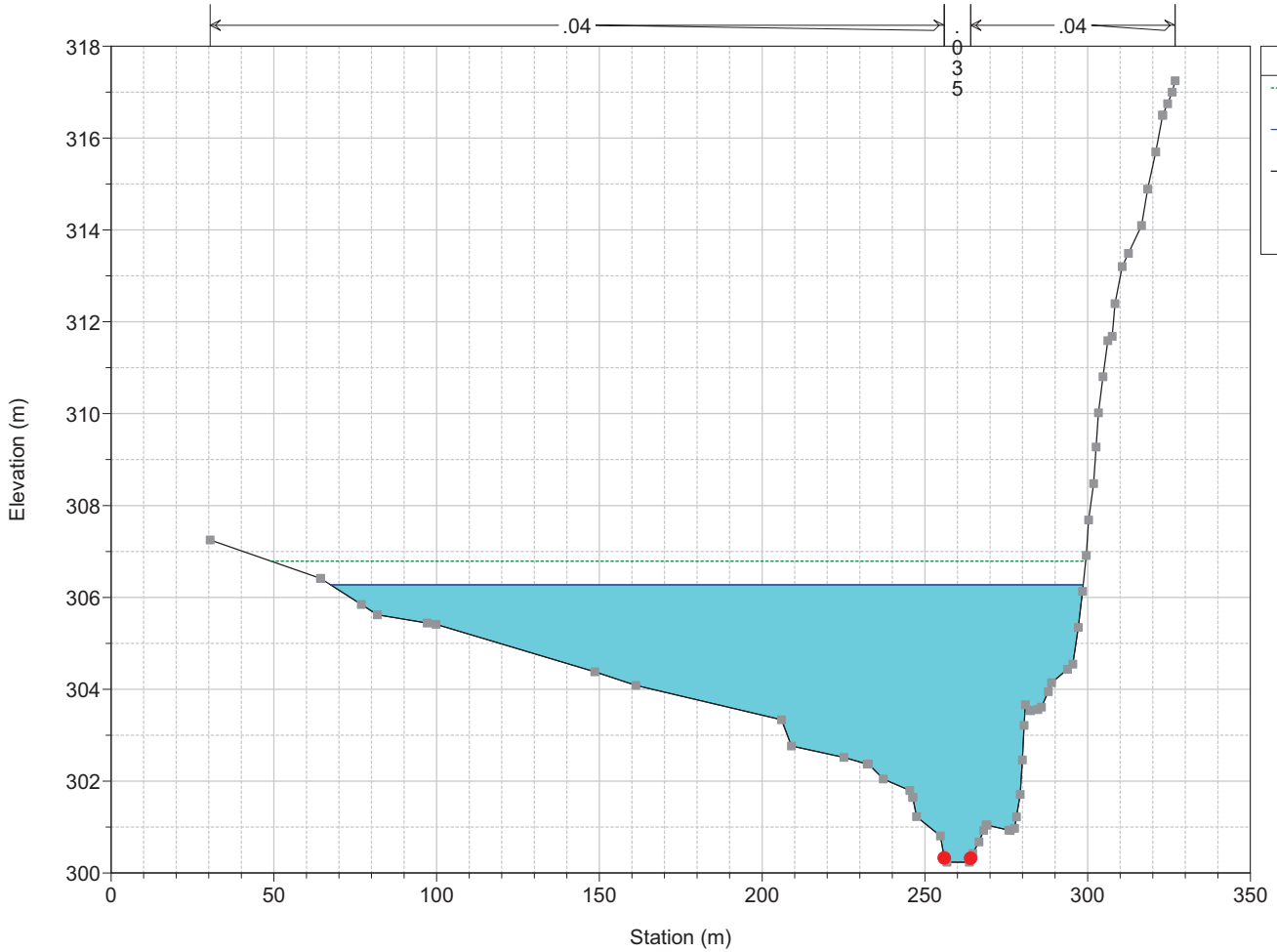


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.25*

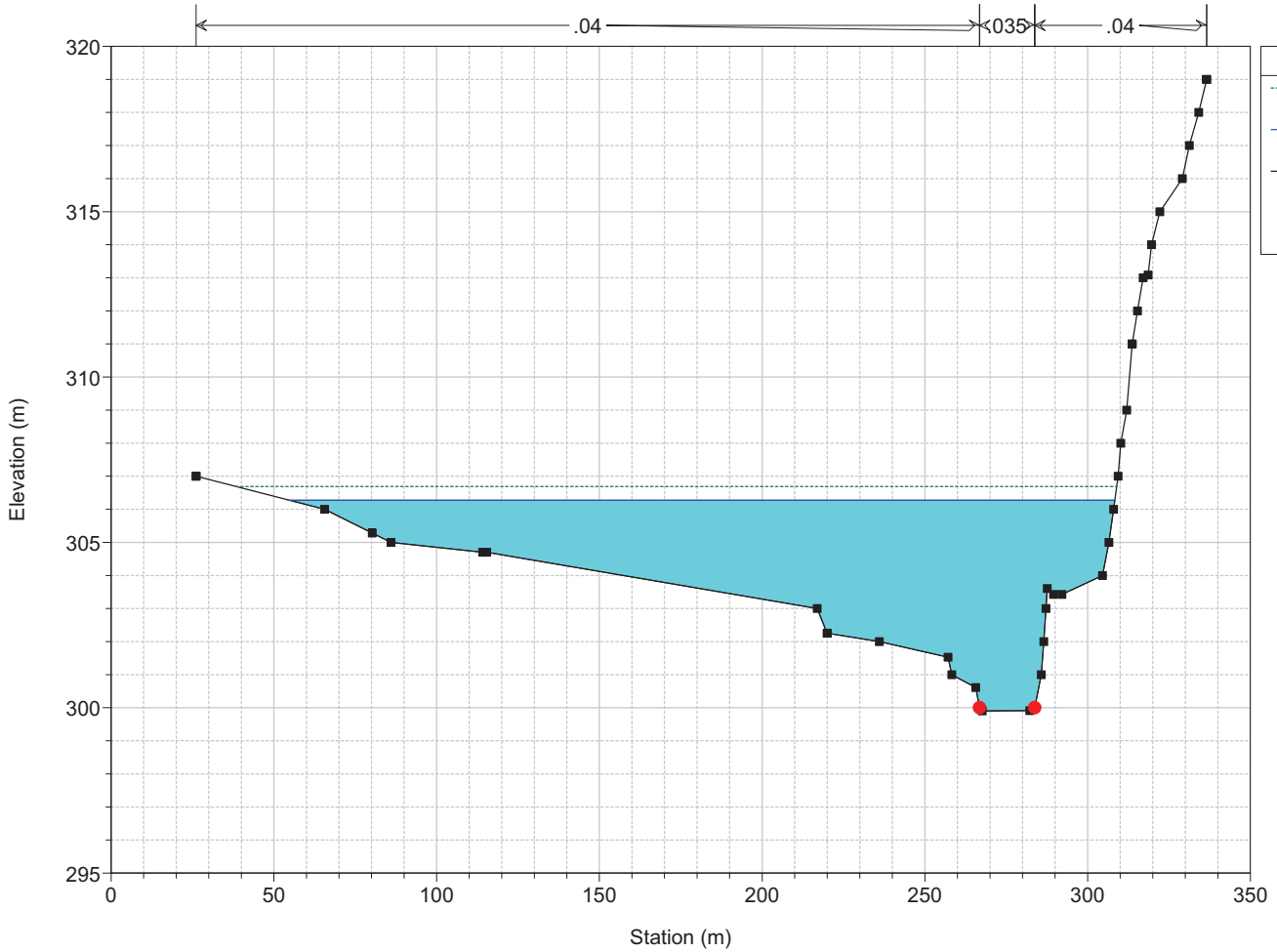


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34

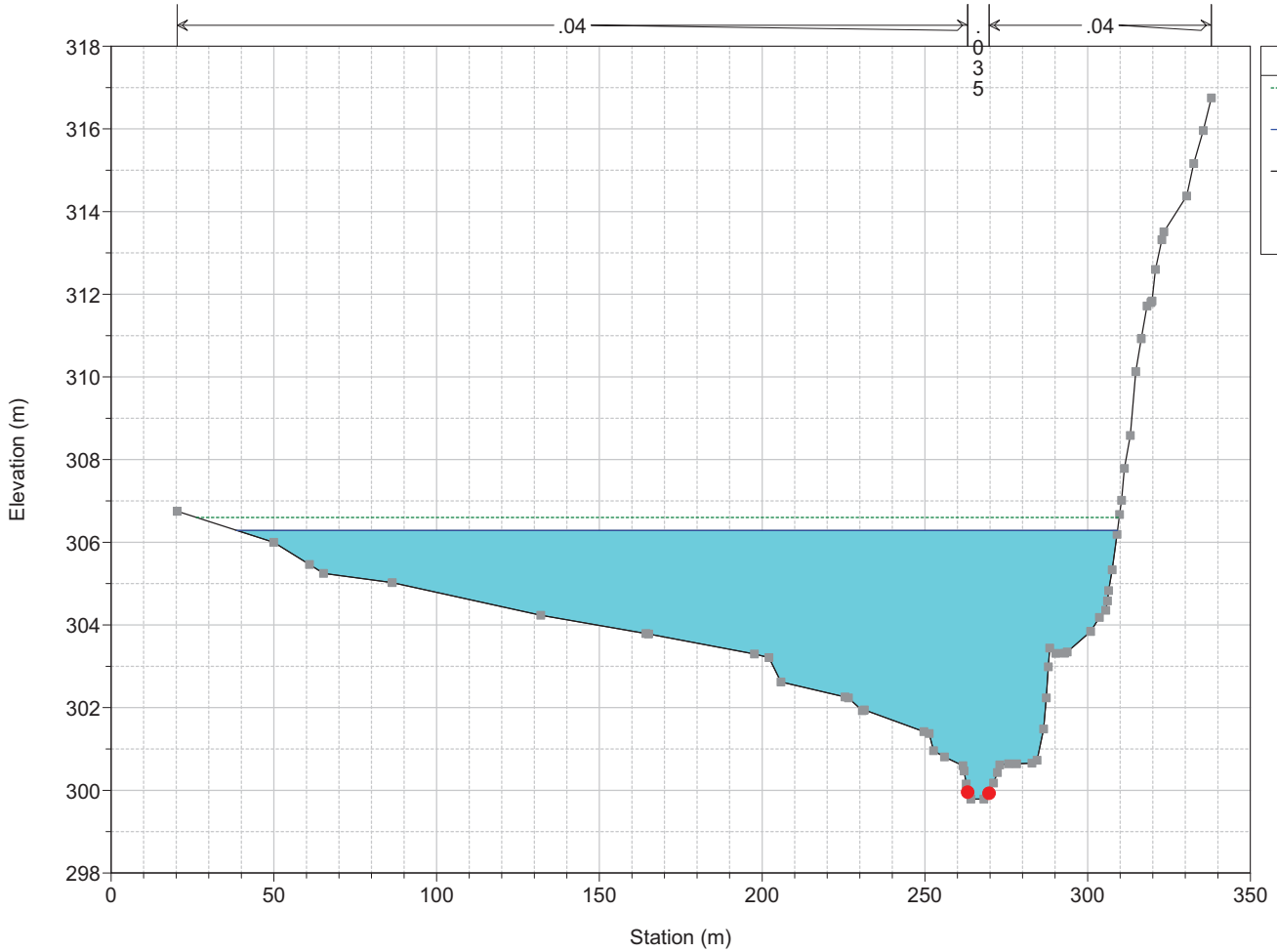


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 33.75*

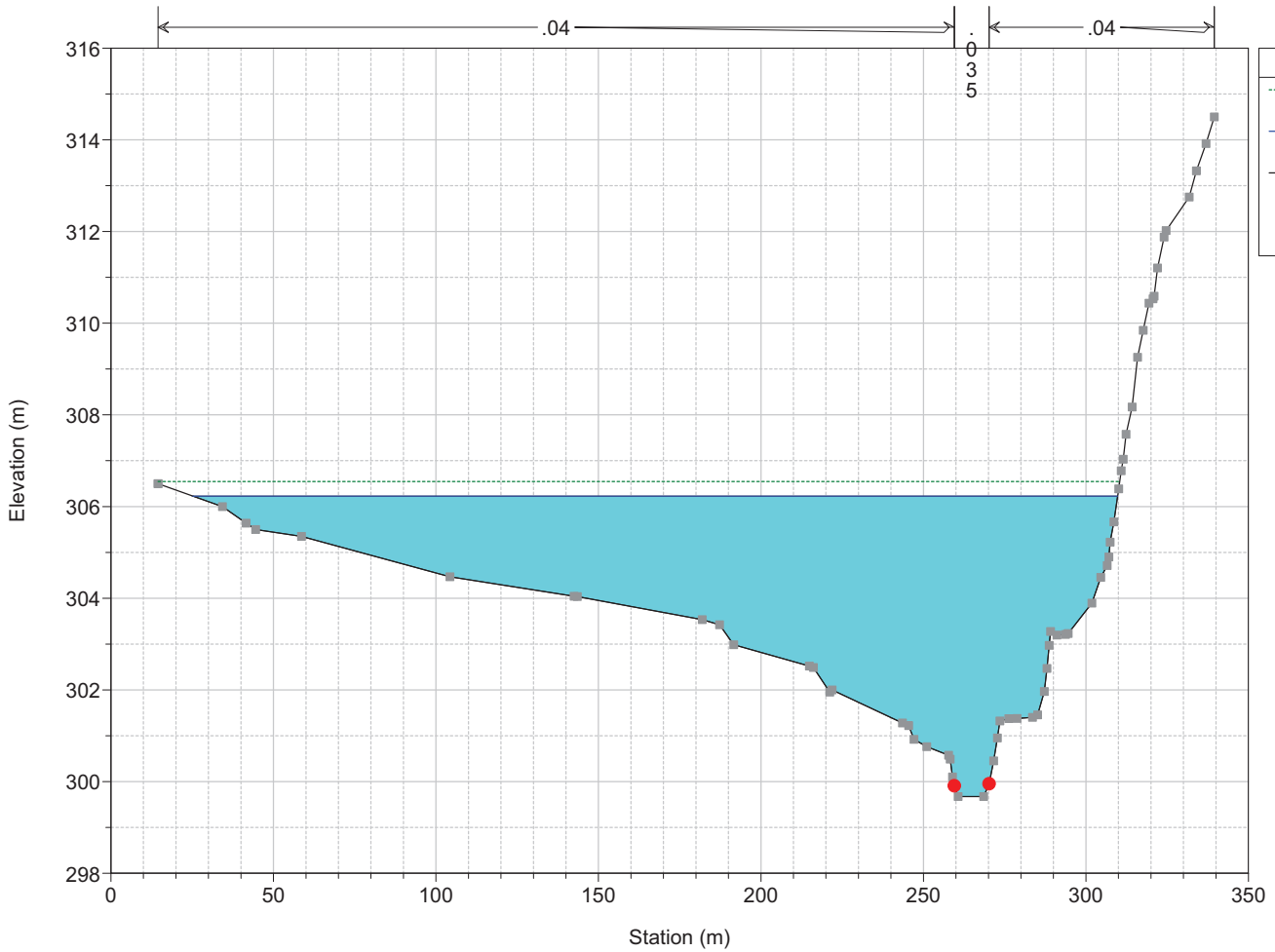


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 33.5*

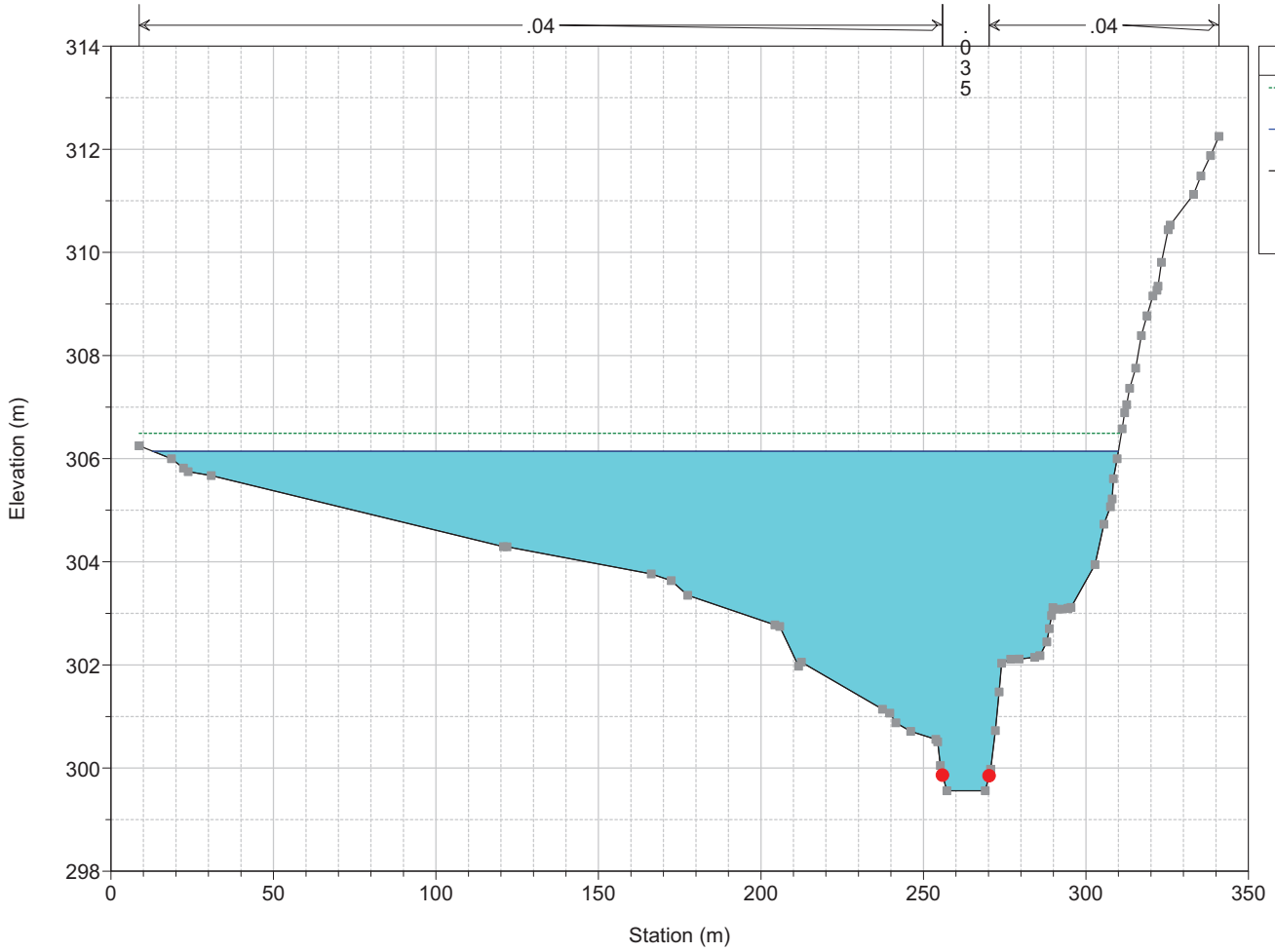


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 33.25*

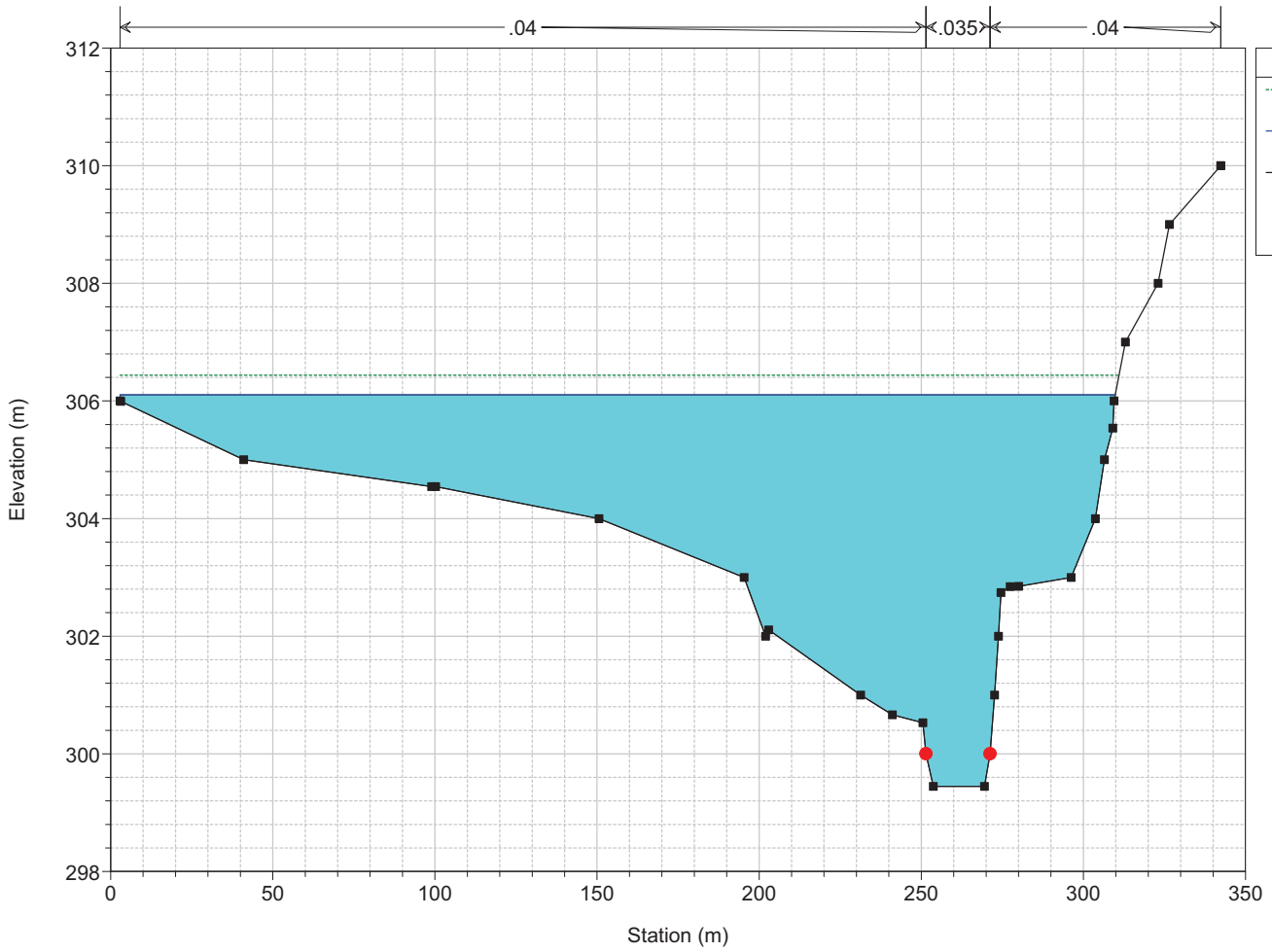


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

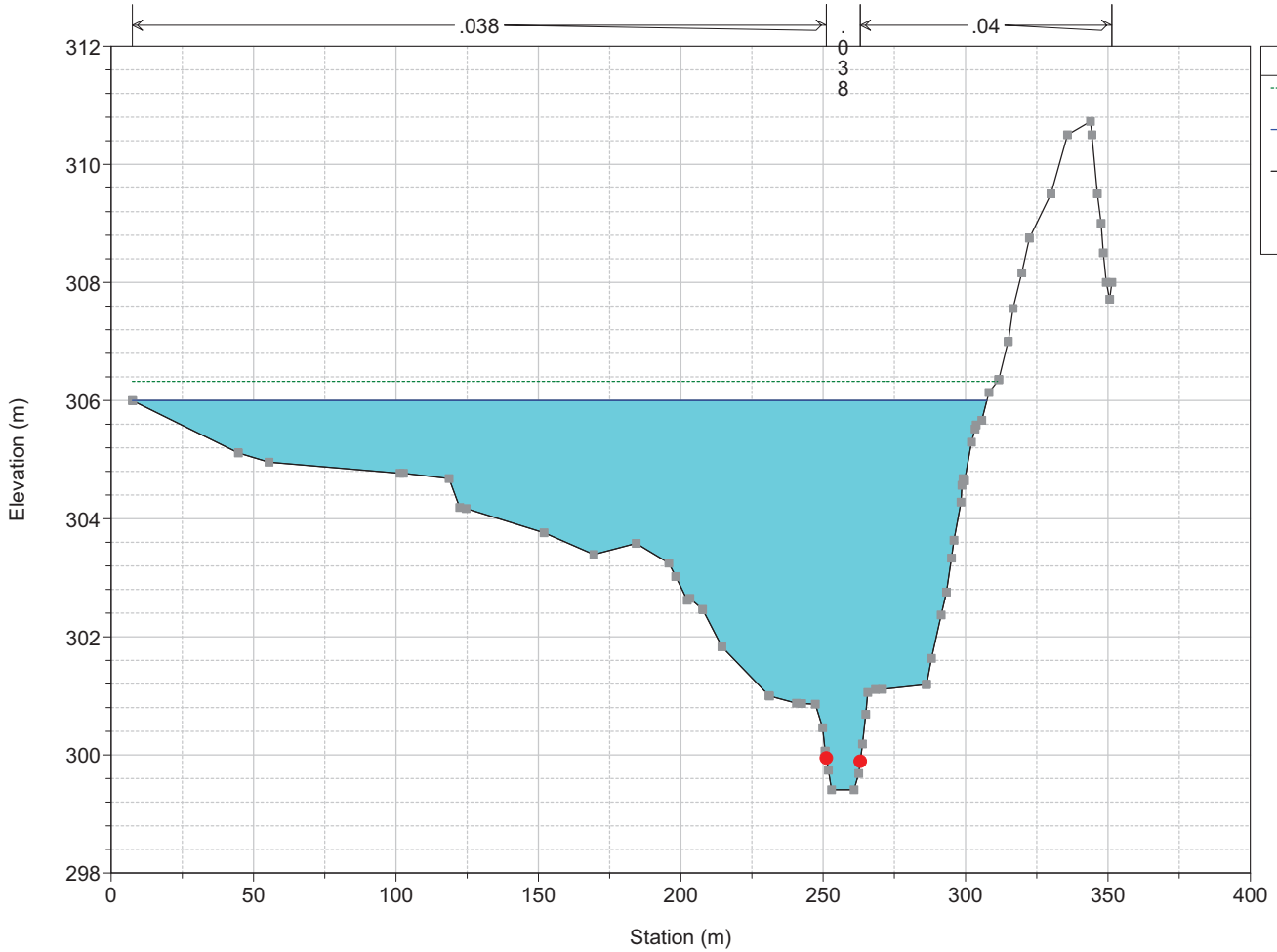
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 33



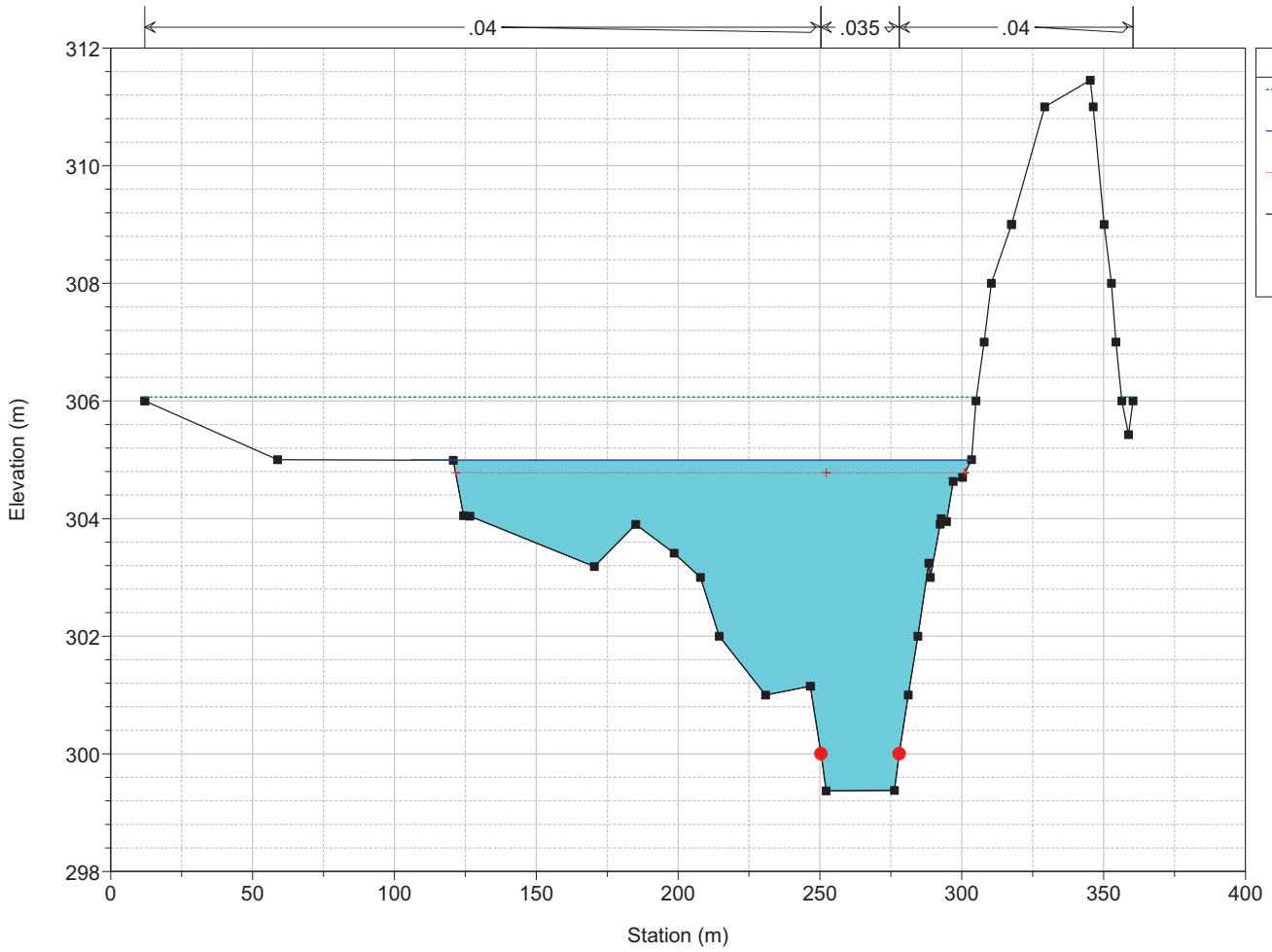
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 32.5*



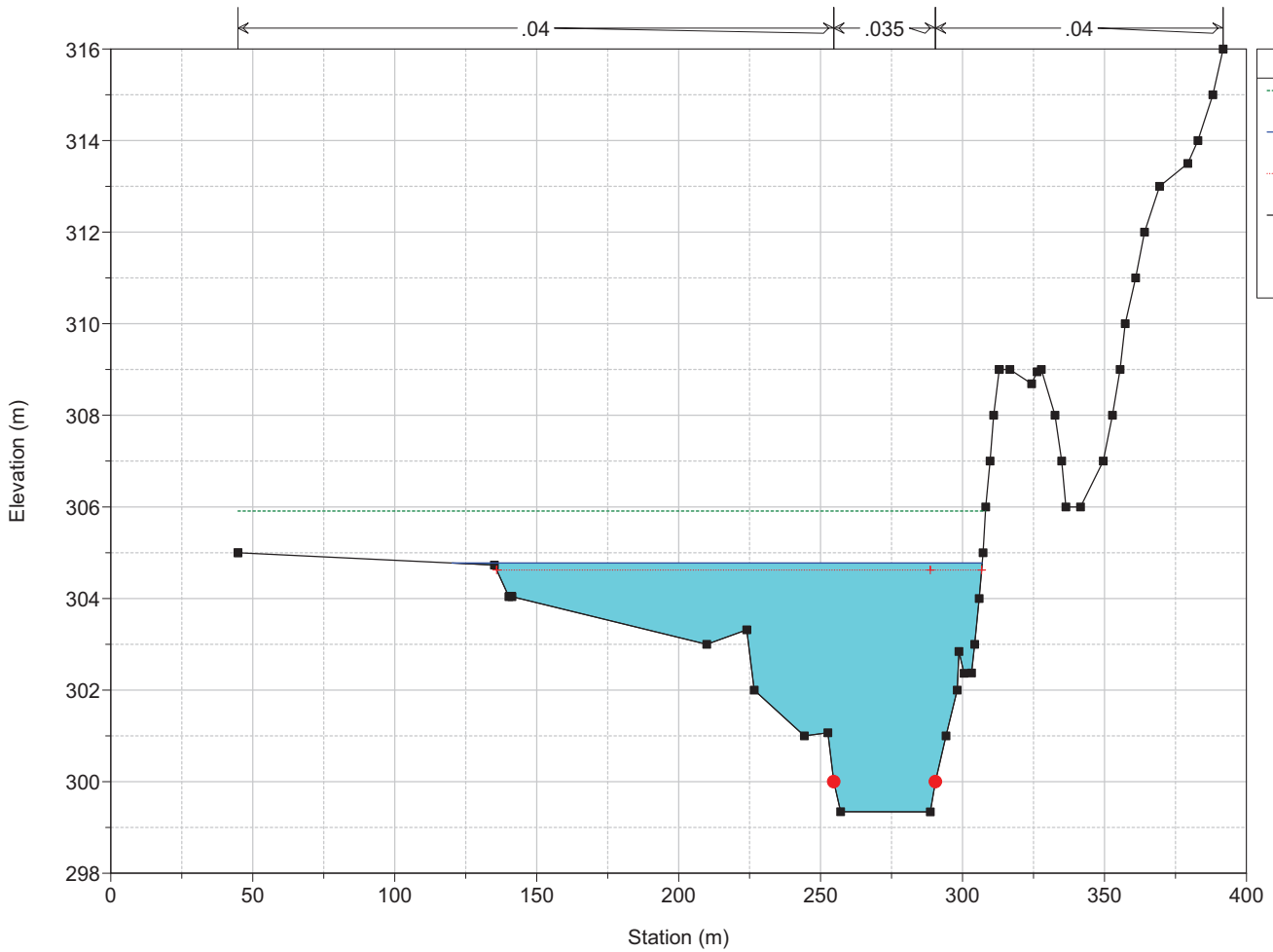
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 32



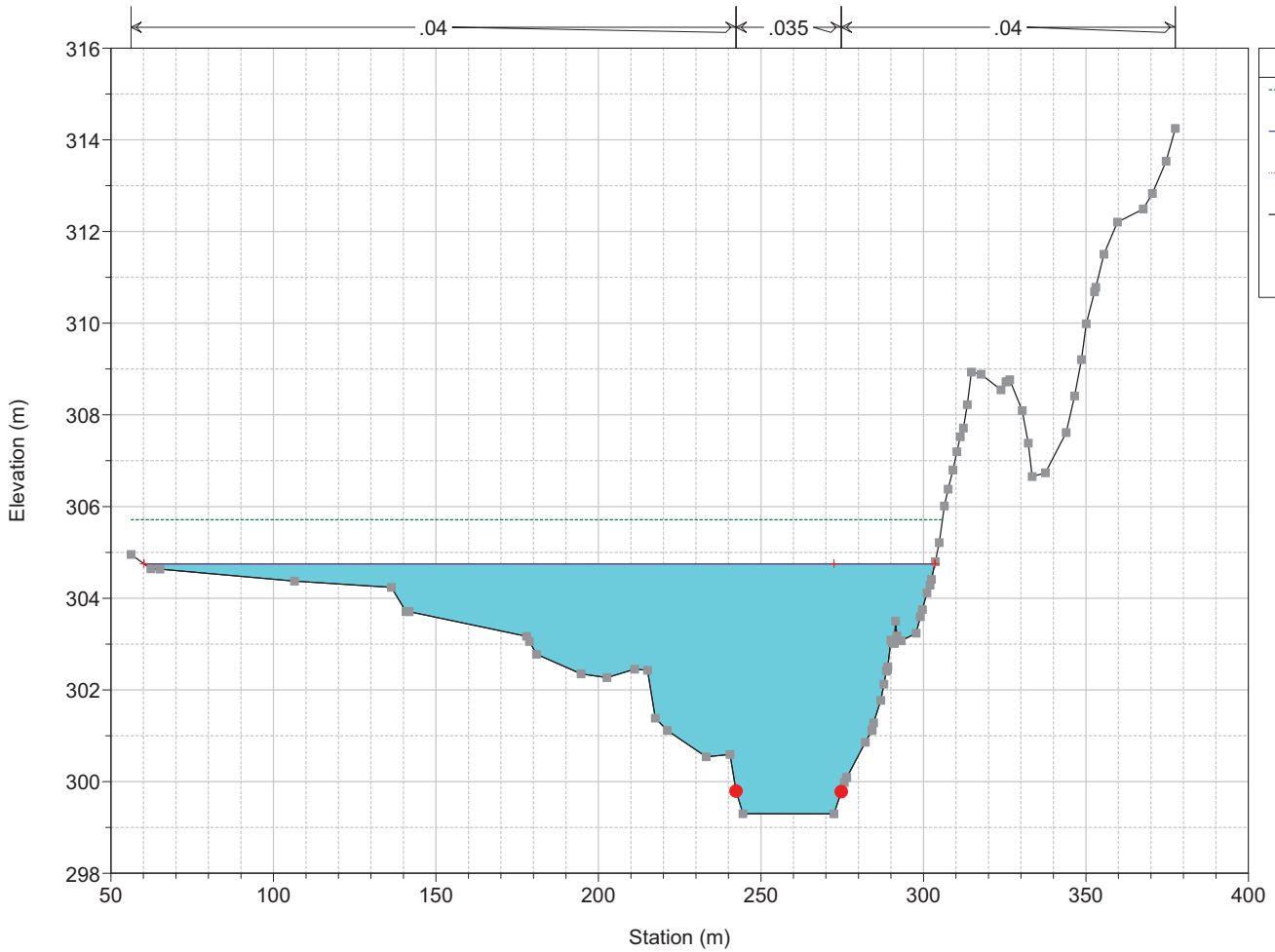
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 31



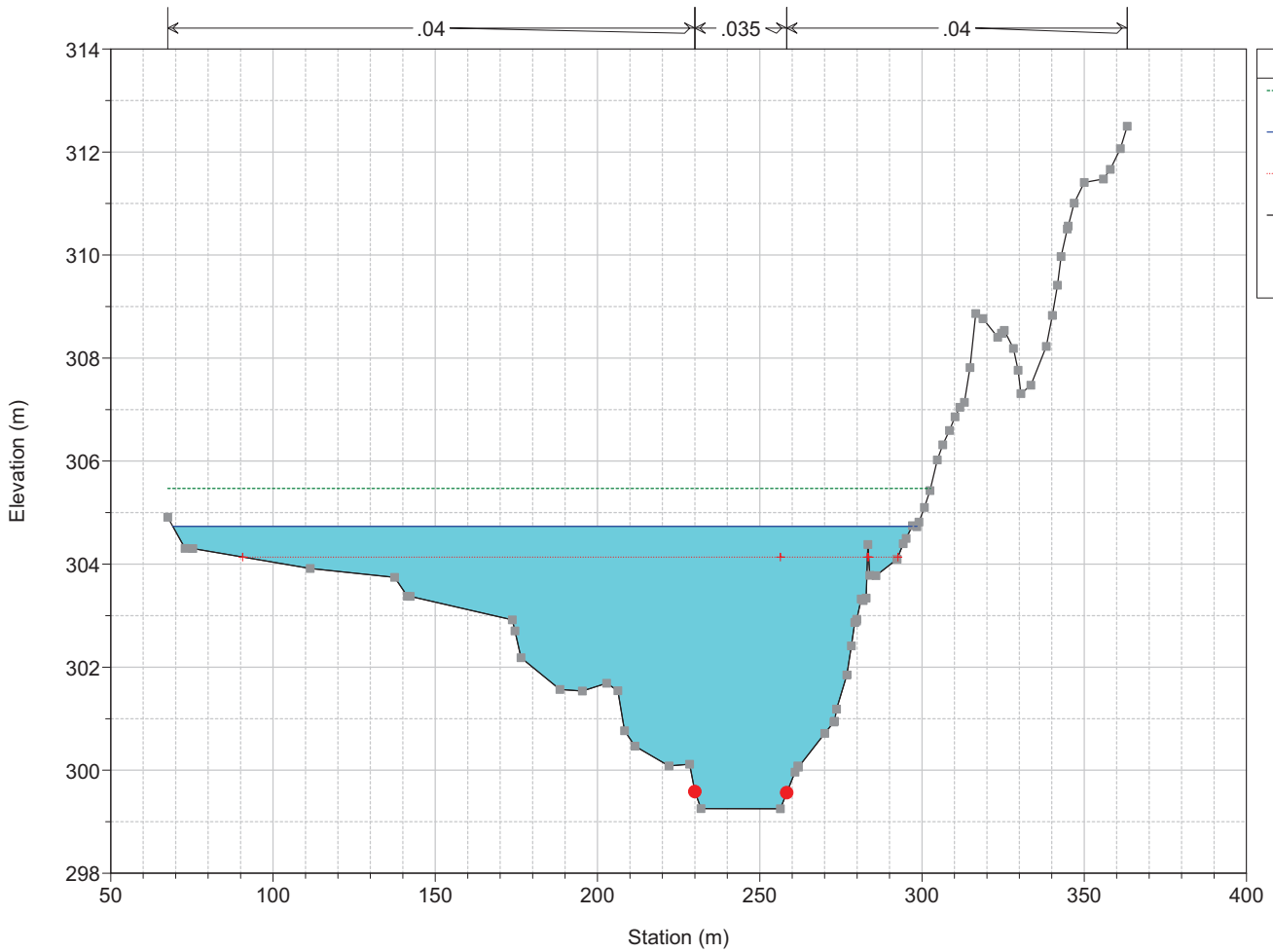
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.75*



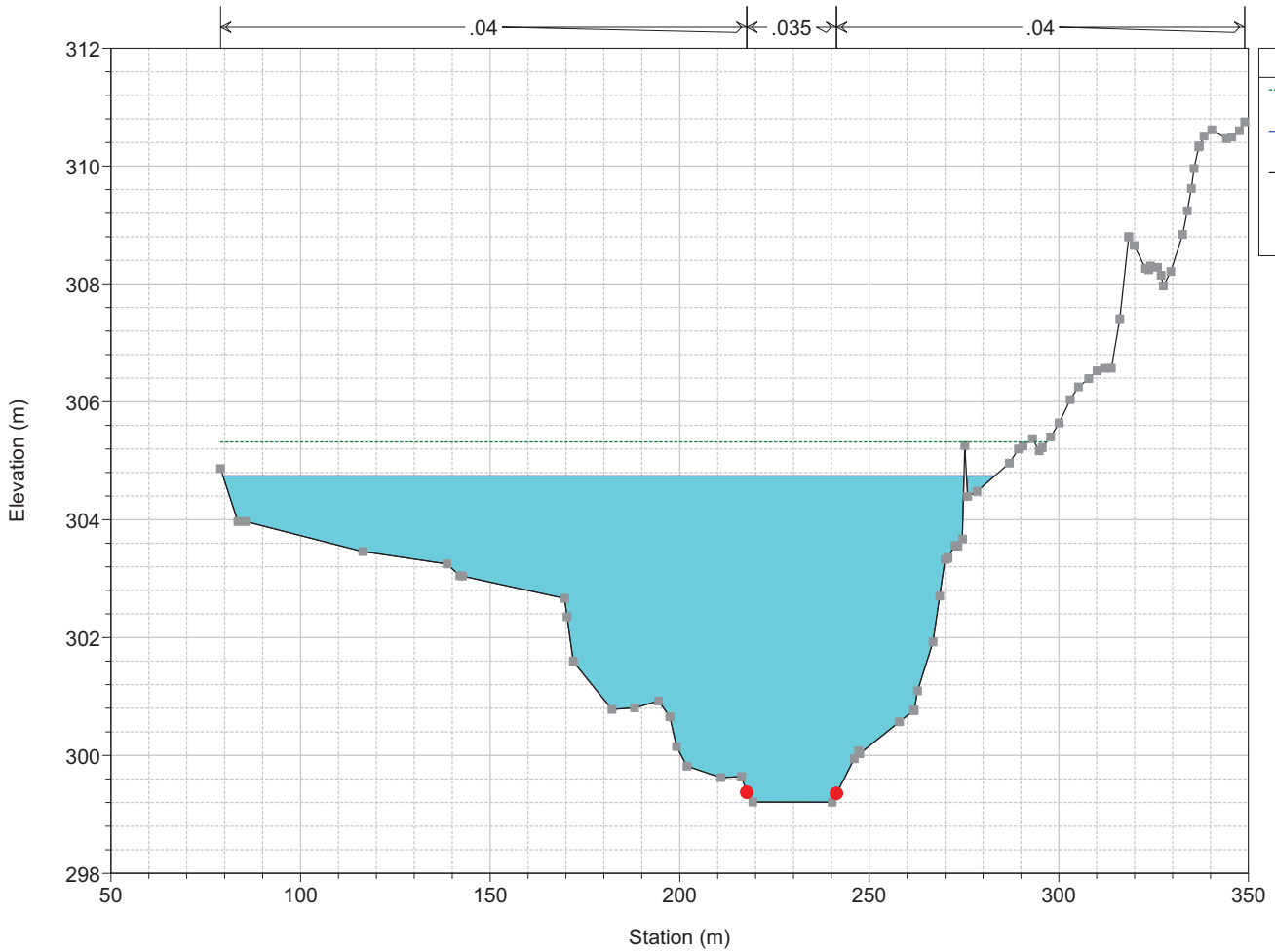
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.5*



ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.25*

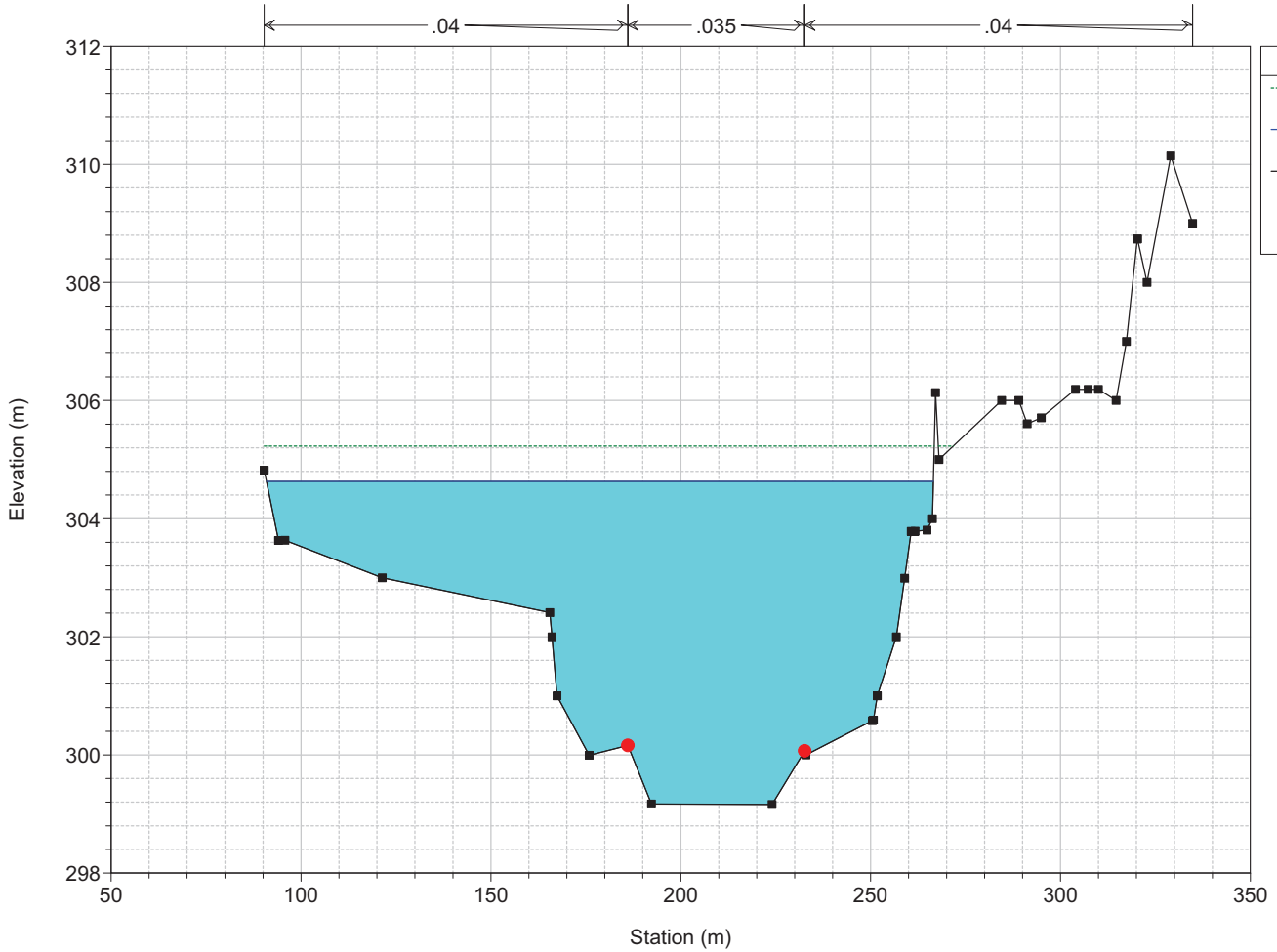


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30

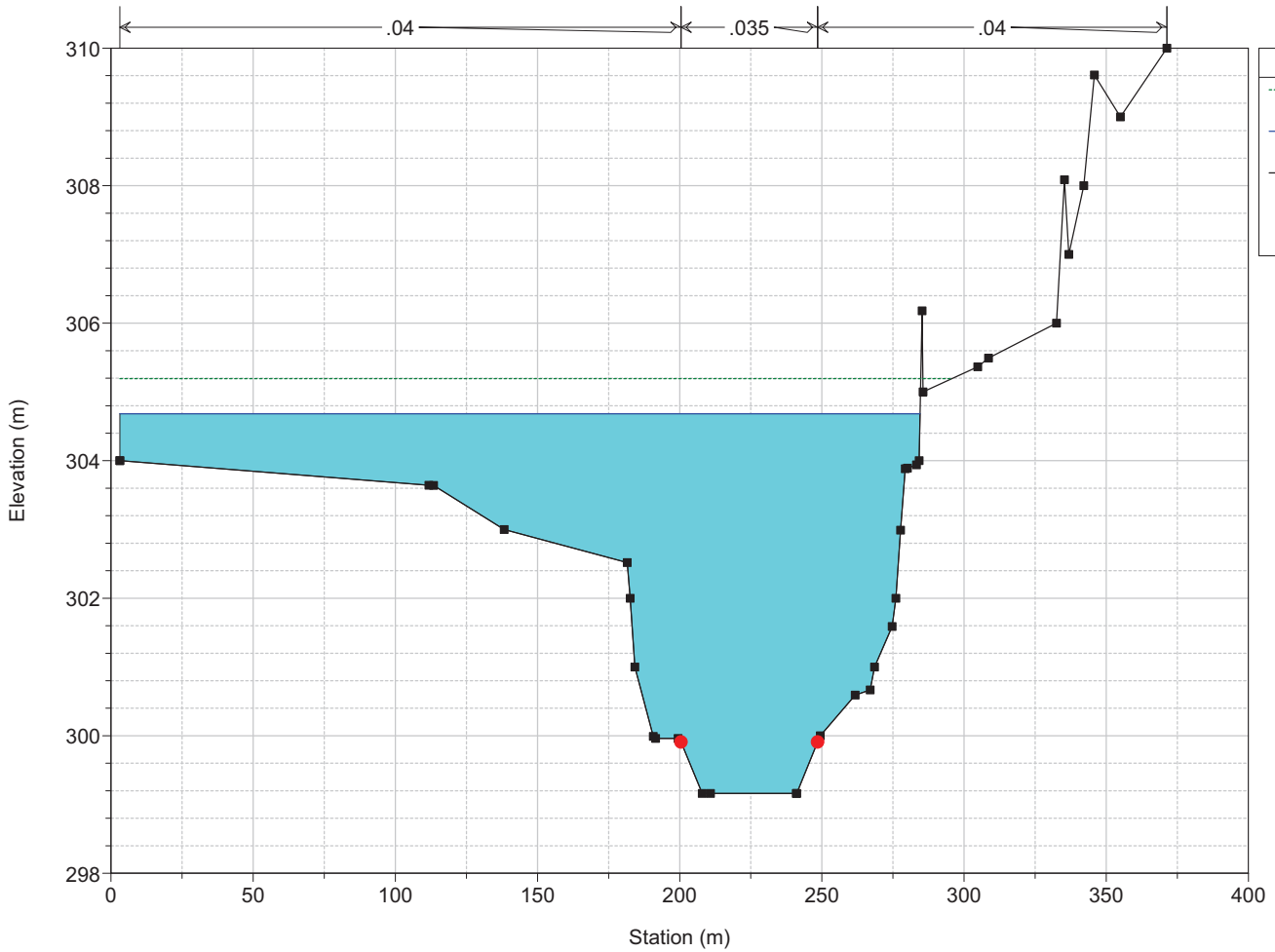


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 29

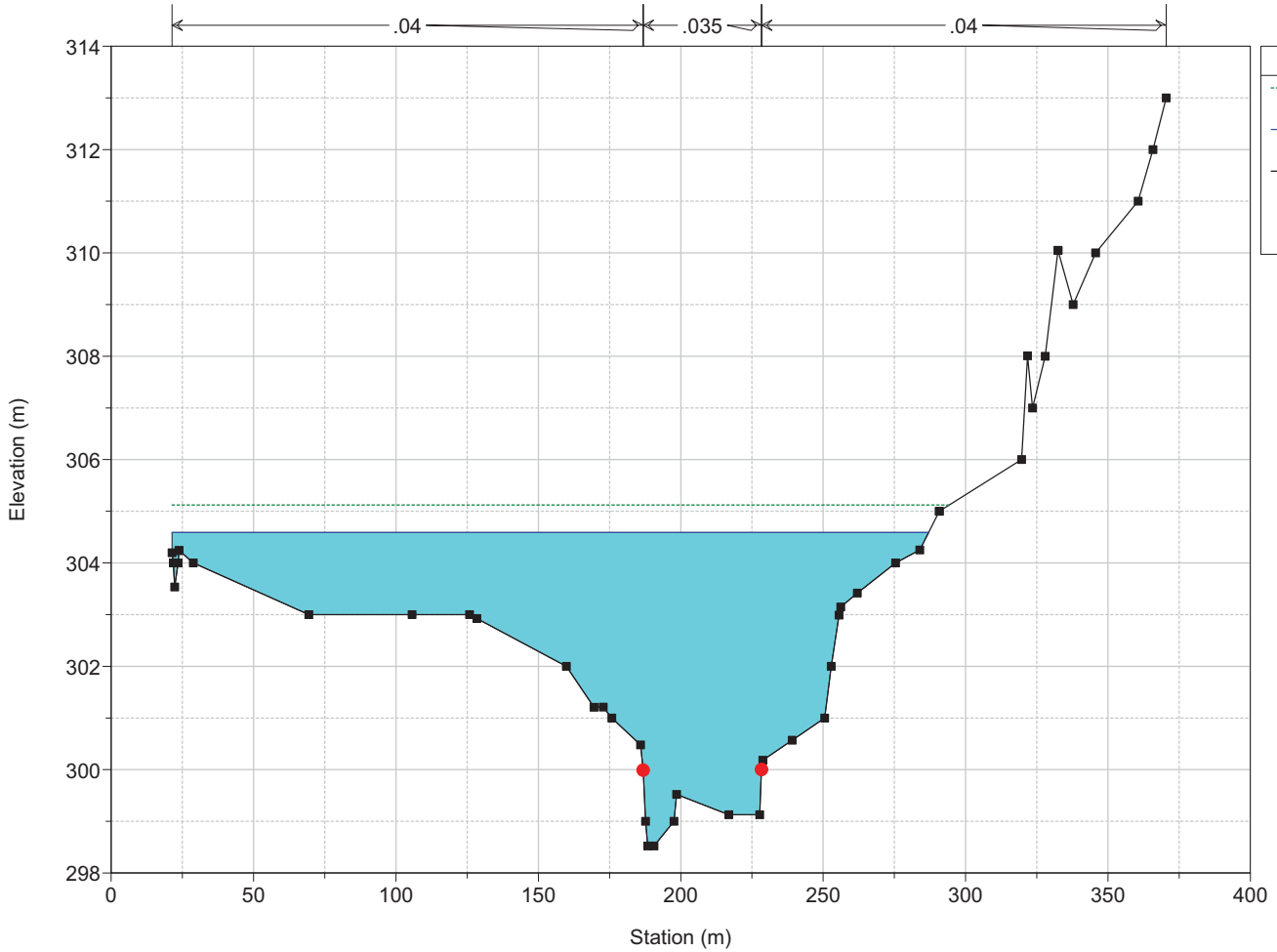


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 28

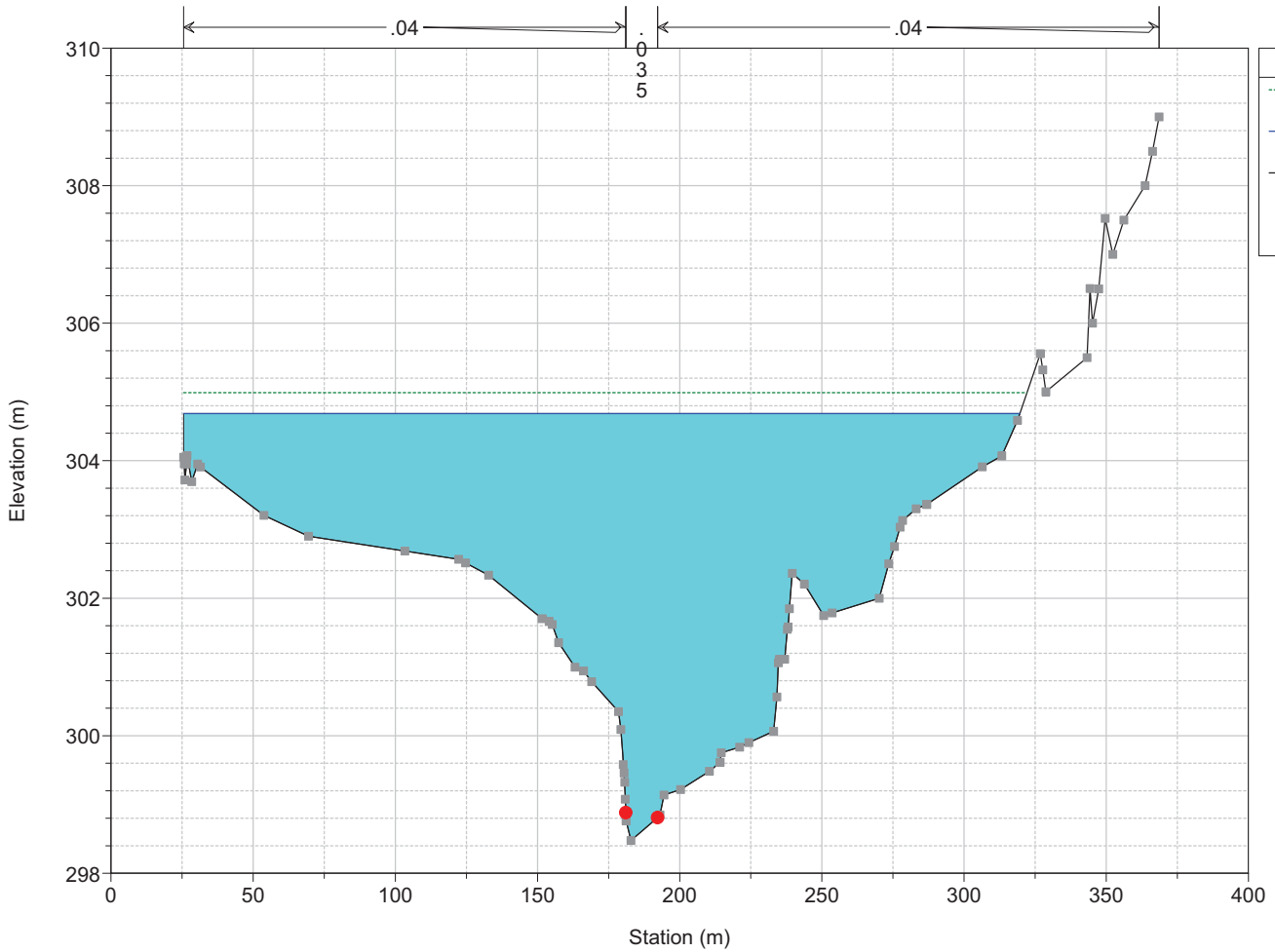


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 27.5*

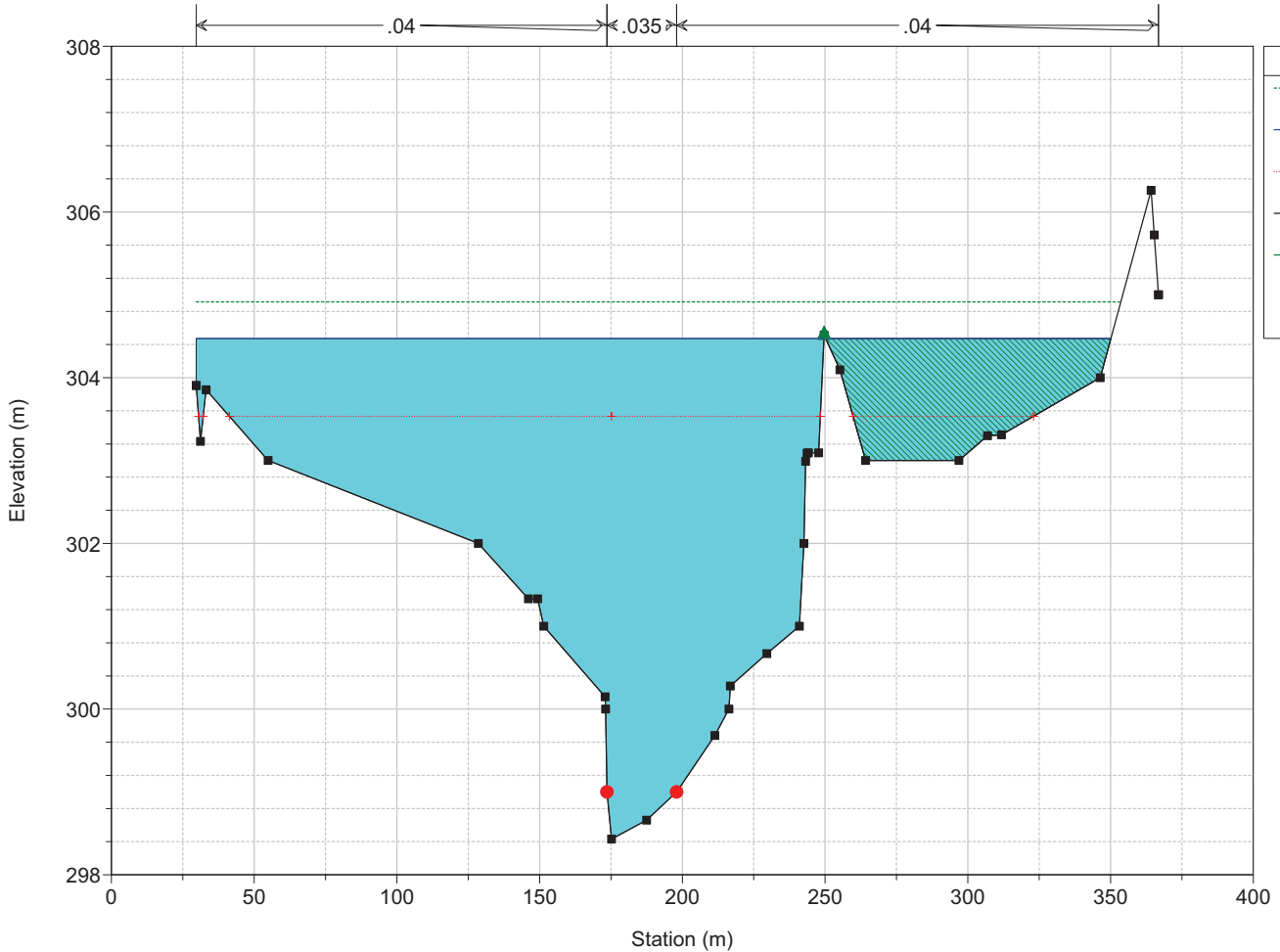


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 27

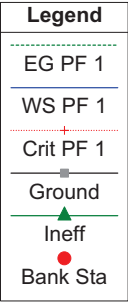
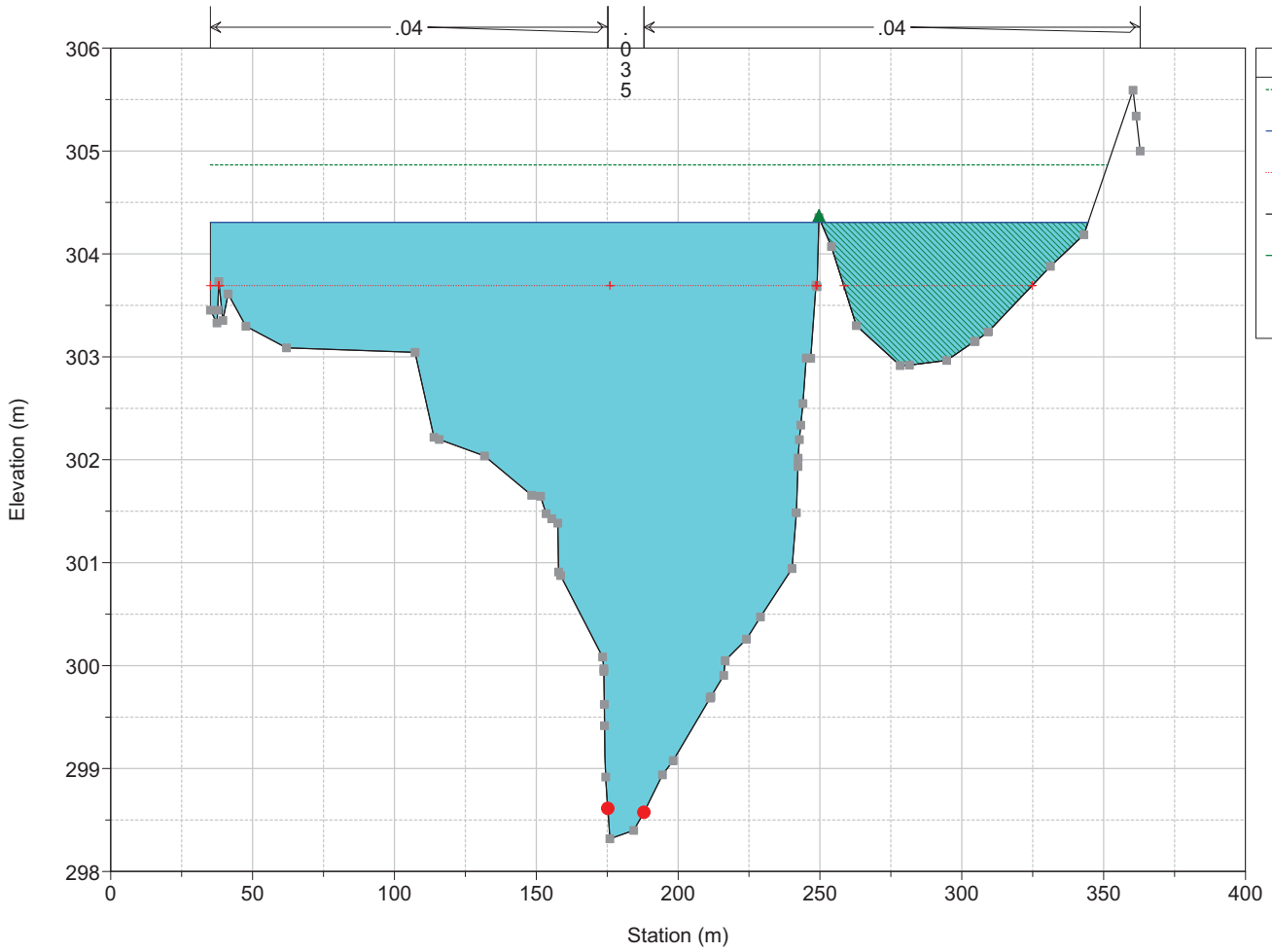


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Ineff
- Bank Sta

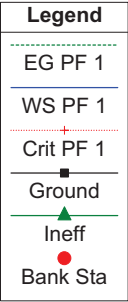
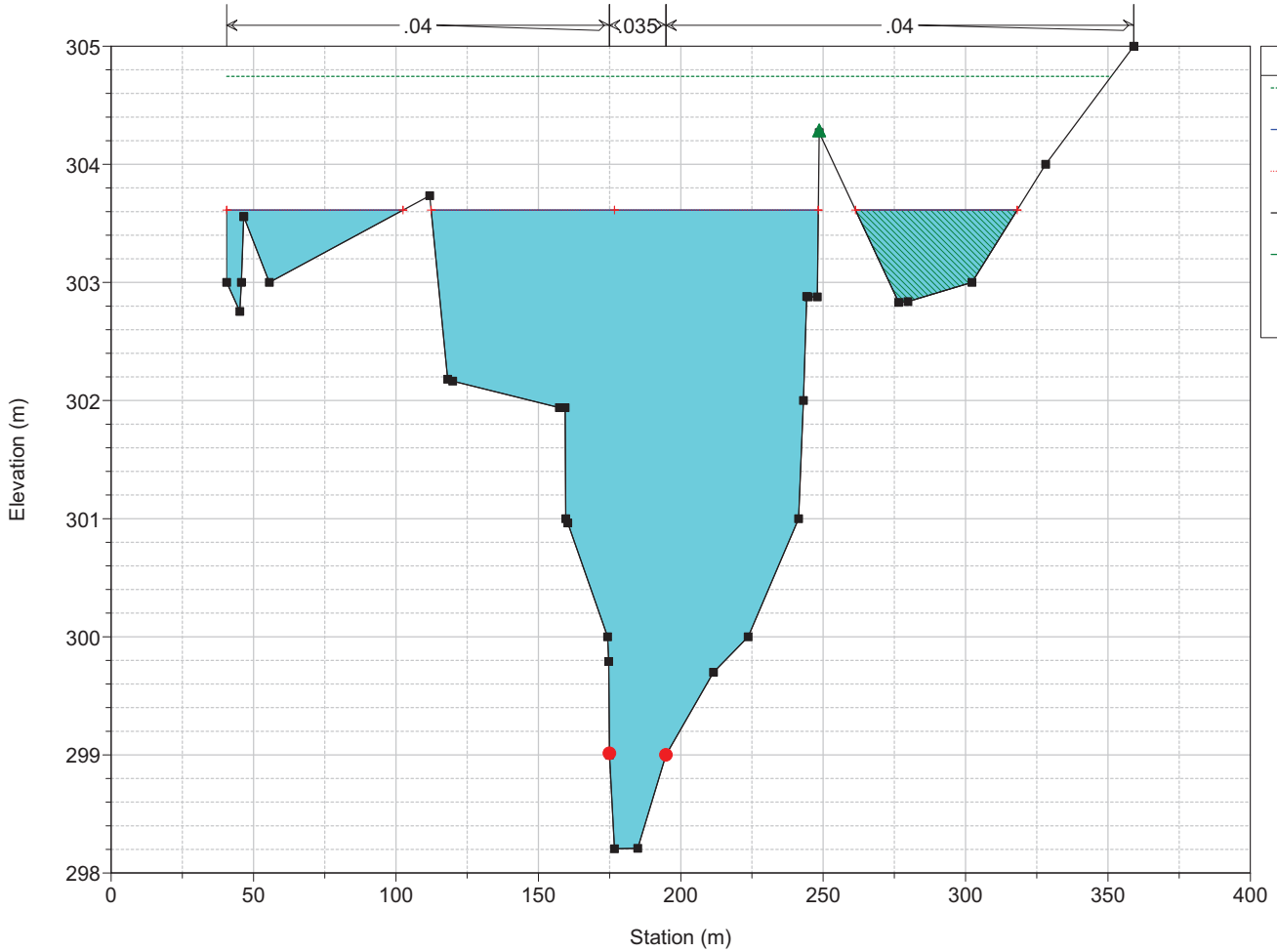
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 26.5*



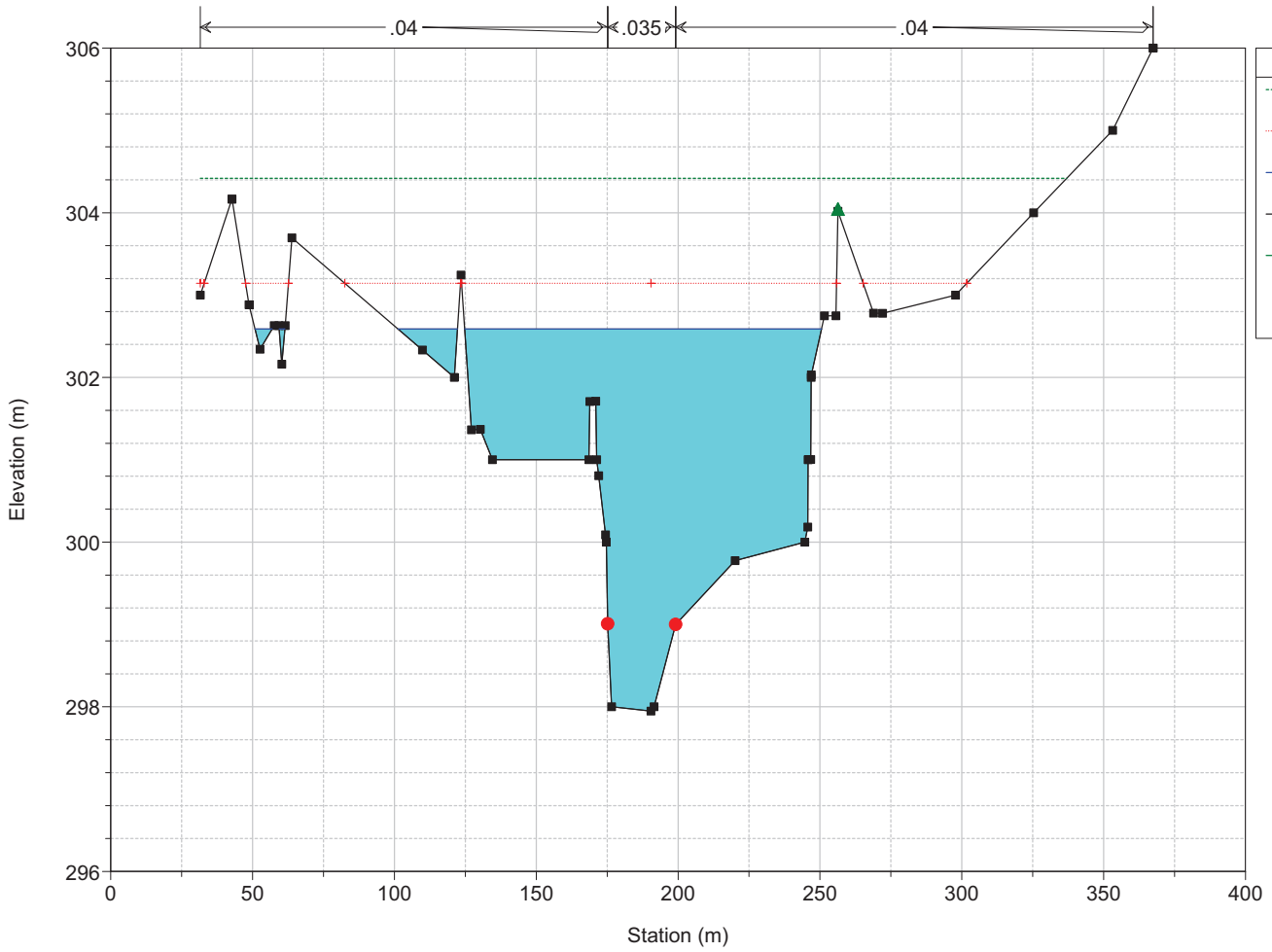
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 26



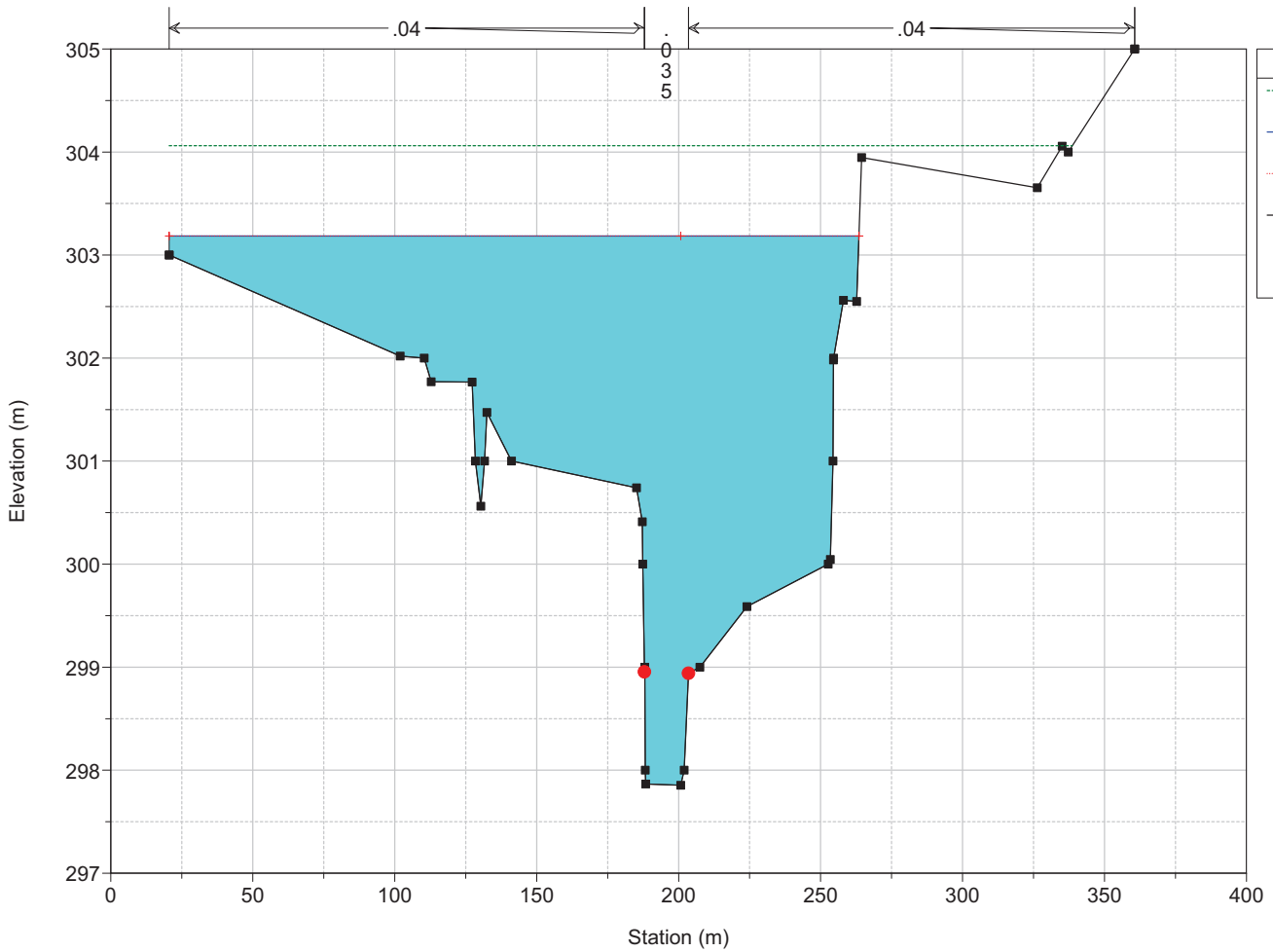
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 25



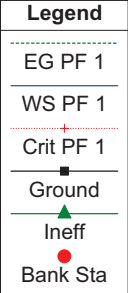
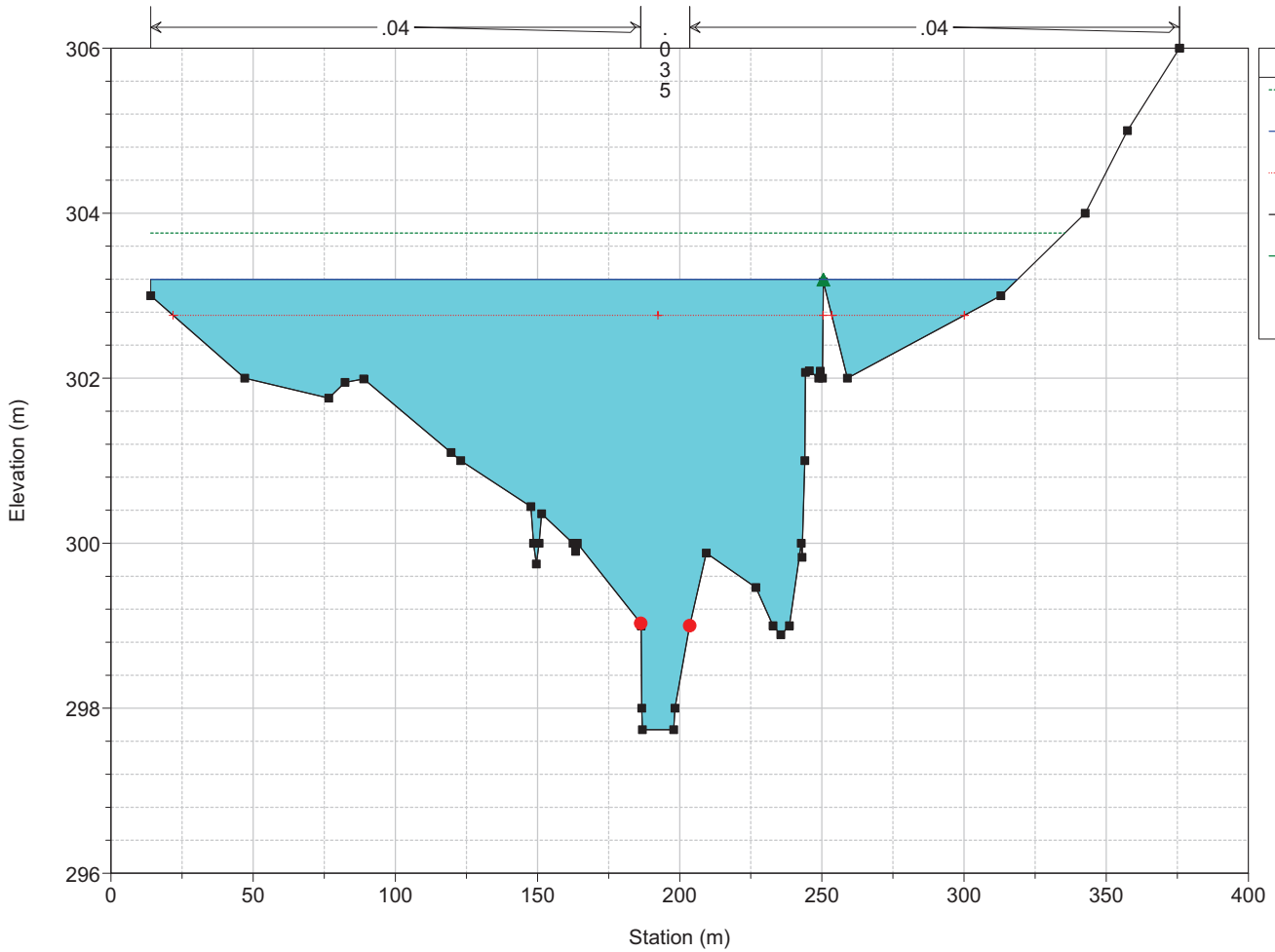
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 24



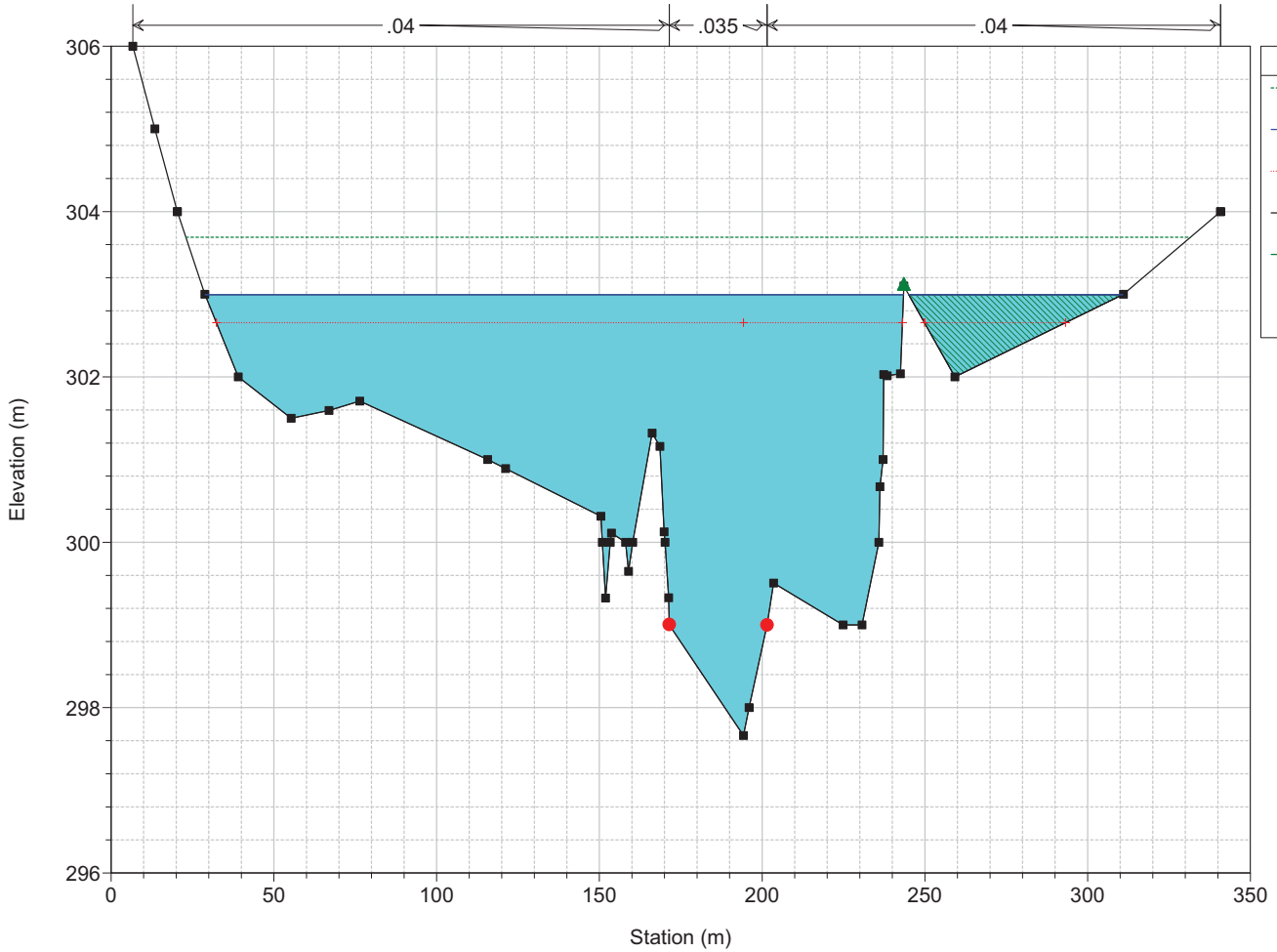
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 23



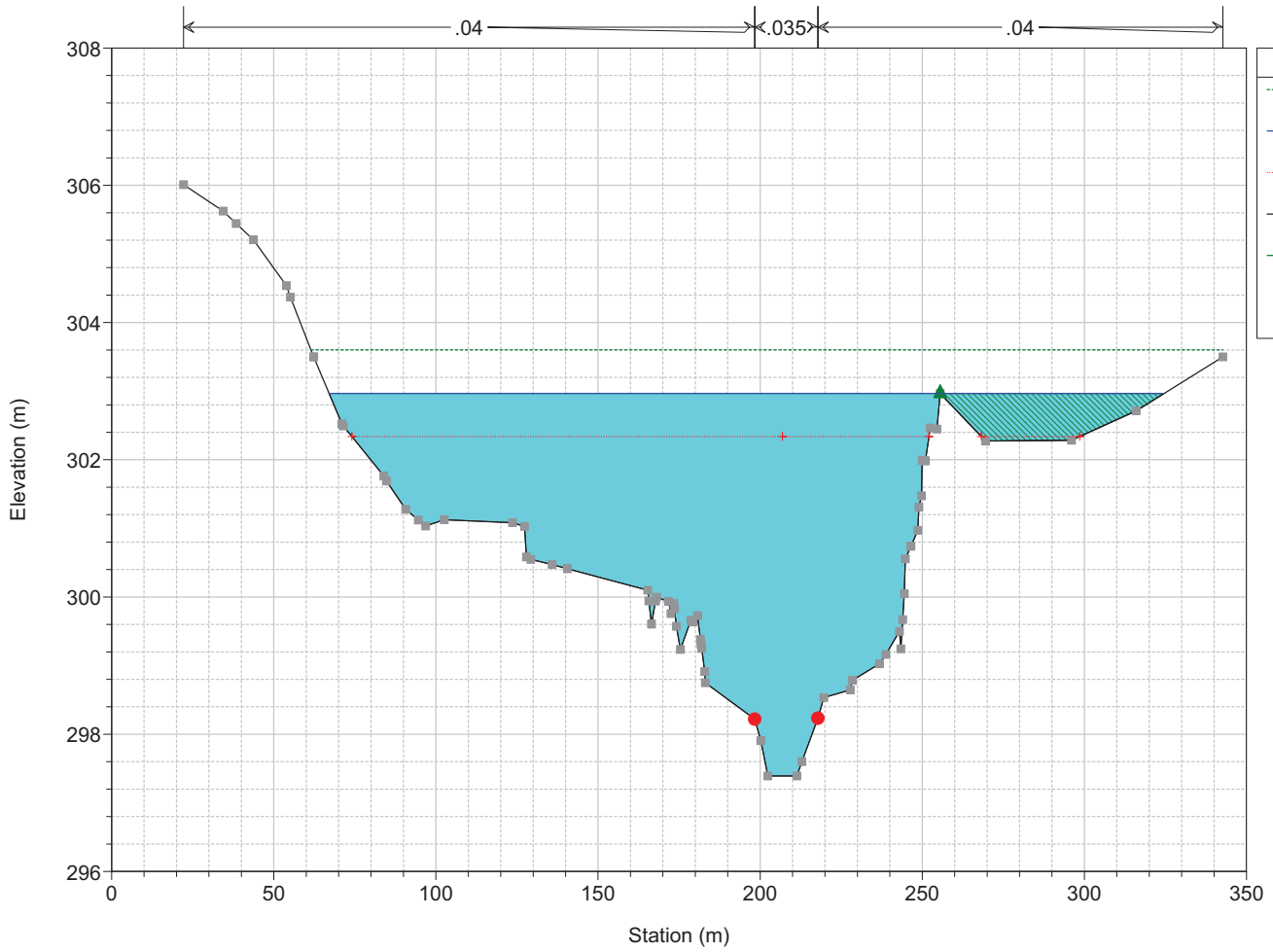
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 22



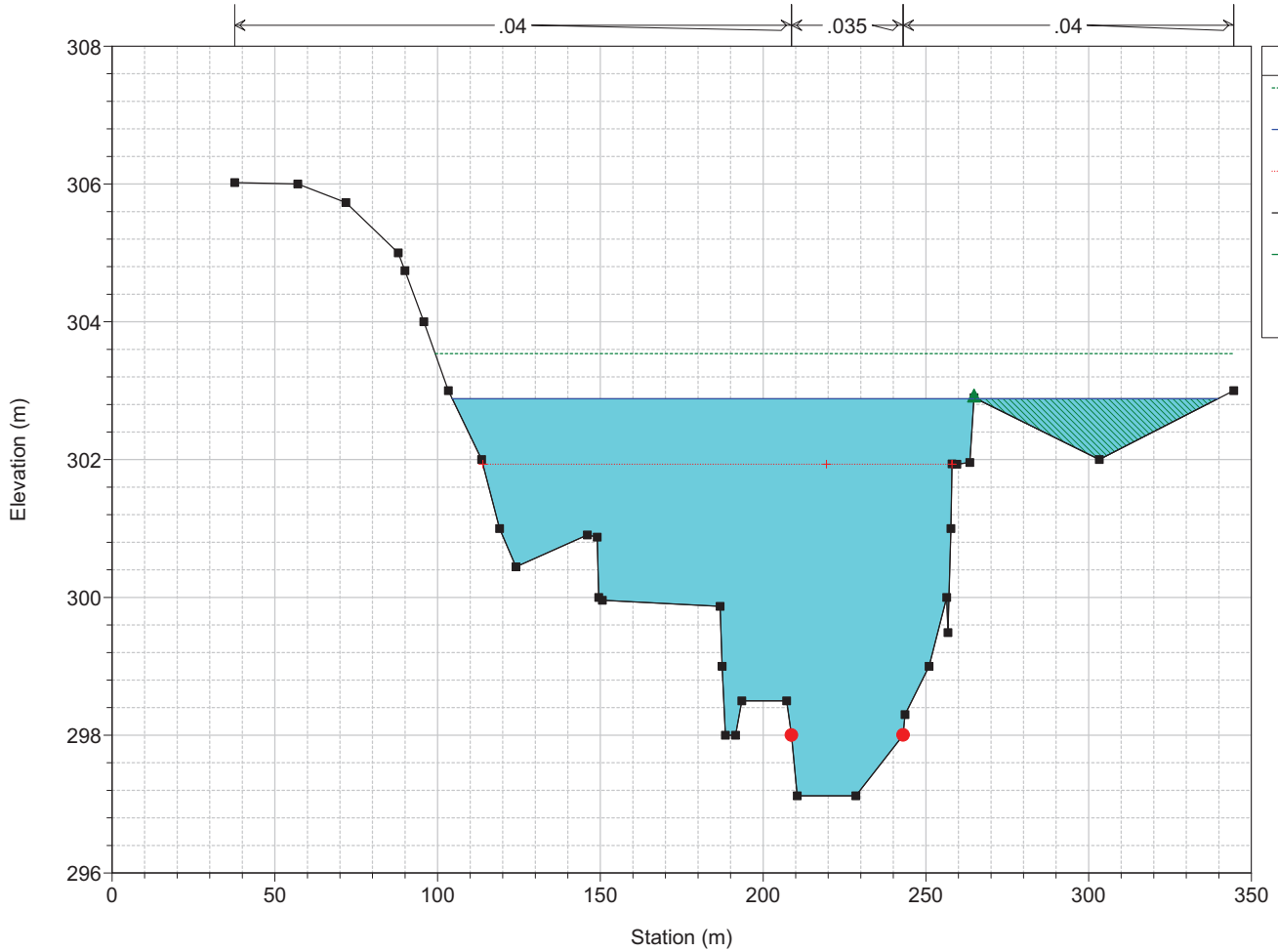
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 21.5*



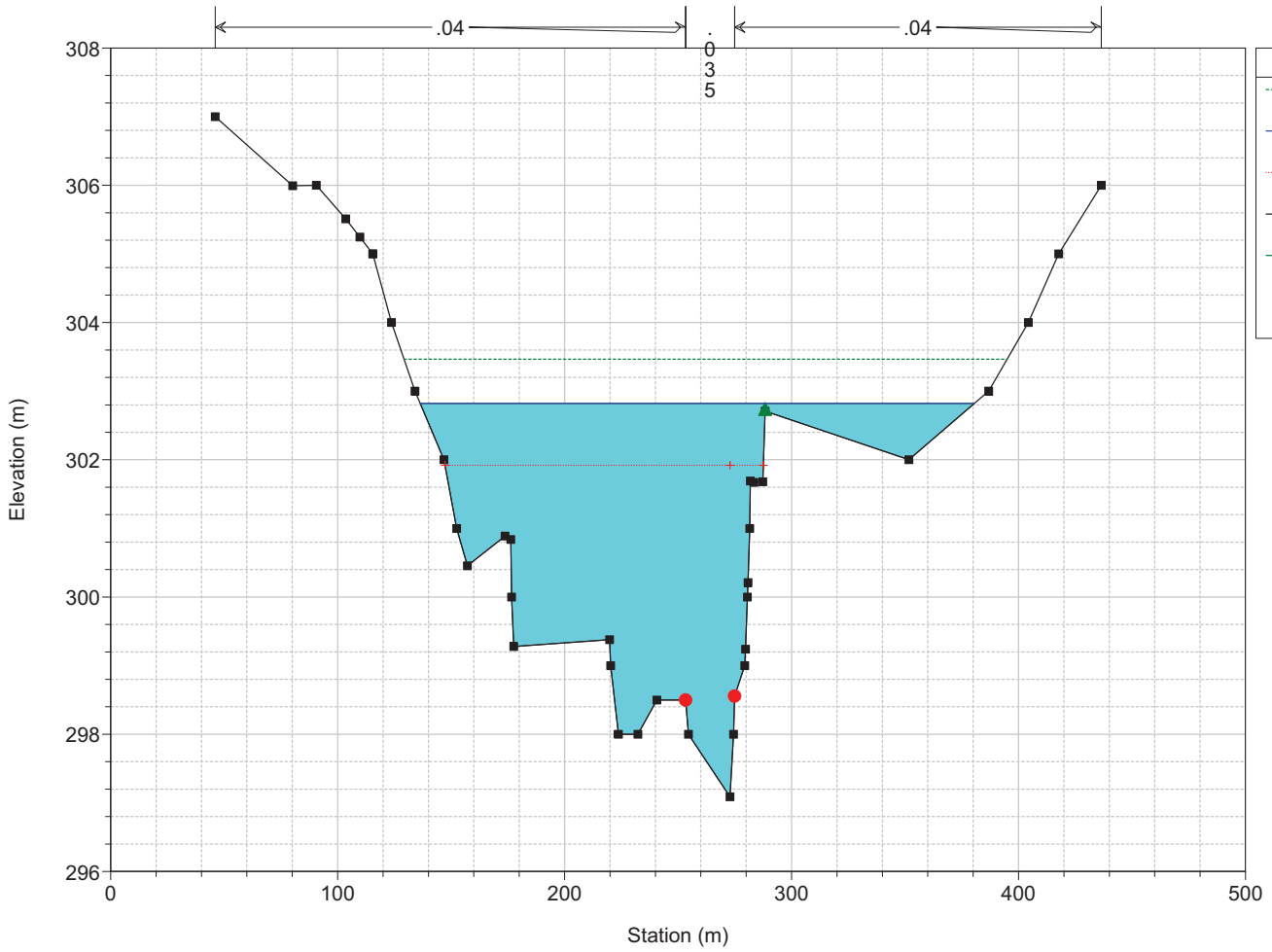
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 21



ANTE OPERAM_SALSO

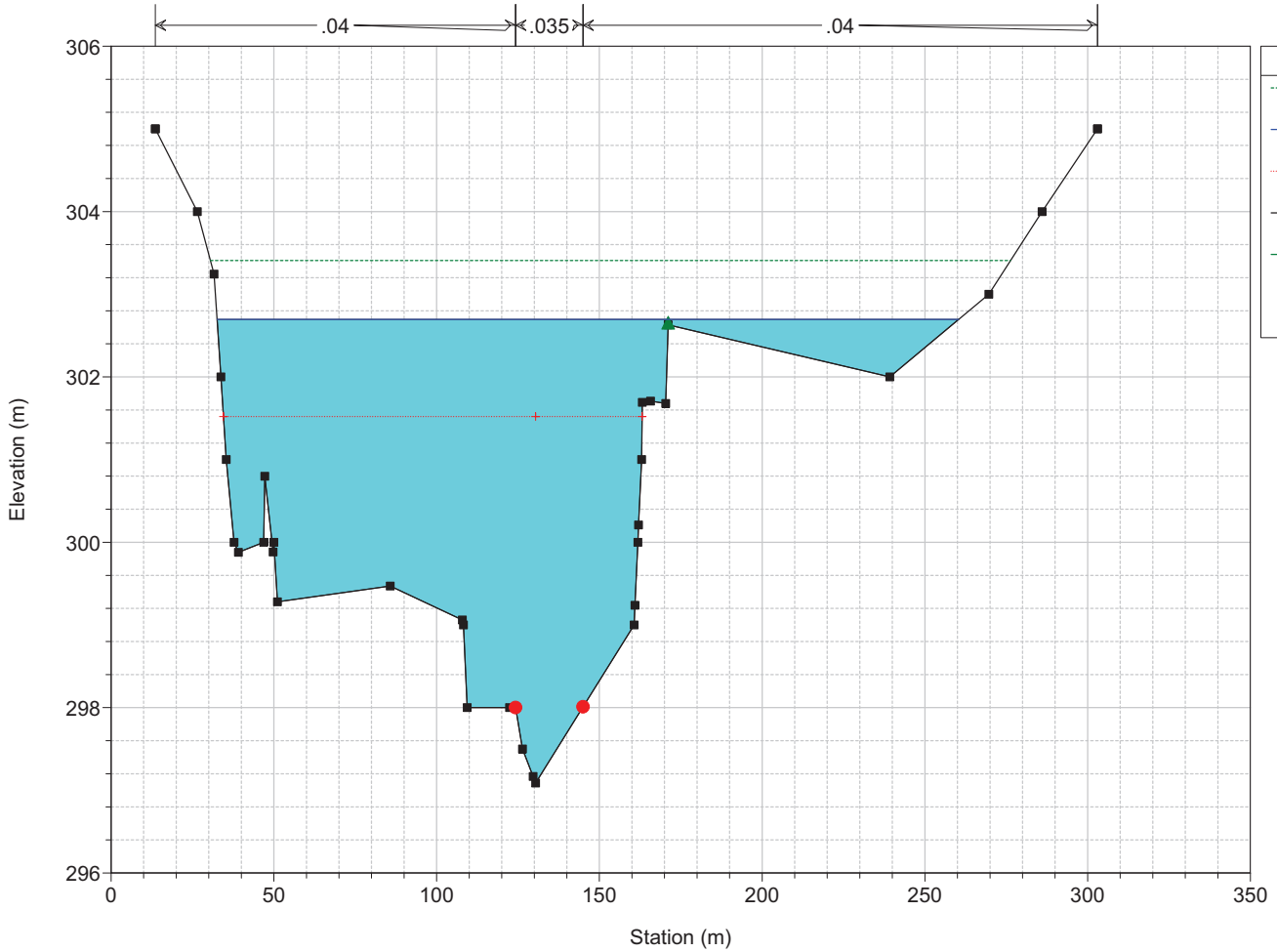
River = SALSO Reach = SALSO RS = 20



- Legend**
- EG PF 1
 - WS PF 1
 - Crit PF 1
 - Ground
 - Ineff
 - Bank Sta

ANTE OPERAM_SALSO

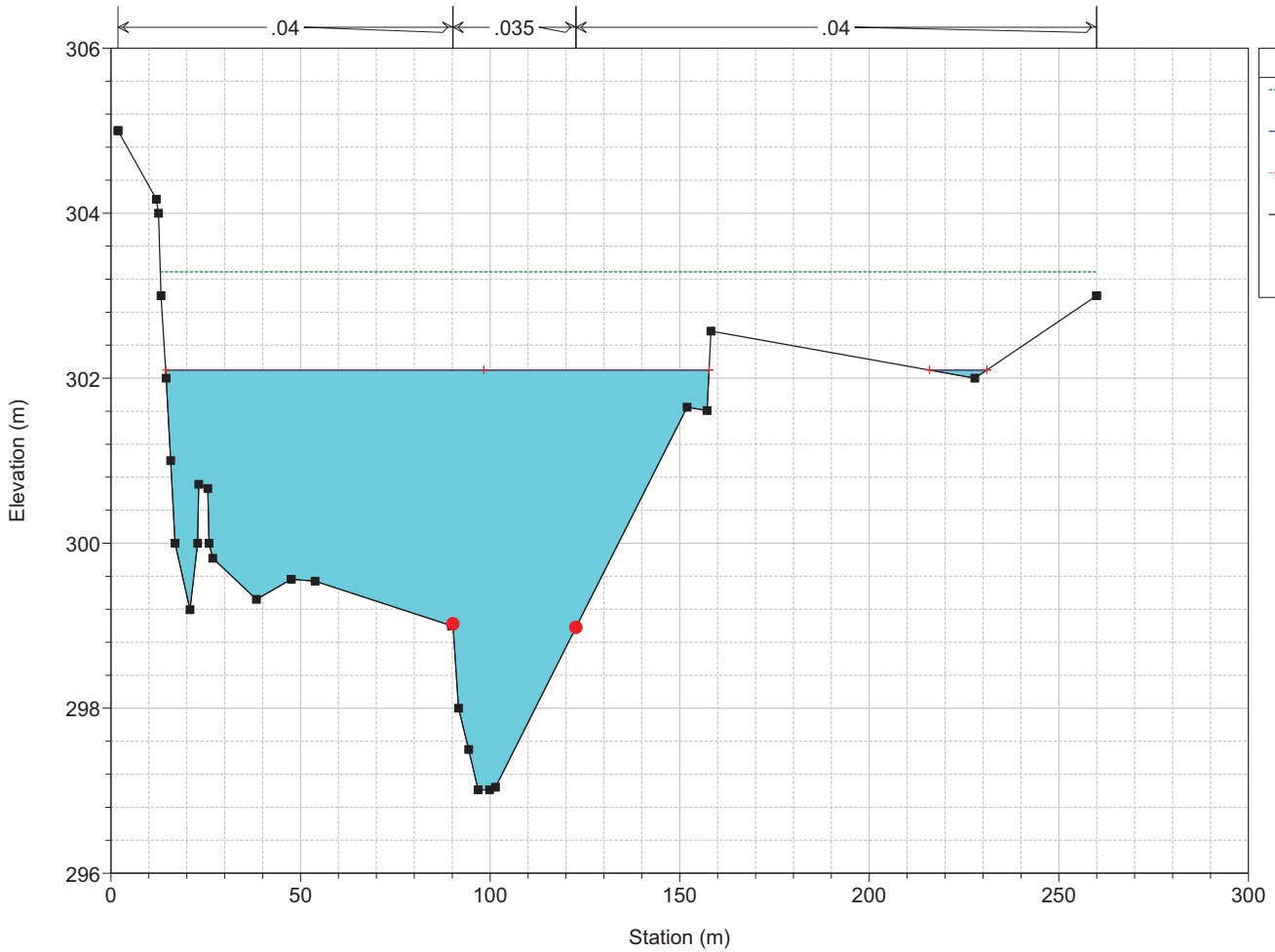
River = SALSO Reach = SALSO RS = 19



- Legend**
- EG PF 1
 - WS PF 1
 - Crit PF 1
 - Ground
 - Ineff
 - Bank Sta

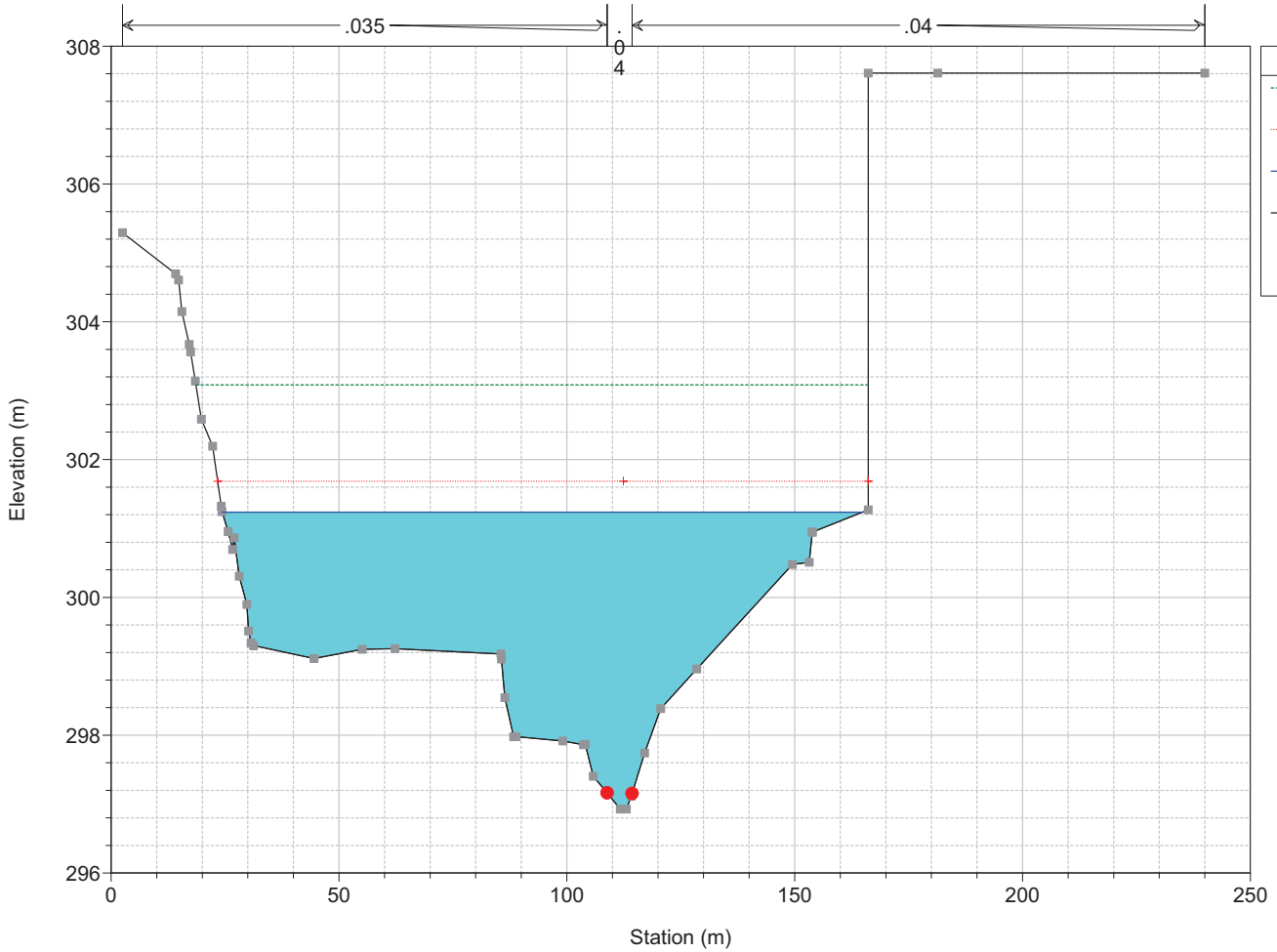
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 18



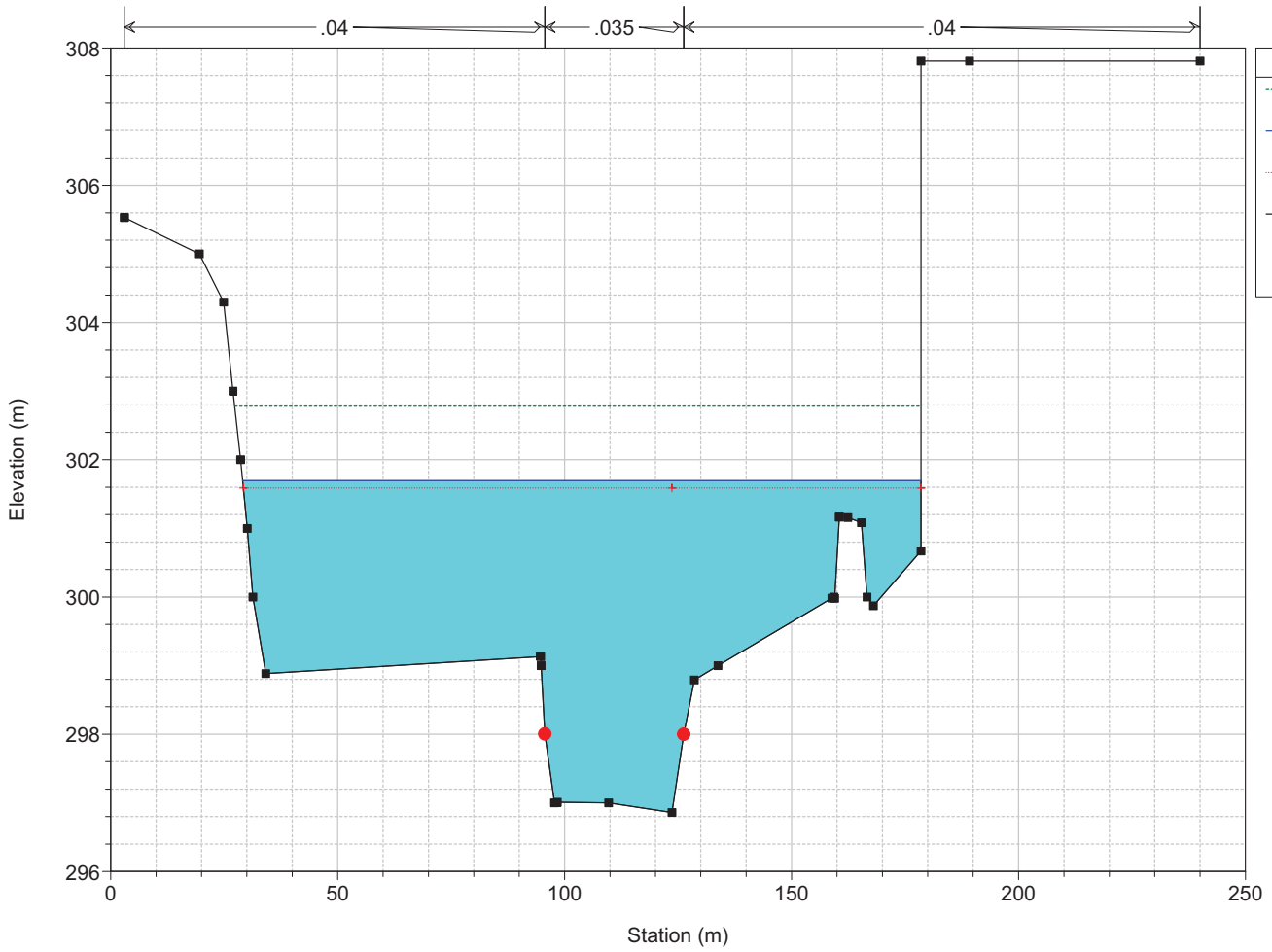
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 17.5*



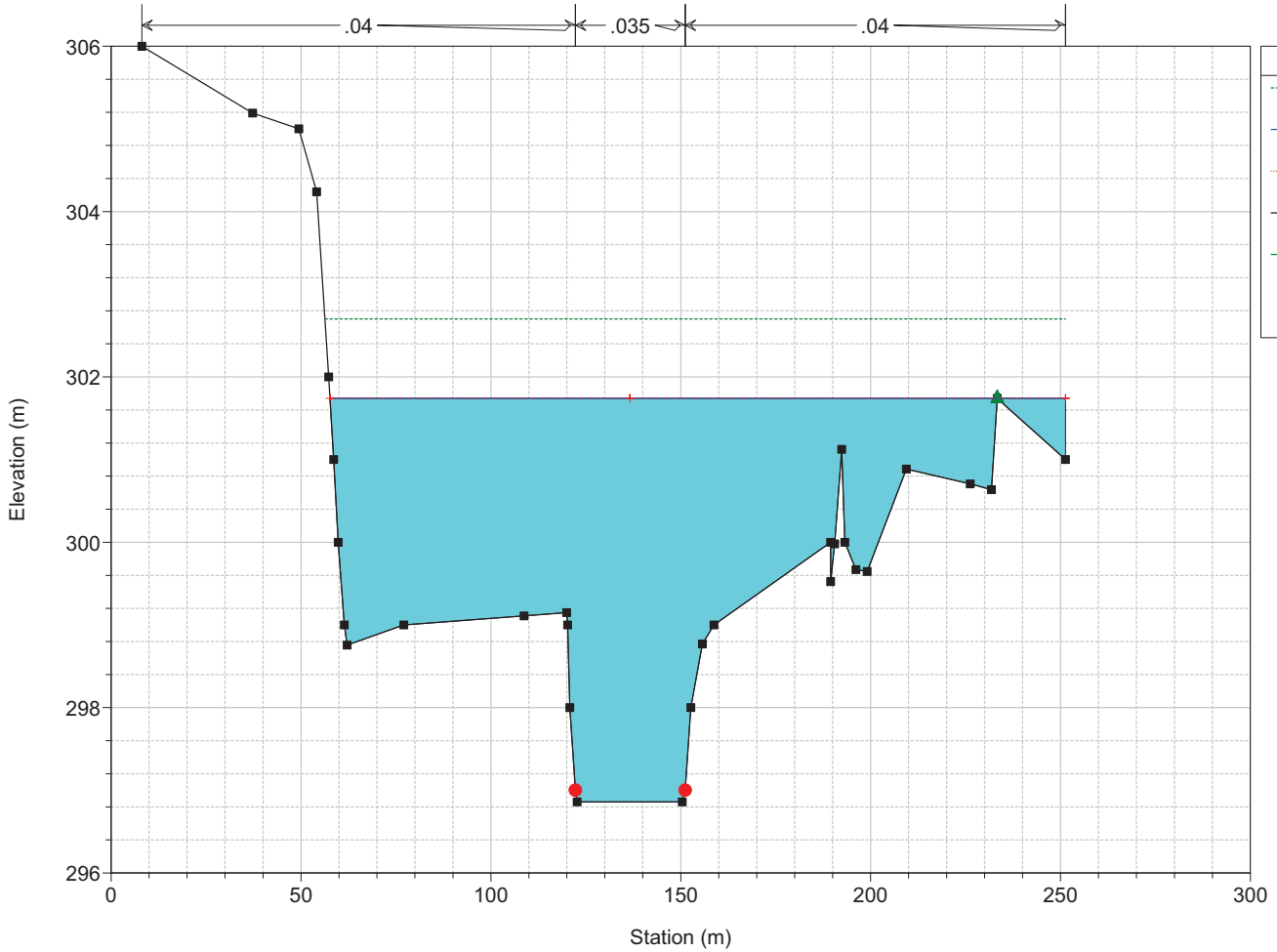
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 17



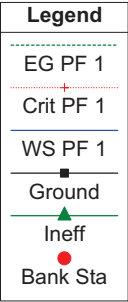
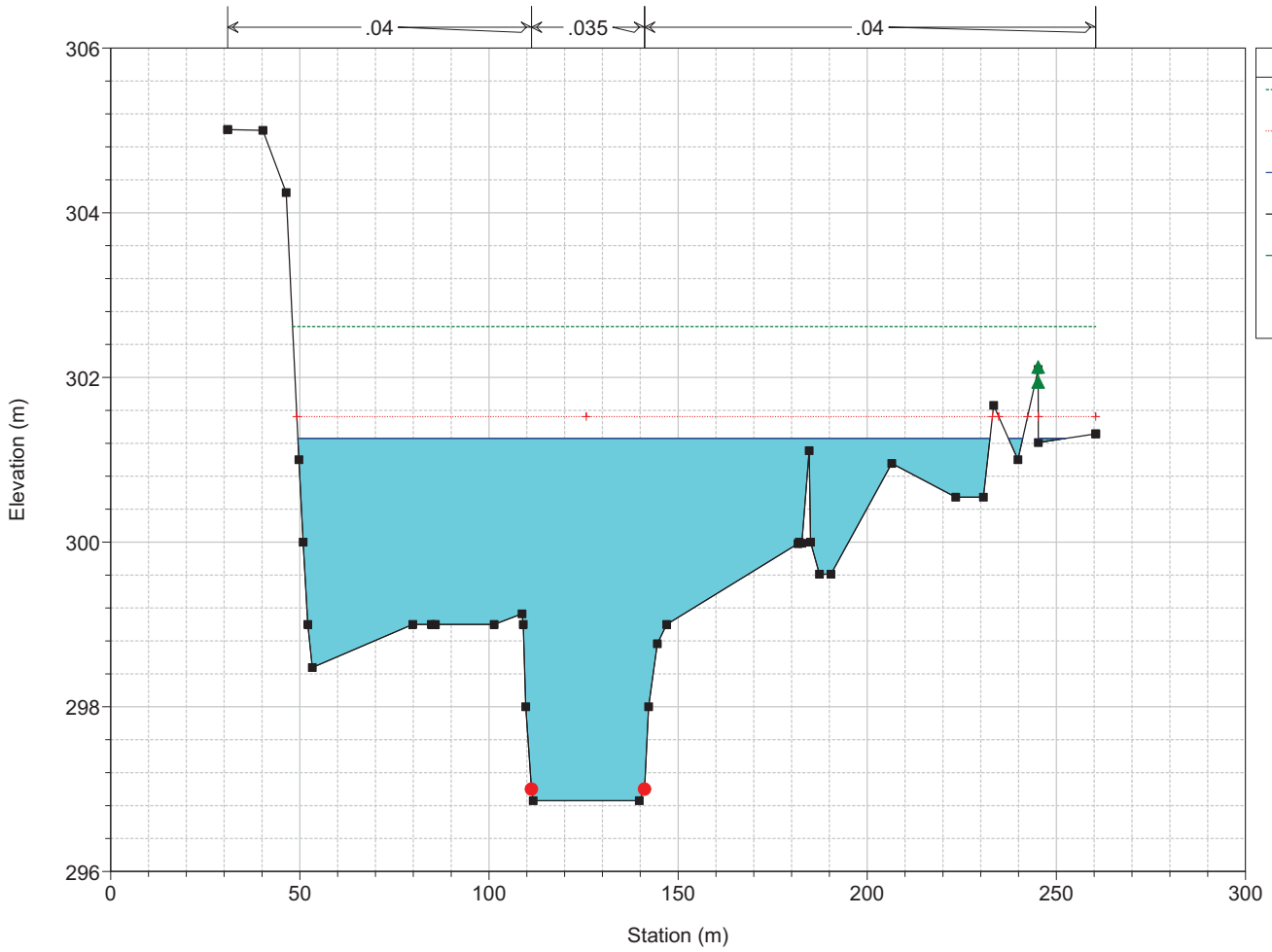
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 16



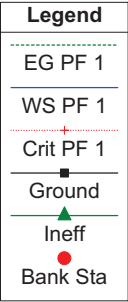
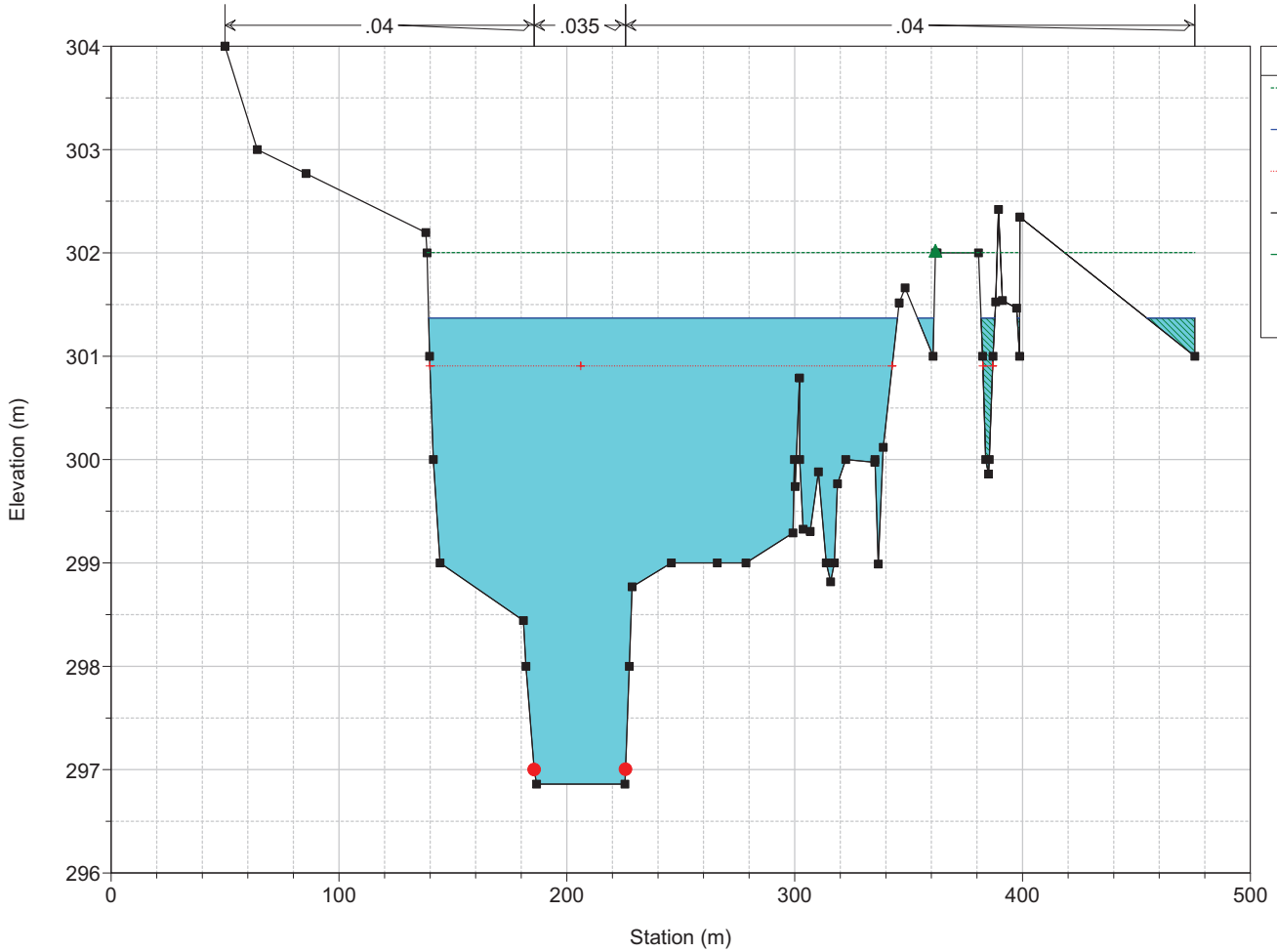
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 15



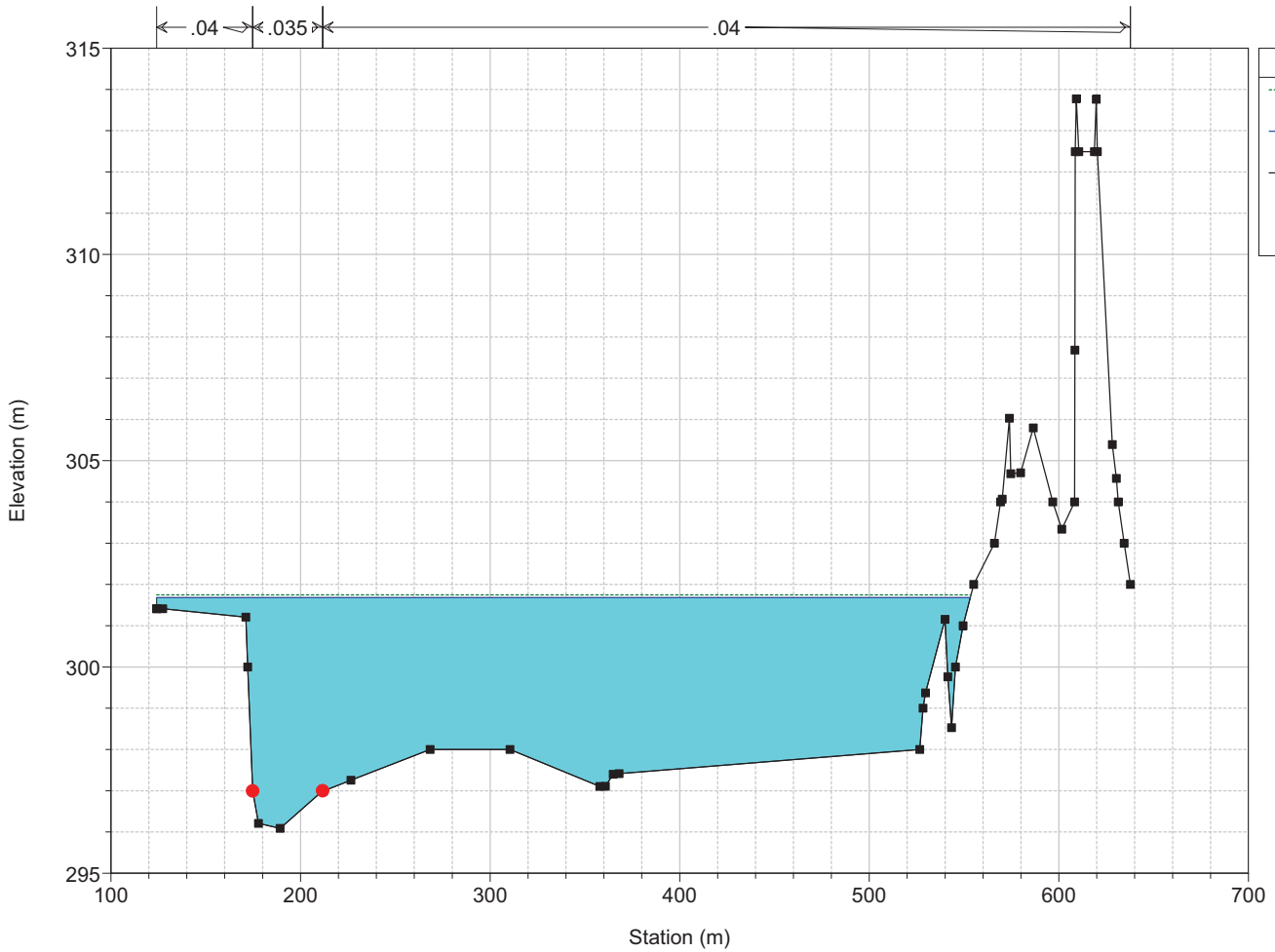
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 14



ANTE OPERAM_SALSO

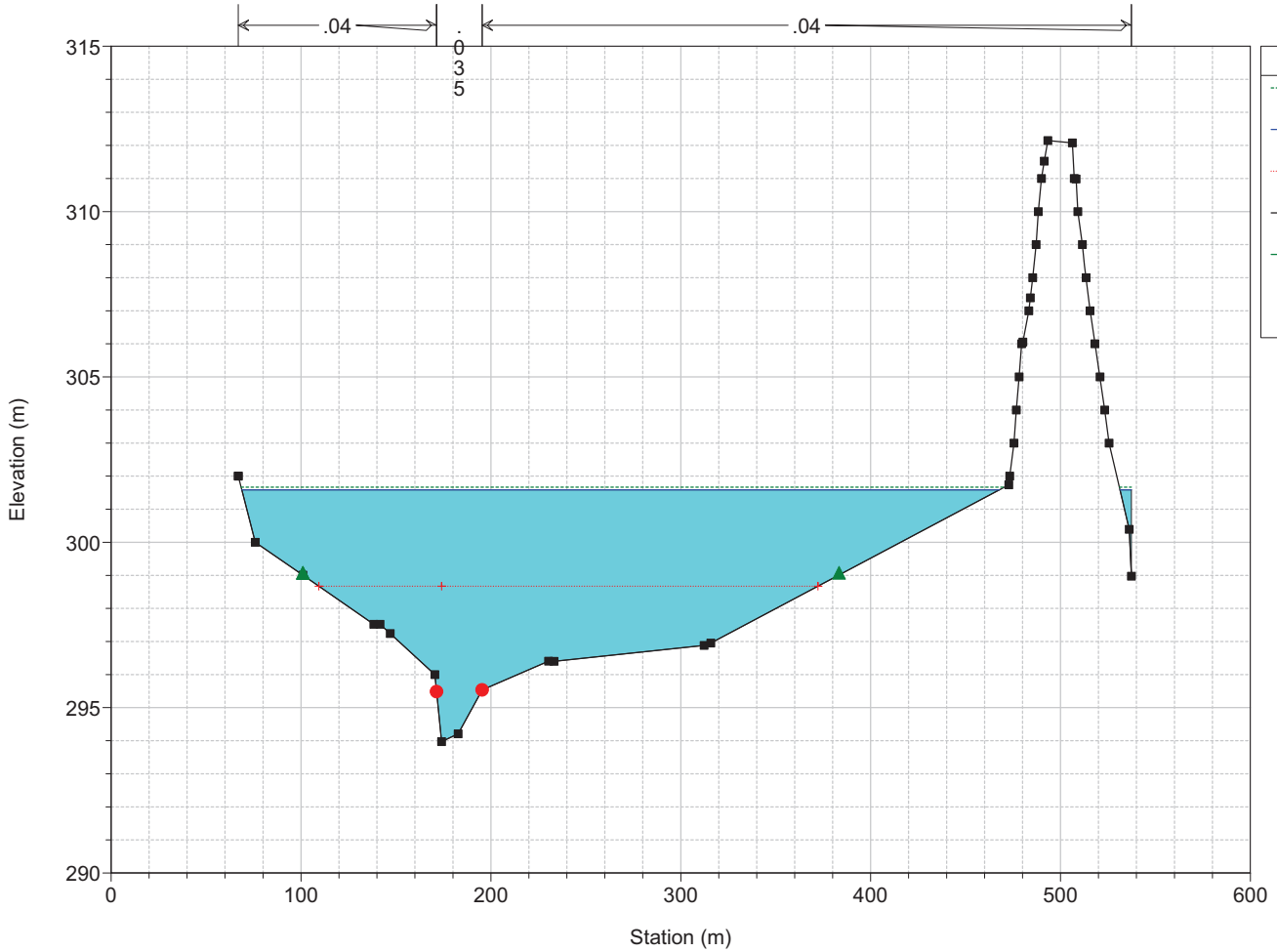
River = SALSO Reach = SALSO RS = 13



Legend	
EG PF 1	---
WS PF 1	—
Ground	■
Bank Sta	●

ANTE OPERAM_SALSO

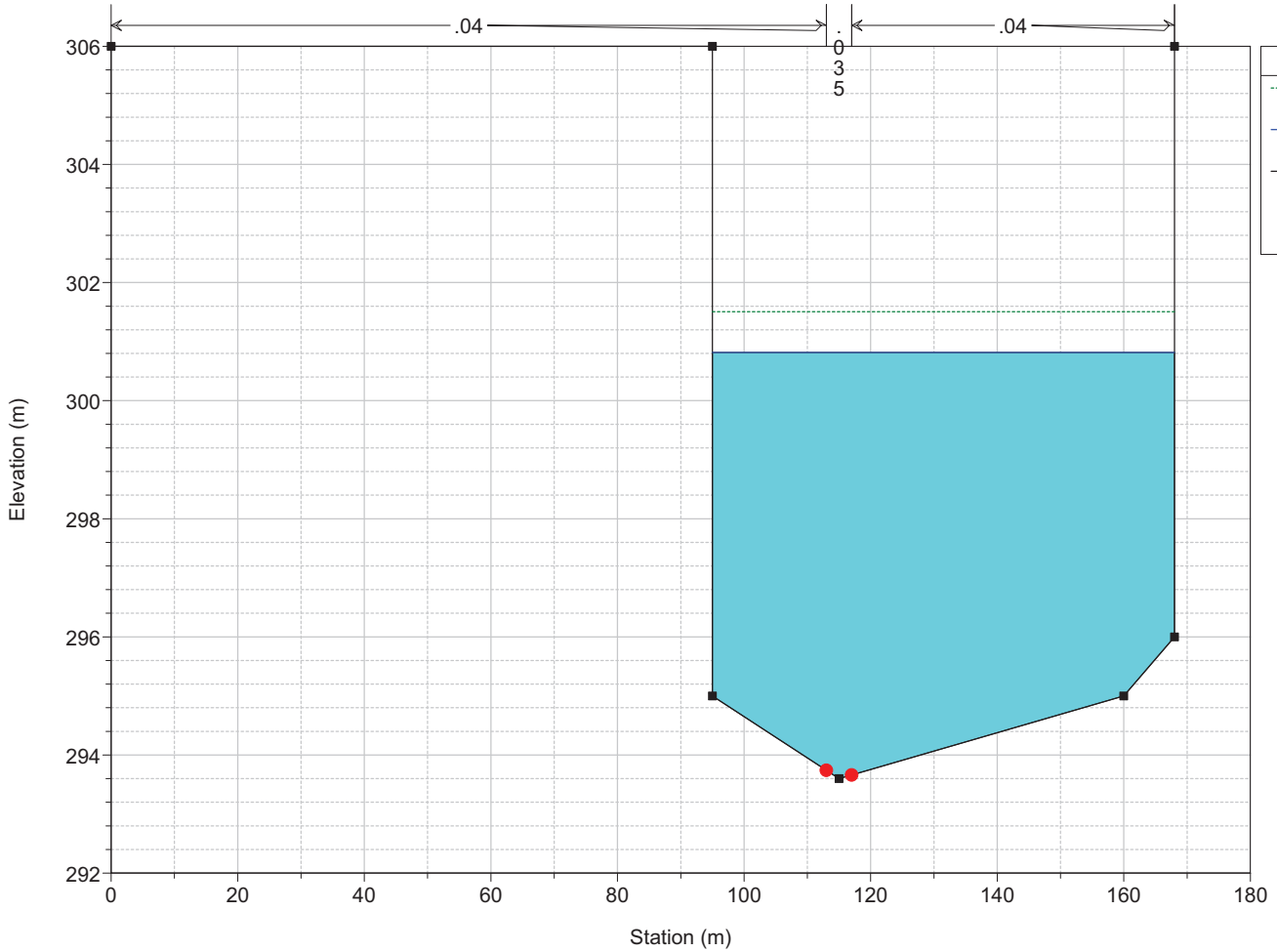
River = SALSO Reach = SALSO RS = 12



Legend	
EG PF 1	---
WS PF 1	—
Crit PF 1	- - - +
Ground	■
Ineff	▲
Bank Sta	●

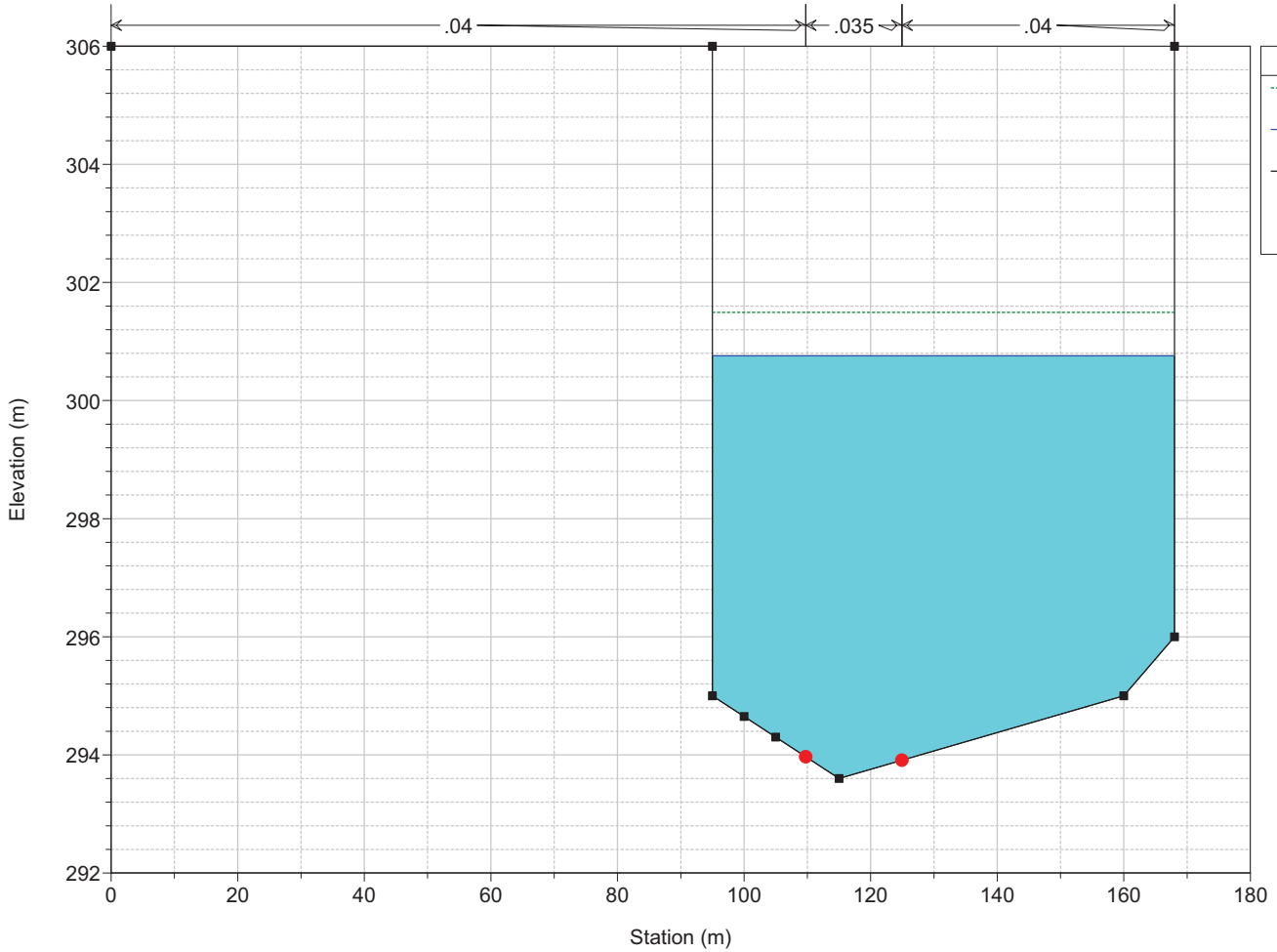
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 11



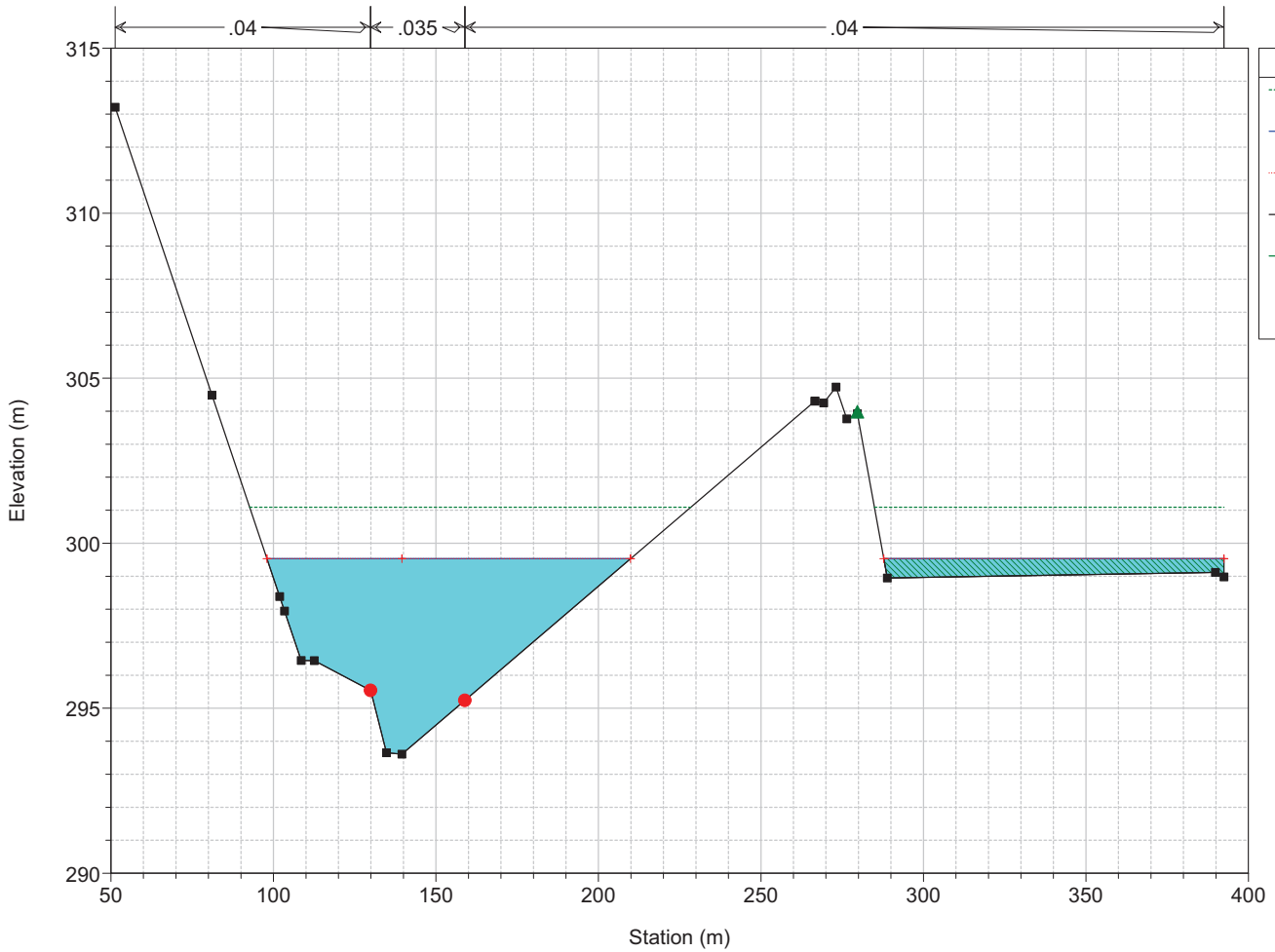
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 10



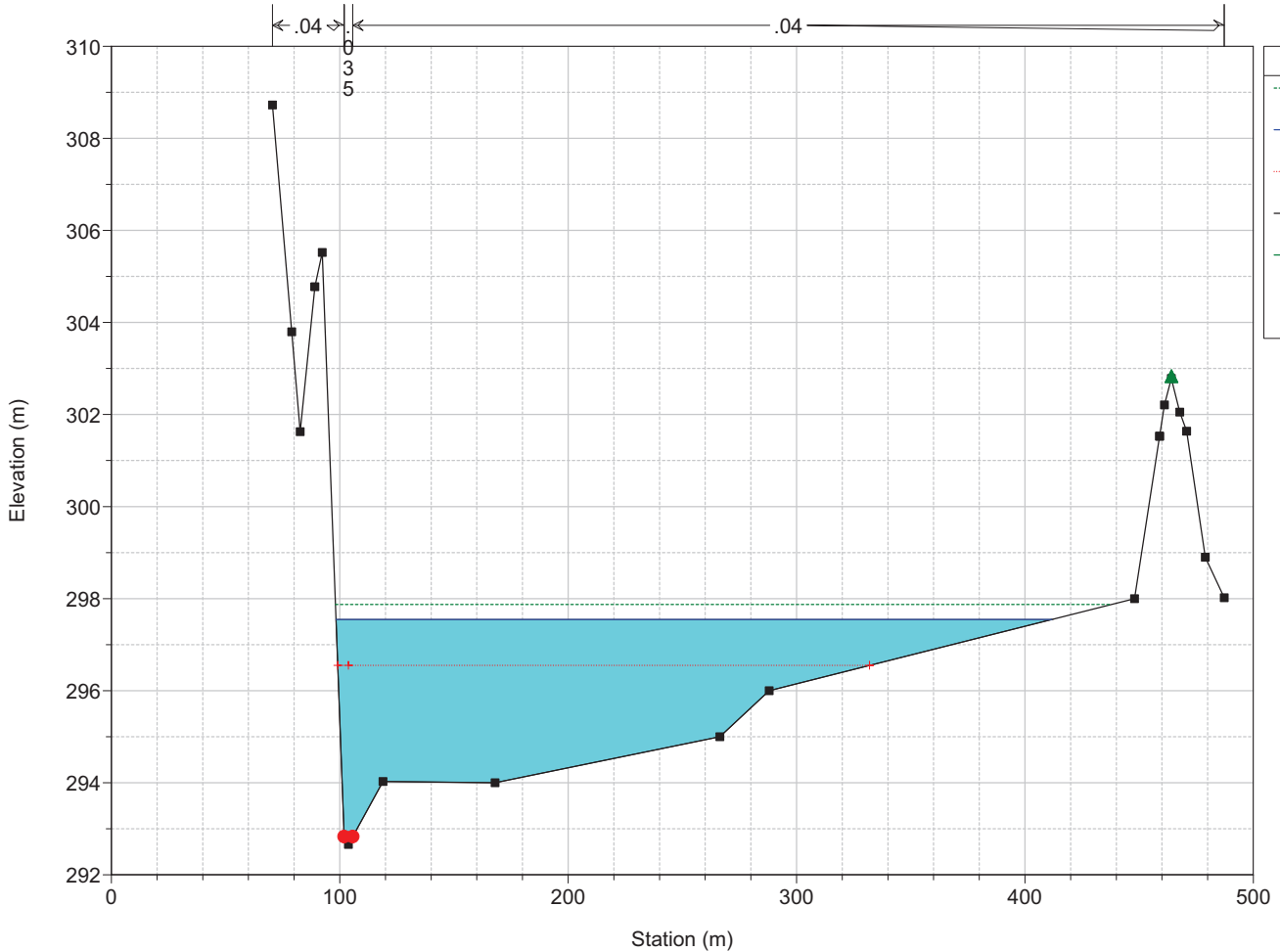
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 9



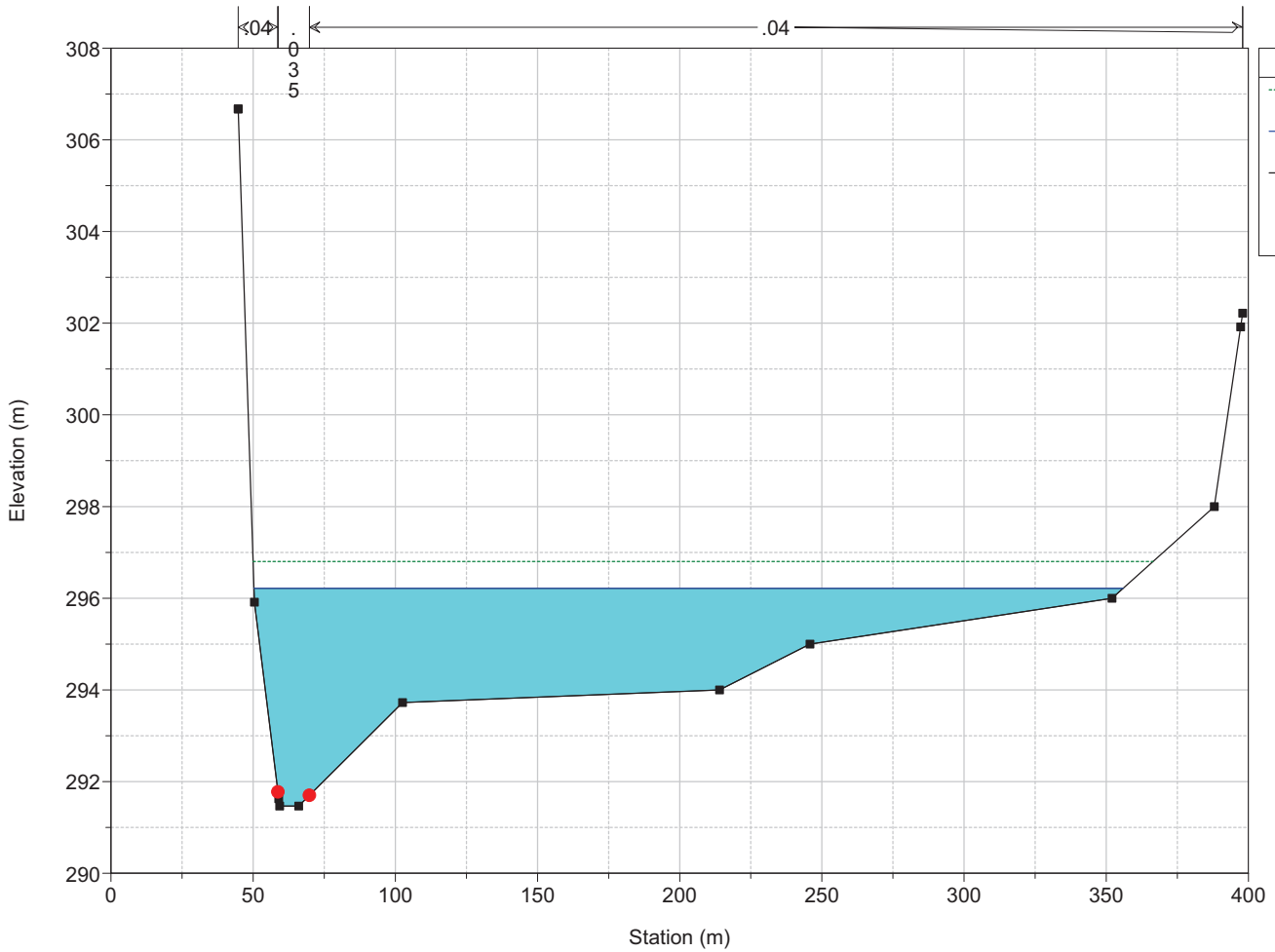
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 8 IMMISSIONE VALLONE ARENELLA



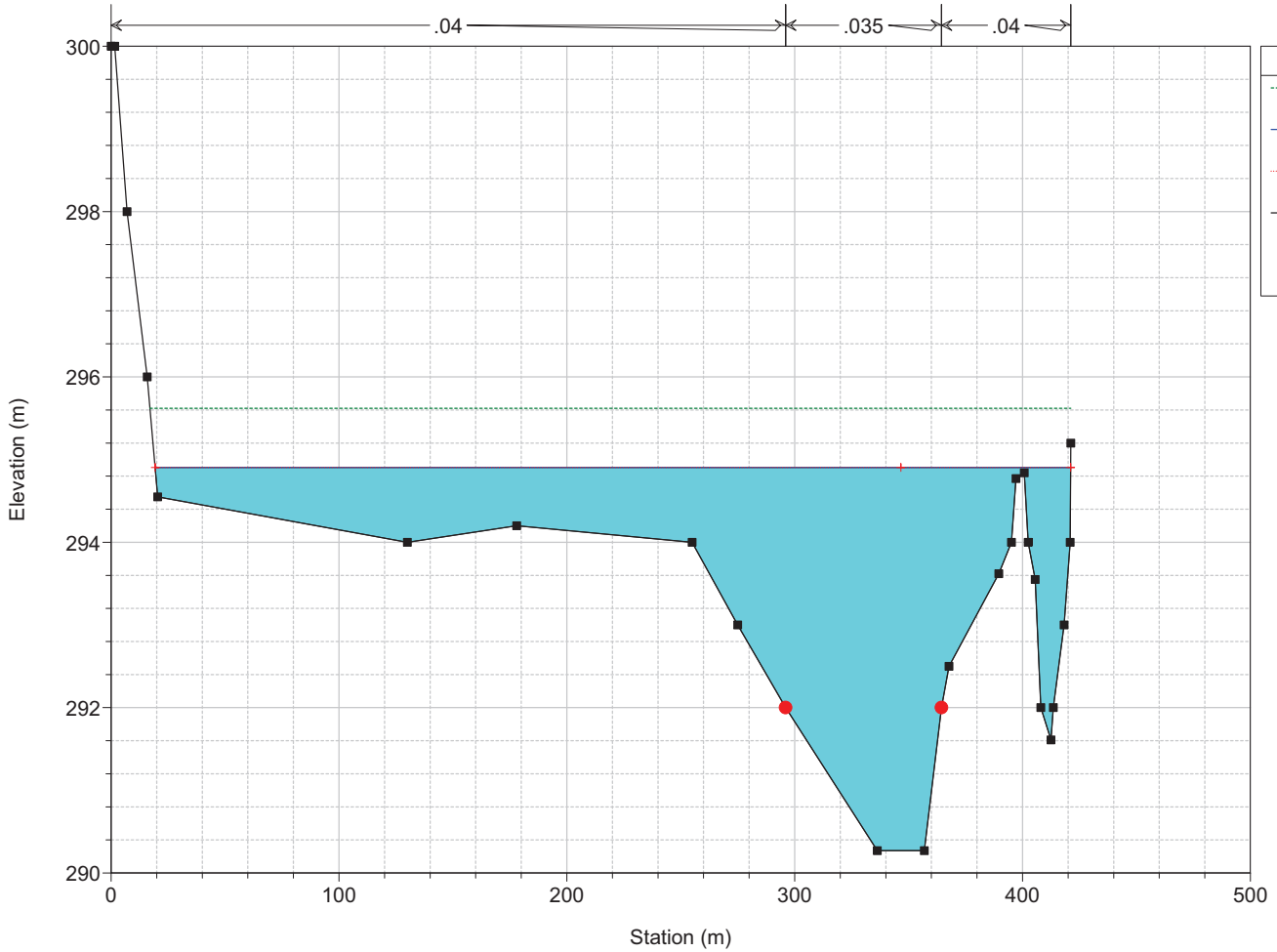
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 7



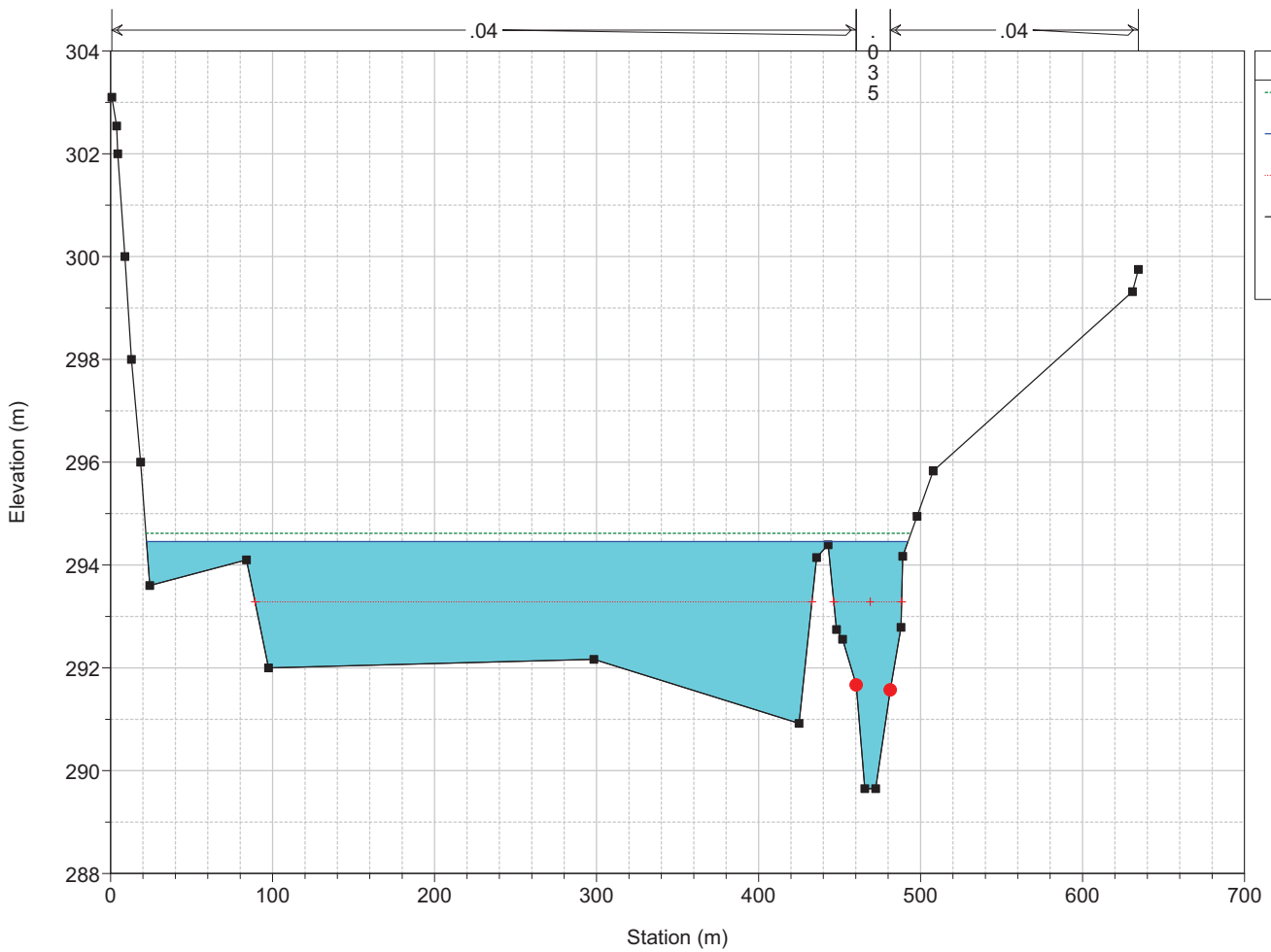
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 6



ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 5

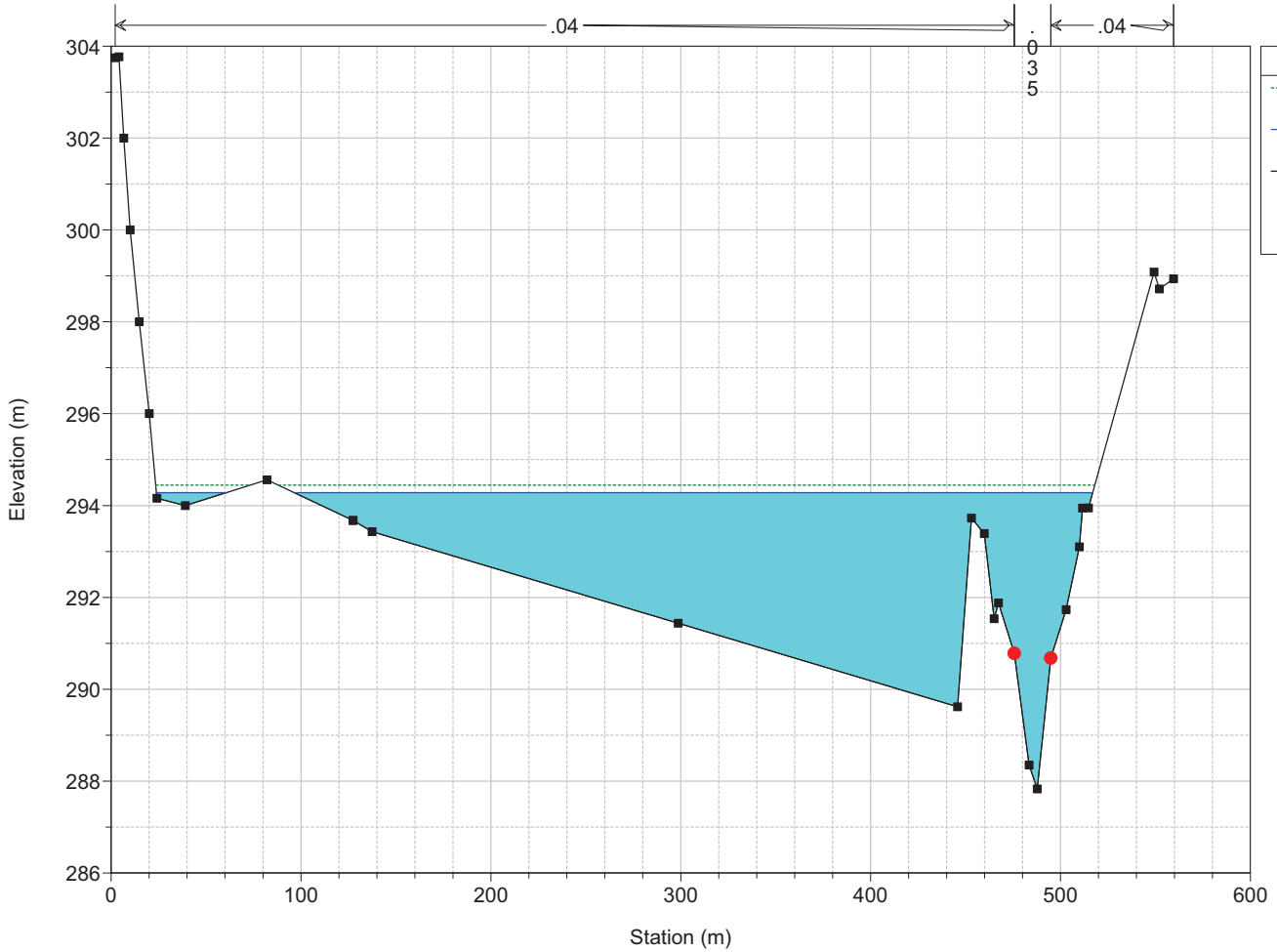


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 4

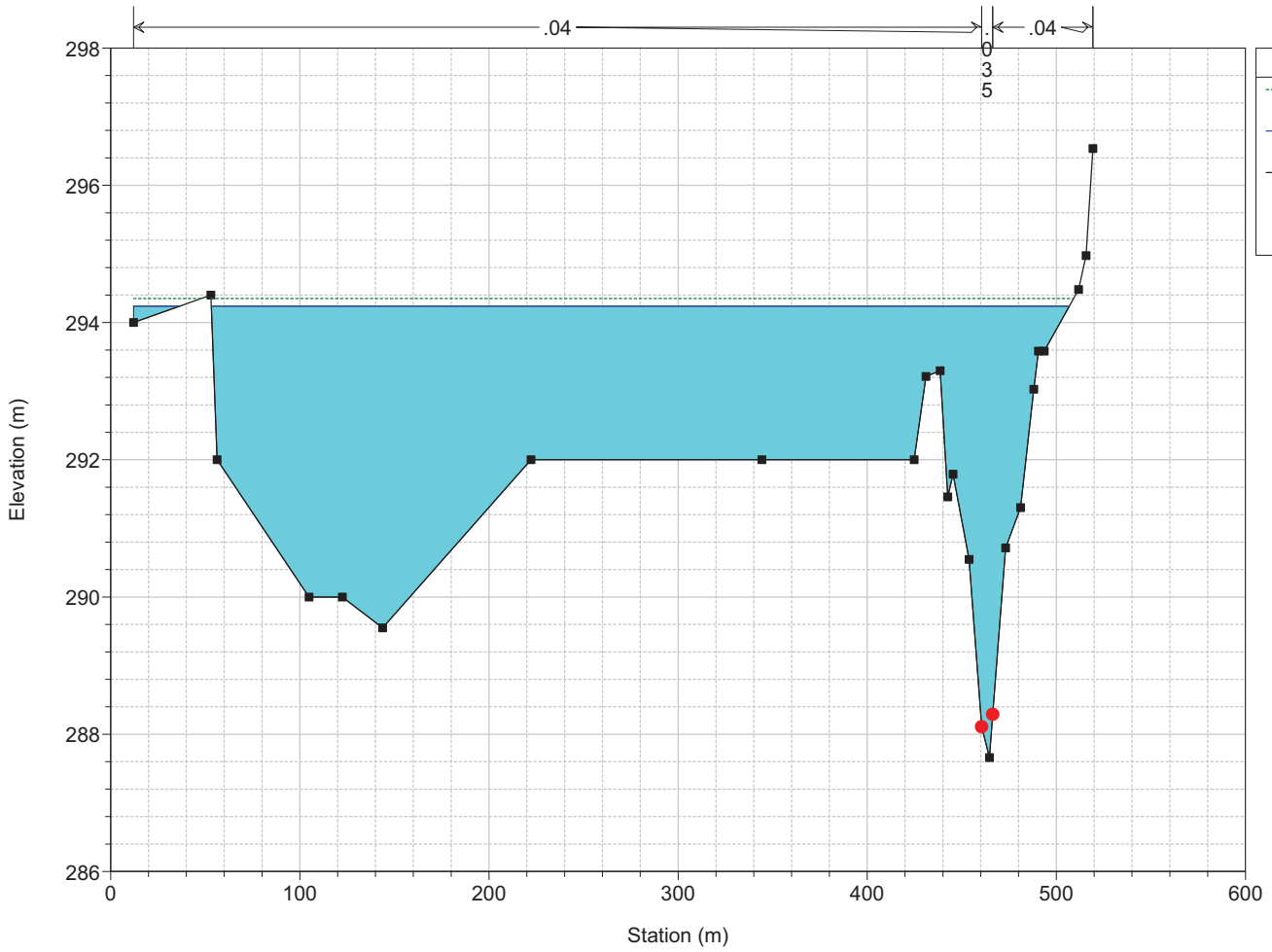


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

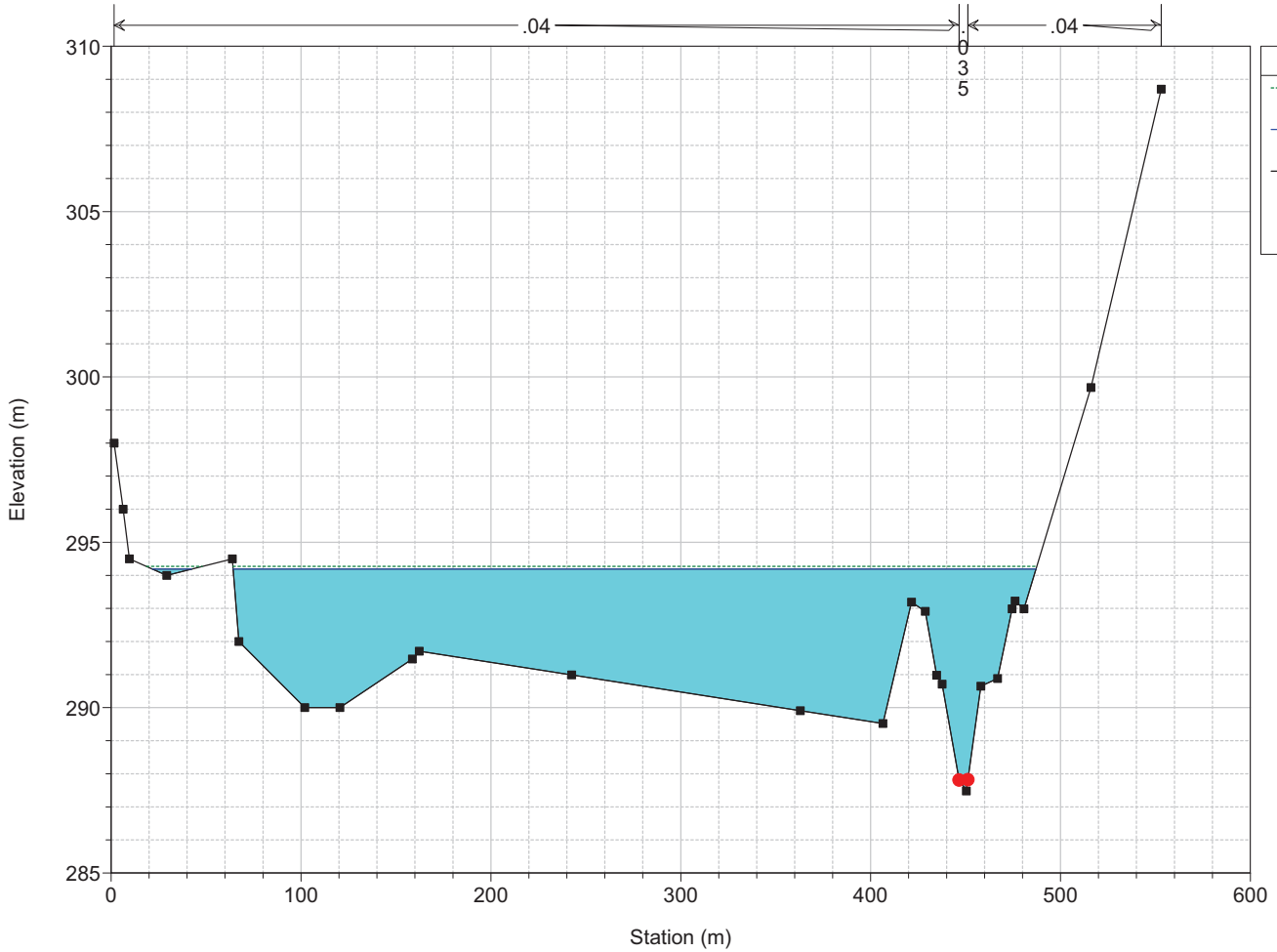
ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 3

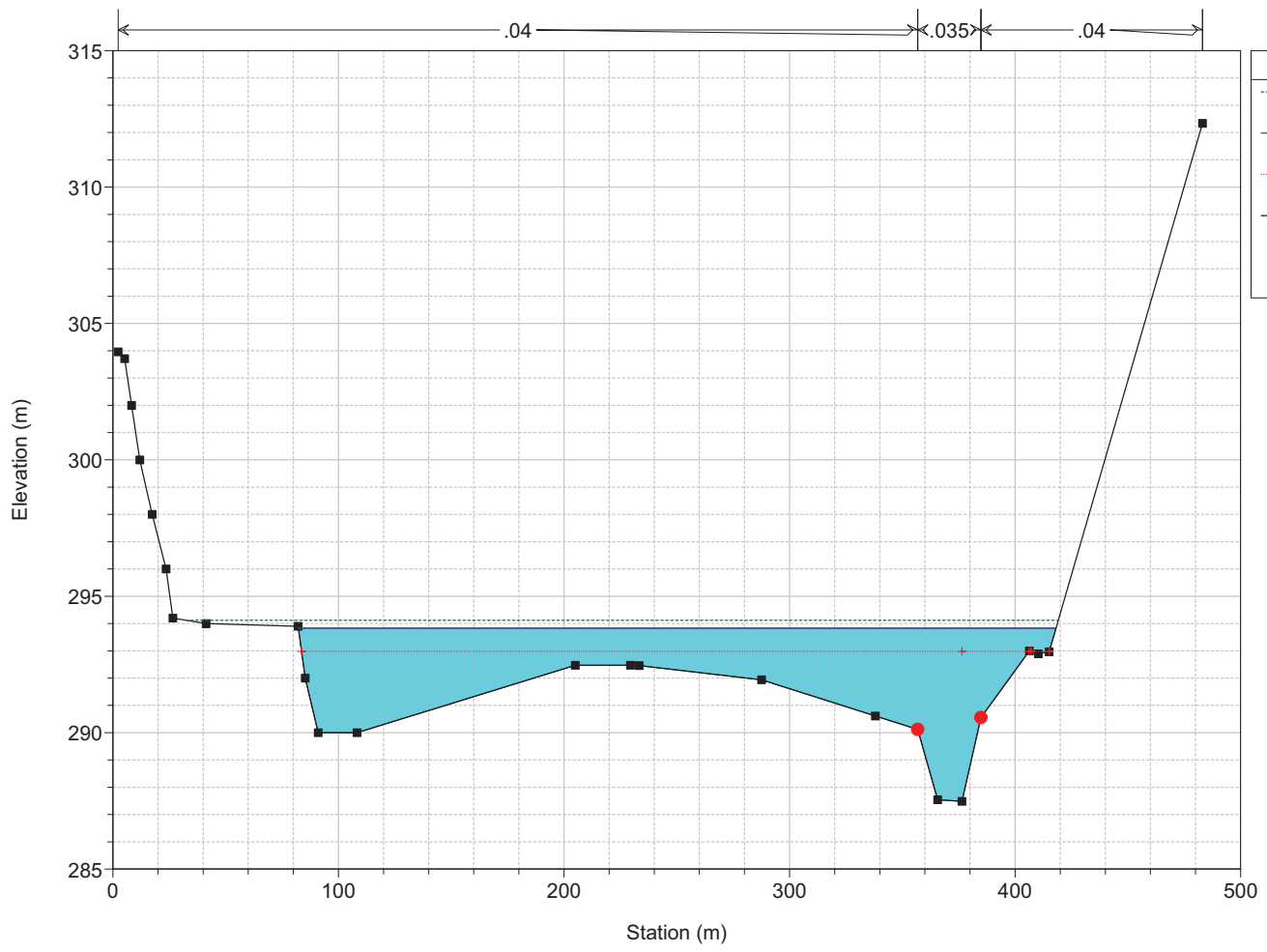


ANTE OPERAM_SALSO

River = SALSO Reach = SALSO RS = 2



ANTE OPERAM_SALSO
River = SALSO Reach = SALSO RS = 1 VALLE

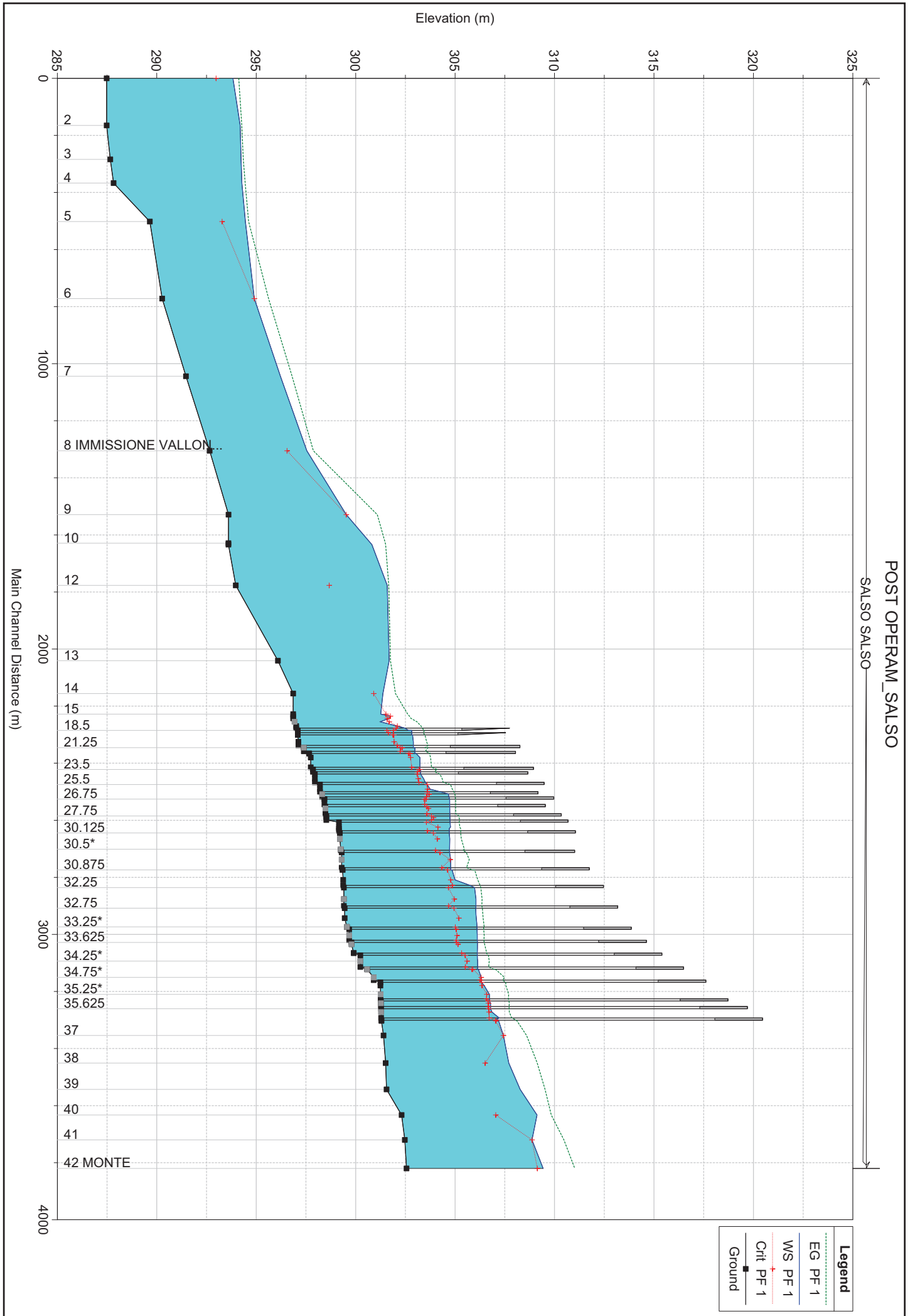


River: SALSO Reach: SALSO POST OPERAM

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Hydr Radius (m)	Hydr Radius C (m)
SALSO	42	1690.24	302.56	309.43	309.14	311.02	0.004792	6.97	352.22	91.64	0.86	3.73	6.61
SALSO	41	1690.24	302.47	308.87	308.87	310.47	0.006152	7.64	340.53	94.77	0.97	3.52	6.29
SALSO	40	1690.24	302.31	309.12	307.05	309.83	0.002348	4.93	475.91	98.39	0.61	4.67	6.72
SALSO	39	1690.24	301.55	308.27		309.52	0.003605	6.06	380.60	86.45	0.75	4.19	6.64
SALSO	38	1690.24	301.51	307.70	306.51	309.13	0.004669	6.52	393.15	128.75	0.84	2.96	6.10
SALSO	37	1690.24	301.40	307.43	307.43	308.59	0.004717	6.41	463.14	195.72	0.84	2.34	5.90
SALSO	36	1690.24	301.29	307.19	307.05	308.11	0.004022	5.81	498.96	197.63	0.77	2.49	5.74
SALSO	35.875	Bridge											
SALSO	35.75*	1690.24	301.28	306.85	306.71	307.73	0.005869	6.04	444.44	188.17	0.82	2.34	5.39
SALSO	35.625	Bridge											
SALSO	35.5*	1690.24	301.27	306.78	306.67	307.73	0.005581	6.08	448.07	183.41	0.83	2.42	5.44
SALSO	35.375	Bridge											
SALSO	35.25*	1690.24	301.25	306.73	306.59	307.70	0.004594	5.79	461.58	178.57	0.79	2.56	5.39
SALSO	35	1690.24	301.24	306.46	306.35	307.55	0.004280	5.50	444.72	171.47	0.78	2.55	5.05
SALSO	34.875	Bridge											
SALSO	34.75*	1690.24	300.91	306.31	306.31	307.48	0.005223	6.32	439.93	179.73	0.87	2.42	5.36
SALSO	34.5*	1690.24	300.57	306.17	305.89	307.03	0.004573	6.08	499.32	205.84	0.82	2.41	5.59
SALSO	34.375	Bridge											
SALSO	34.25*	1690.24	300.24	306.13	305.60	306.72	0.003610	5.59	572.64	227.91	0.74	2.49	5.88
SALSO	34.125	Bridge											
SALSO	34	1690.24	299.90	306.11		306.59	0.002278	4.60	666.92	247.02	0.59	2.67	6.20
SALSO	33.75*	1690.24	299.79	306.13	305.15	306.48	0.002194	4.56	712.38	264.15	0.58	2.68	6.29
SALSO	33.625	Bridge											
SALSO	33.5*	1690.24	299.67	306.12	305.10	306.46	0.001930	4.32	748.72	279.88	0.54	2.66	6.38
SALSO	33.375	Bridge											
SALSO	33.25*	1690.24	299.56	306.10		306.46	0.001804	4.22	770.12	295.44	0.53	2.59	6.49
SALSO	33	1690.24	299.45	306.06	305.19	306.41	0.001558	3.93	806.13	306.81	0.49	2.61	6.51
SALSO	32.75	Bridge											
SALSO	32.5*	1690.24	299.41	306.05	304.96	306.36	0.001754	3.83	774.84	300.29	0.48	2.57	6.49
SALSO	32.25	Bridge											
SALSO	32	1690.24	299.37	305.00	304.78	306.14	0.004535	6.02	473.53	215.47	0.81	2.18	5.54
SALSO	31	1690.24	299.34	304.85	304.62	305.98	0.004041	5.61	468.02	211.13	0.77	2.19	5.44
SALSO	30.875	Bridge											
SALSO	30.75*	1690.24	299.30	304.78	304.75	305.71	0.003713	5.38	521.20	243.90	0.74	2.12	5.43
SALSO	30.625	Bridge											
SALSO	30.5*	1690.24	299.25	304.72		305.47	0.003268	5.05	554.52	227.65	0.69	2.42	5.44
SALSO	30.25*	1690.24	299.21	304.73	304.10	305.31	0.002628	4.57	578.24	202.60	0.62	2.83	5.51
SALSO	30.125	Bridge											
SALSO	30	1690.24	299.16	304.71		305.28	0.002045	3.97	579.26	175.87	0.55	3.26	5.38
SALSO	29	1690.24	299.16	304.77	304.14	305.24	0.001730	3.69	696.18	281.47	0.50	2.45	5.48
SALSO	28.5	Bridge											
SALSO	28	1690.24	298.52	304.75	303.91	305.21	0.001843	3.80	697.28	267.06	0.51	2.58	5.46

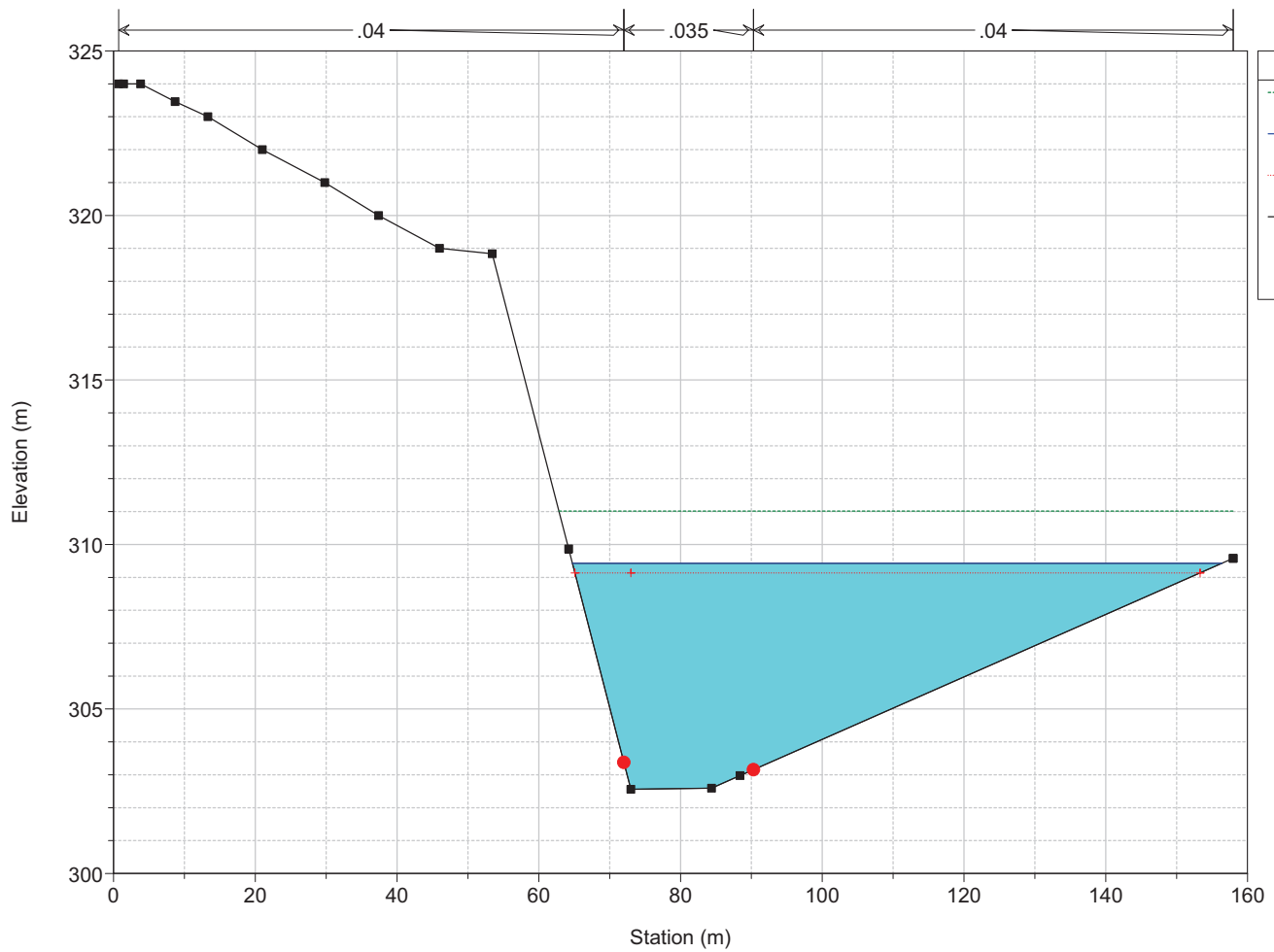
River: SALSO Reach: SALSO POST OPERAM

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl	Hydr Radius (m)	Hydr Radius C (m)
SALSO	27.75	Bridge											
SALSO	27.5*	1690.24	298.48	304.73	303.66	305.03	0.001708	3.92	797.73	294.45	0.51	2.69	6.05
SALSO	27.25	Bridge											
SALSO	27	1690.24	298.43	304.73	303.53	305.02	0.001401	3.54	853.57	322.41	0.46	2.62	6.02
SALSO	26.75	Bridge											
SALSO	26.5*	1690.24	298.32	304.66	303.69	304.99	0.001883	4.20	789.68	313.77	0.54	2.49	6.23
SALSO	26.25	Bridge											
SALSO	26	1690.24	298.21	303.75	303.61	304.86	0.004985	6.09	448.10	270.57	0.84	2.12	5.25
SALSO	25.5	Bridge											
SALSO	25	1690.24	297.95	303.41	303.14	304.35	0.004260	5.57	478.38	250.30	0.78	2.28	5.16
SALSO	24.5	Bridge											
SALSO	24	1690.24	297.85	303.26	303.18	304.06	0.004607	5.63	517.42	243.03	0.78	2.09	4.94
SALSO	23.5	Bridge											
SALSO	23	1690.24	297.74	303.23	302.76	303.77	0.003669	5.01	631.17	305.84	0.70	2.04	4.93
SALSO	22	1690.24	297.66	303.04	302.66	303.71	0.003472	4.71	544.63	282.93	0.69	2.49	4.68
SALSO	21.75	Bridge											
SALSO	21.5*	1690.24	297.39	302.98	302.34	303.63	0.003520	5.16	581.37	258.17	0.71	2.23	5.32
SALSO	21.25	Bridge											
SALSO	21	1690.24	297.12	302.90	301.93	303.56	0.002543	4.51	576.54	236.21	0.61	2.40	5.53
SALSO	20	1690.24	297.09	302.86	301.92	303.48	0.003016	4.65	559.15	245.93	0.65	2.24	5.11
SALSO	19.5	Bridge											
SALSO	19	1690.24	297.09	302.82	301.57	303.46	0.002951	4.70	559.38	231.80	0.65	2.37	5.27
SALSO	18.5	Bridge											
SALSO	18	1690.24	297.01	302.10	302.10	303.29	0.006279	5.91	391.13	158.40	0.91	2.43	4.22
SALSO	17.5*	1690.24	296.93	301.24	301.69	303.08	0.015196	8.02	295.59	140.51	1.25	2.09	4.20
SALSO	17	1690.24	296.86	301.69	301.59	302.78	0.005314	5.75	417.46	149.44	0.85	2.72	4.58
SALSO	16	1690.24	296.86	301.74	301.74	302.70	0.004595	5.57	470.39	193.66	0.80	2.37	4.87
SALSO	15	1690.24	296.86	301.26	301.52	302.62	0.007175	6.49	397.44	193.98	0.99	2.09	4.39
SALSO	14	1690.24	296.86	301.37	300.91	302.00	0.003241	4.44	550.99	241.28	0.67	2.54	4.50
SALSO	13	1690.24	296.09	301.68		301.75	0.000307	1.51	1525.03	429.21	0.21	3.52	5.24
SALSO	12	1690.24	293.97	301.59	298.67	301.66	0.000331	1.88	1484.33	405.06	0.23	3.63	6.88
SALSO	11	1690.24	293.60	300.82		301.51	0.002069	4.83	466.13	73.00	0.58	5.56	7.16
SALSO	10	1690.24	293.60	300.76		301.49	0.001993	4.66	461.77	73.00	0.56	5.52	6.98
SALSO	9	1690.24	293.61	299.53	299.53	301.09	0.005991	6.58	350.53	216.60	0.92	3.10	5.13
SALSO	8	1690.24	292.66	297.55	296.55	297.87	0.003218	4.60	694.11	313.39	0.67	2.20	4.78
SALSO	7	1690.24	291.47	296.22		296.80	0.005124	5.71	580.45	305.64	0.84	1.89	4.67
SALSO	6	1769.19	290.27	294.91	294.91	295.62	0.003682	4.38	622.53	401.82	0.70	1.54	4.02
SALSO	5	1769.19	289.65	294.46	293.28	294.62	0.001423	2.73	1058.93	470.08	0.43	2.24	4.03
SALSO	4	1769.19	287.83	294.28		294.44	0.001162	2.82	1075.47	457.13	0.40	2.34	4.92
SALSO	3	1769.19	287.66	294.24		294.35	0.000768	2.67	1268.50	478.16	0.34	2.64	6.19
SALSO	2	1769.19	287.48	294.19		294.27	0.000457	2.11	1448.46	443.57	0.26	3.24	6.43
SALSO	1	1769.19	287.48	293.83	292.98	294.12	0.001592	3.46	862.91	335.92	0.47	2.55	5.28



POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 42 MONTE

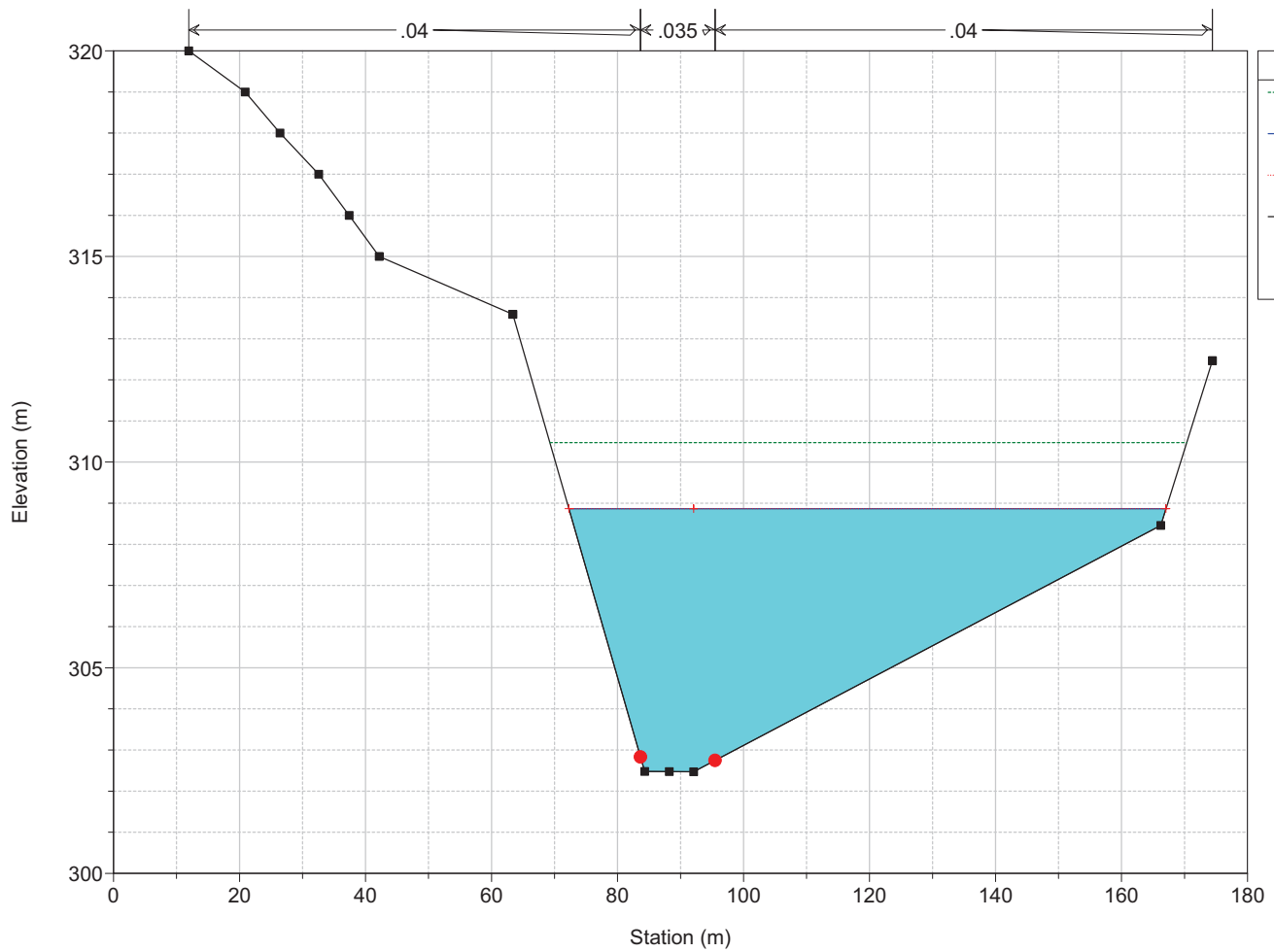


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 41

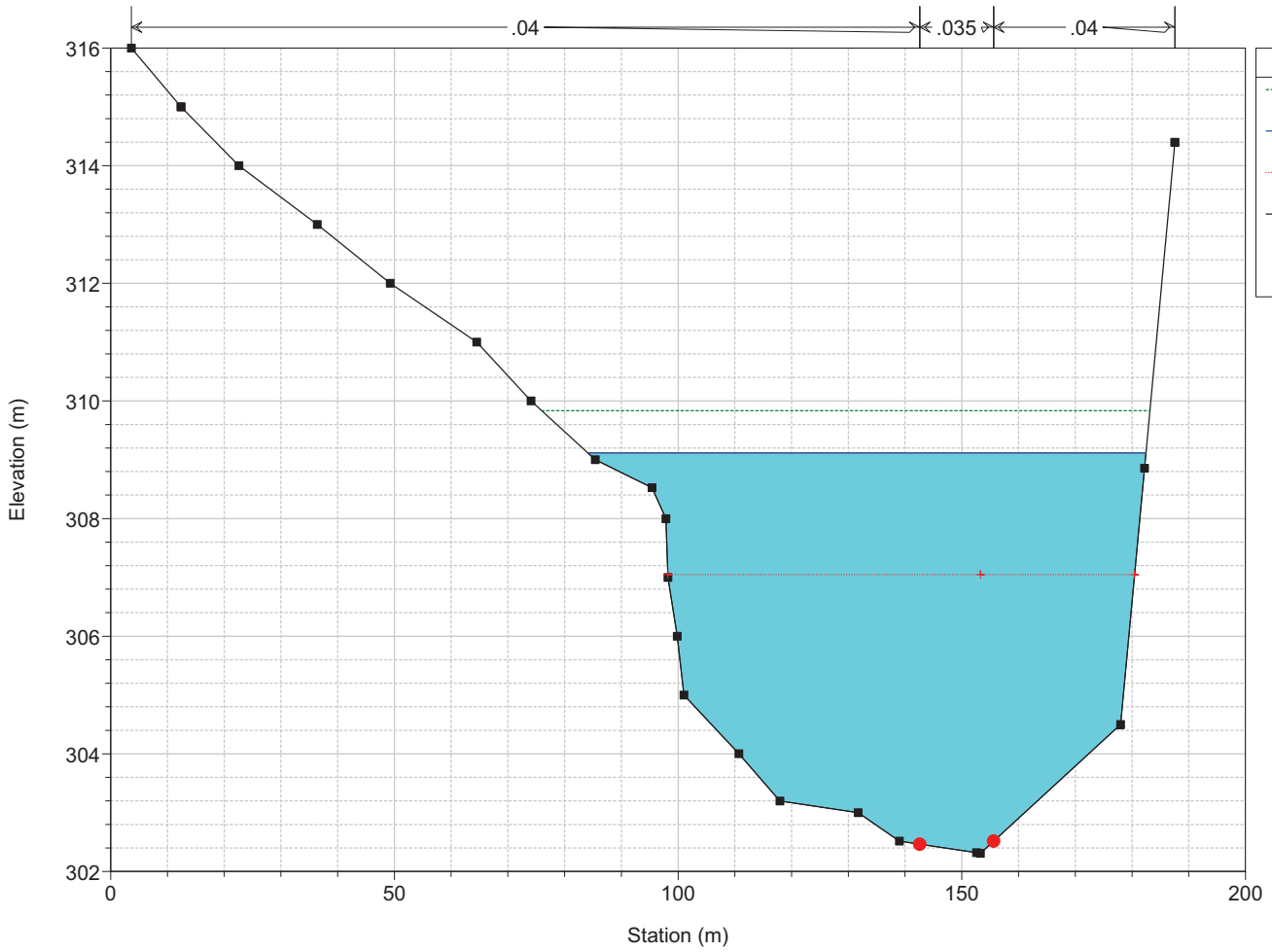


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

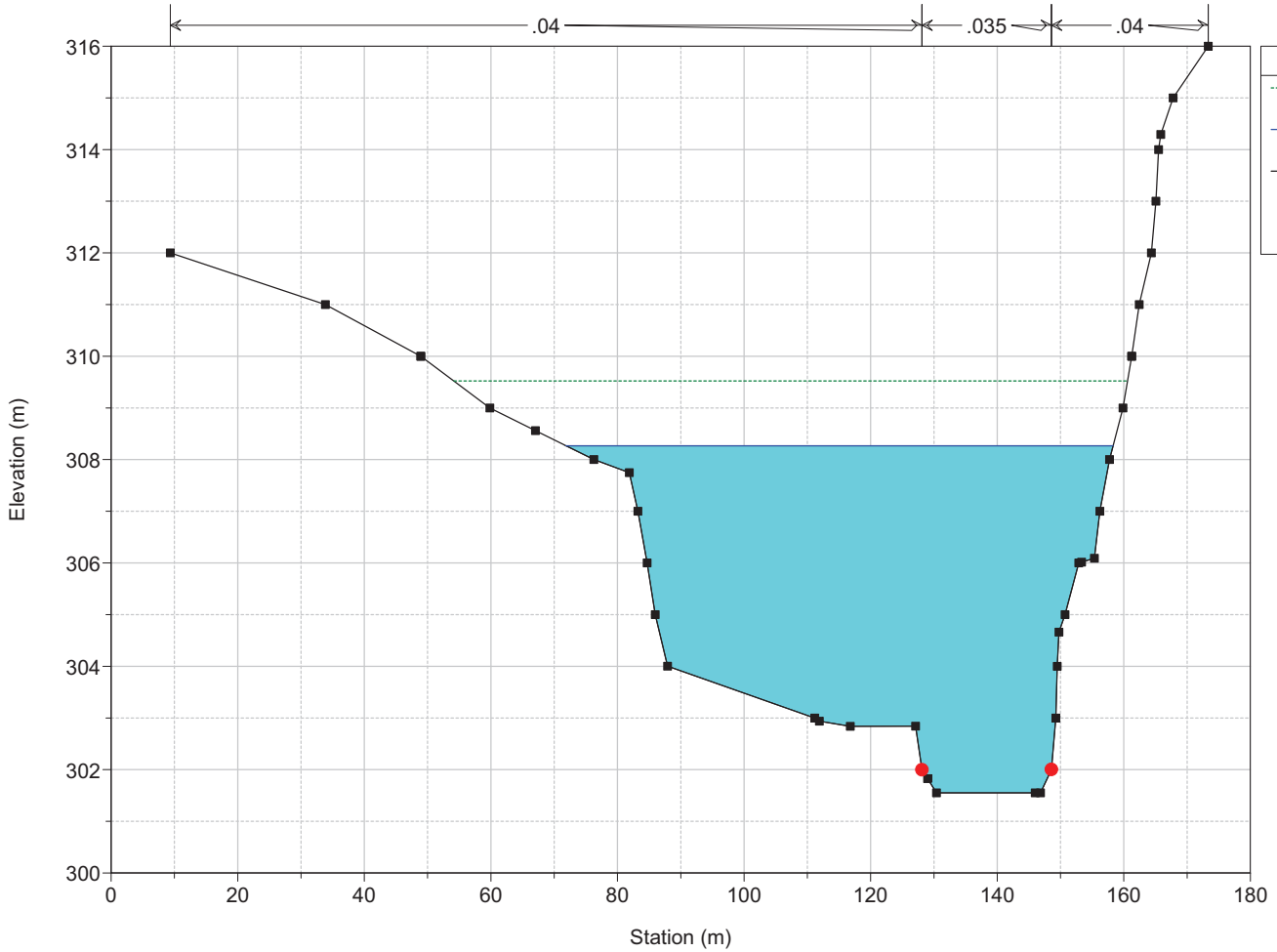
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 40



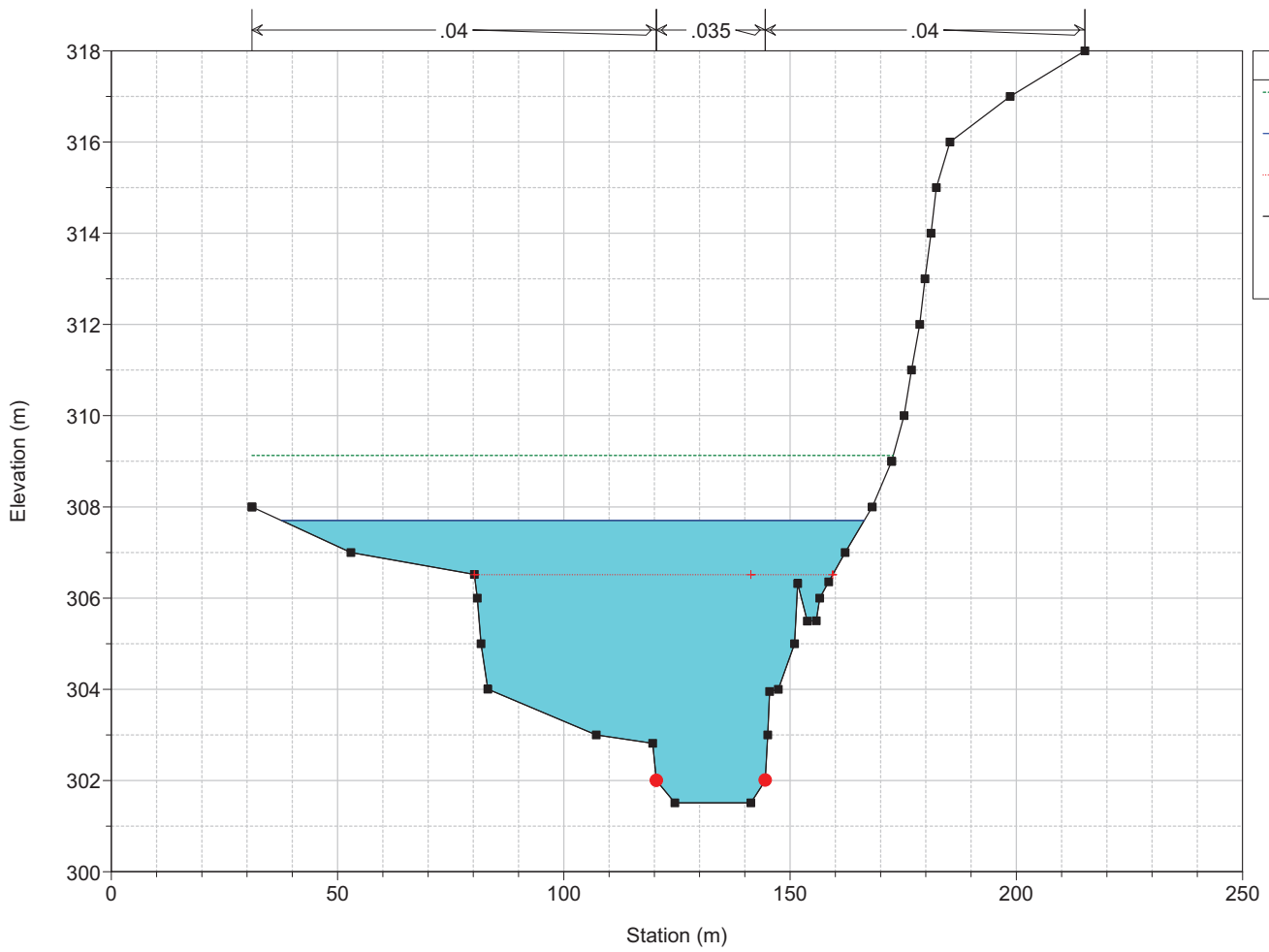
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 39



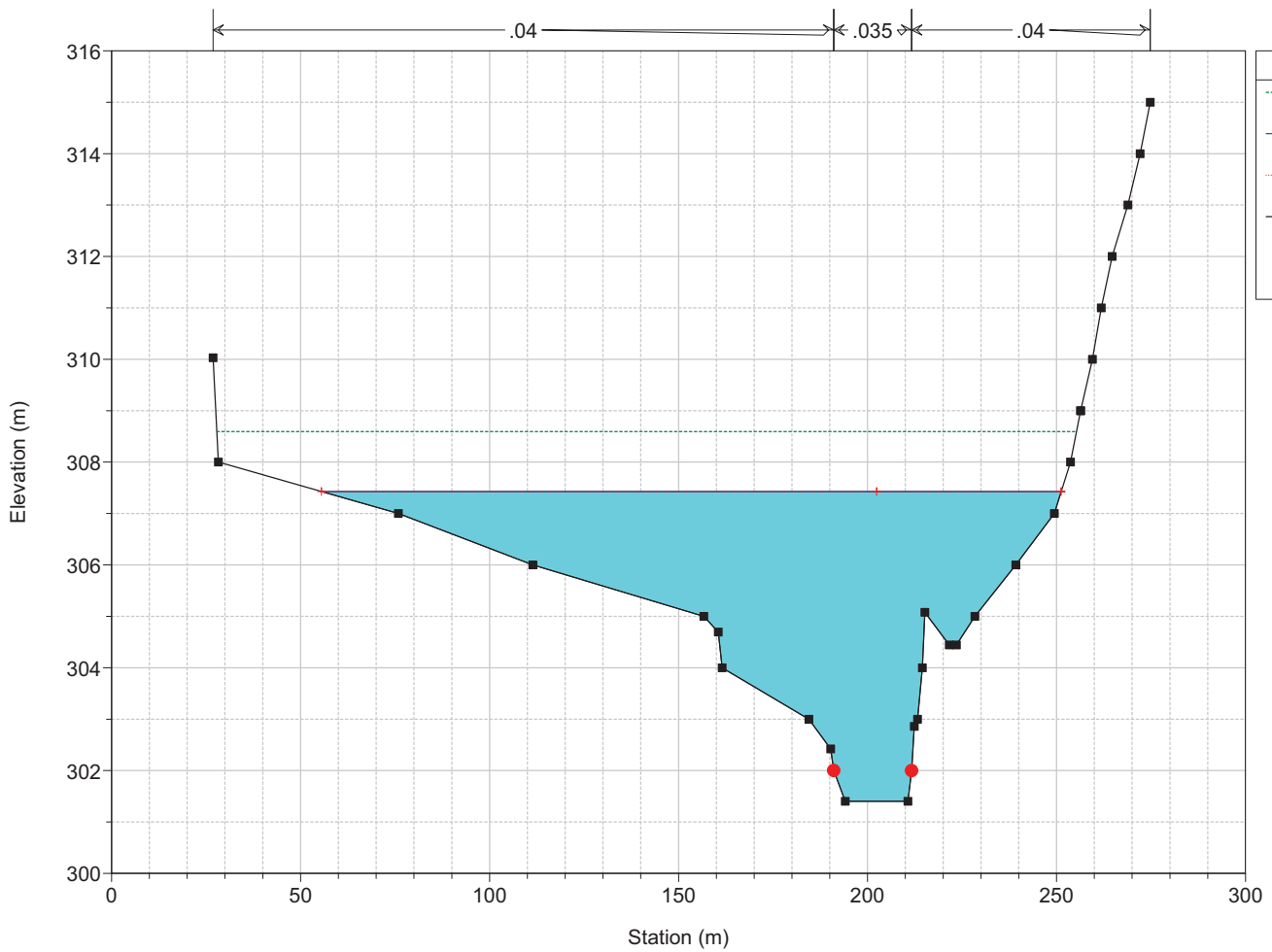
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 38



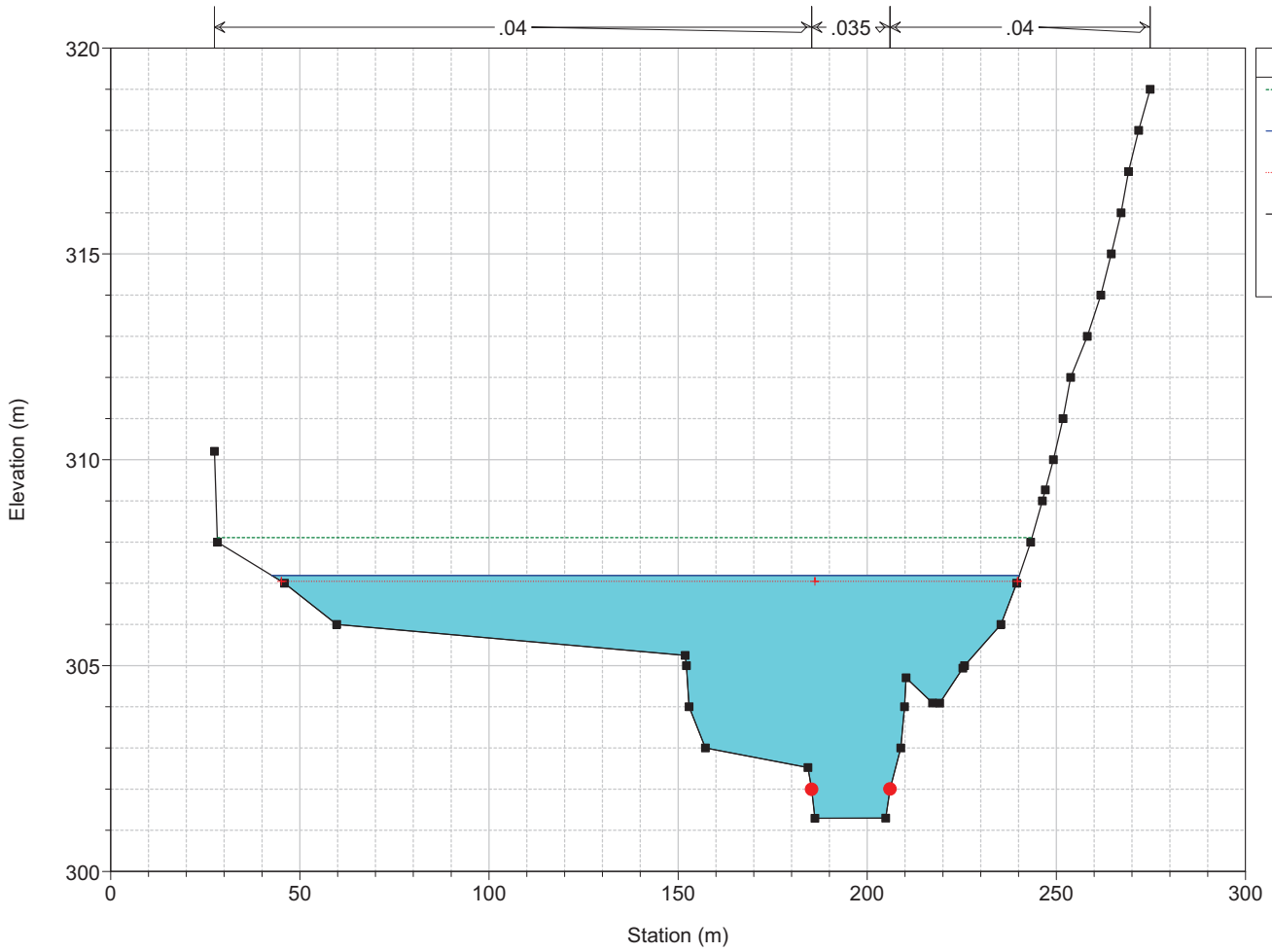
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 37



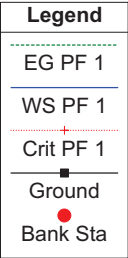
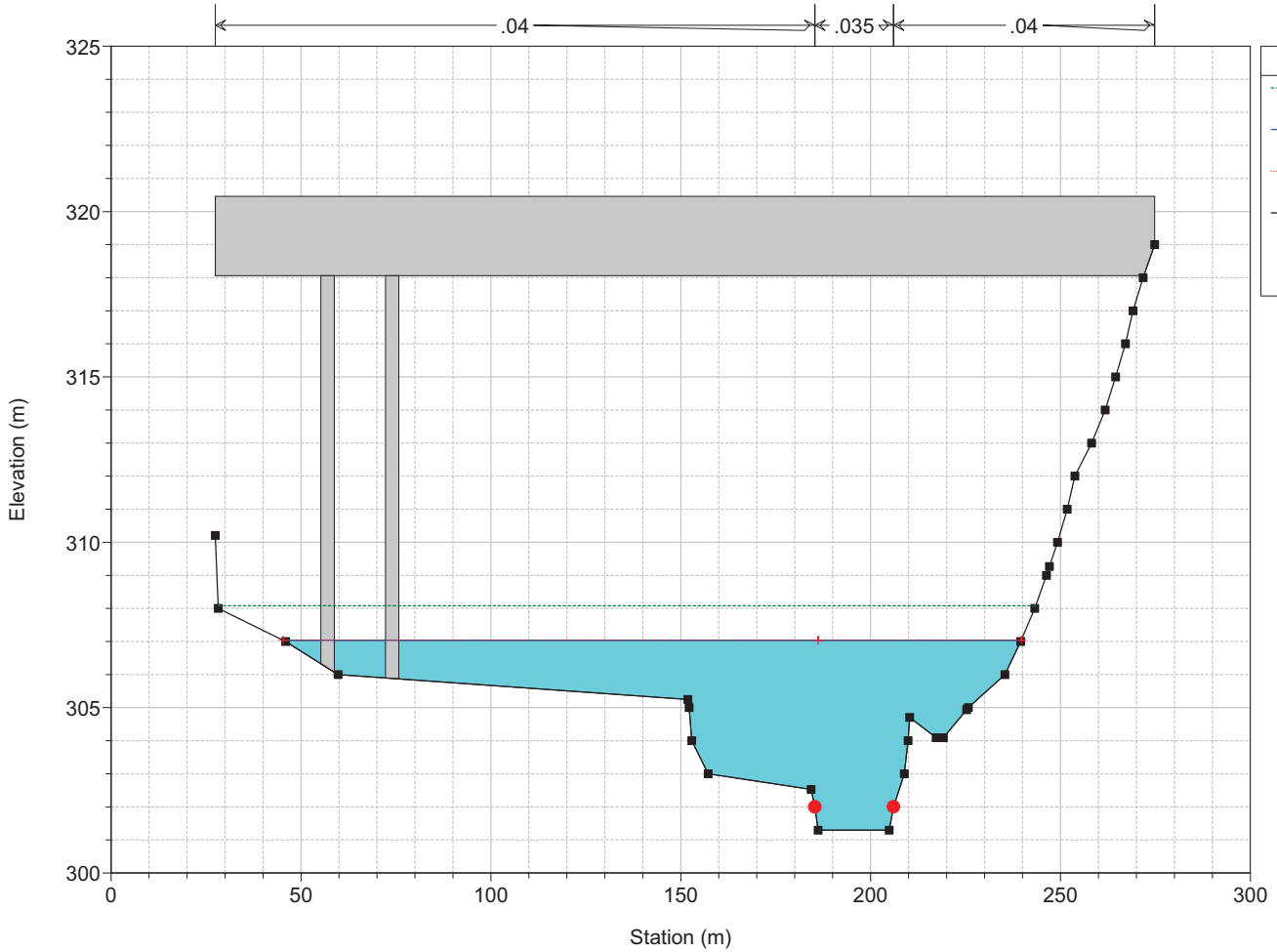
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 36



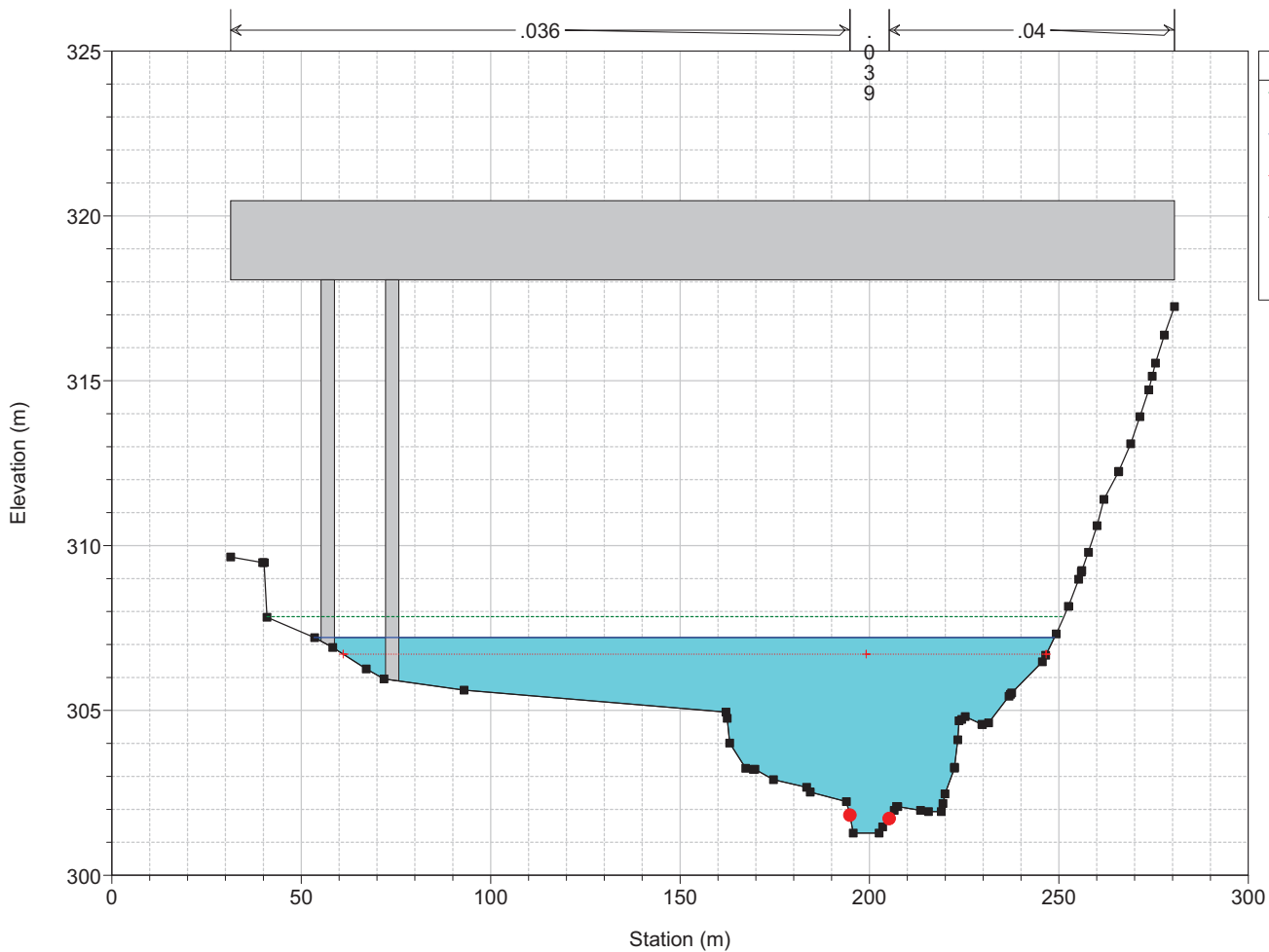
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.875 BR



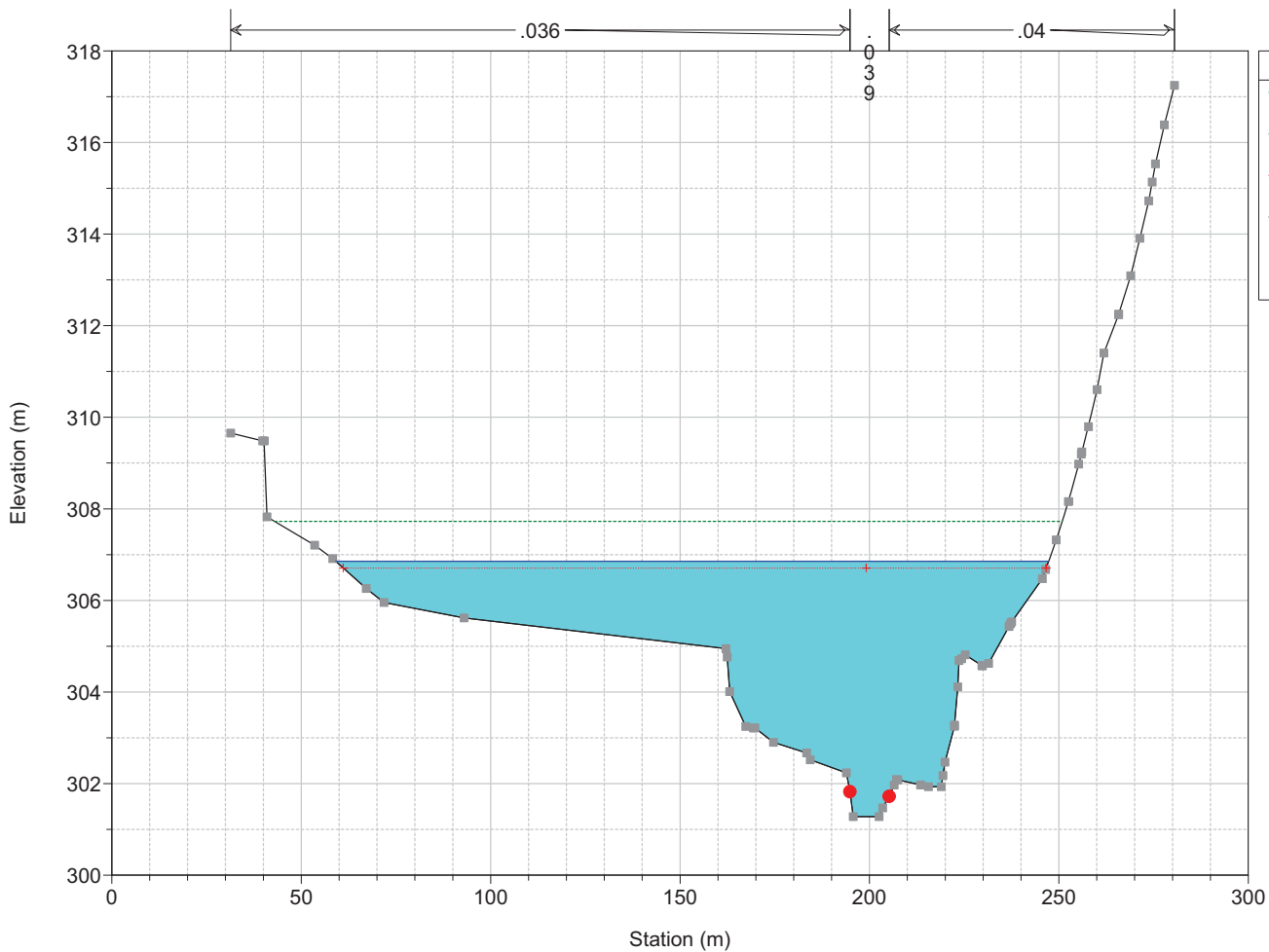
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.875 BR



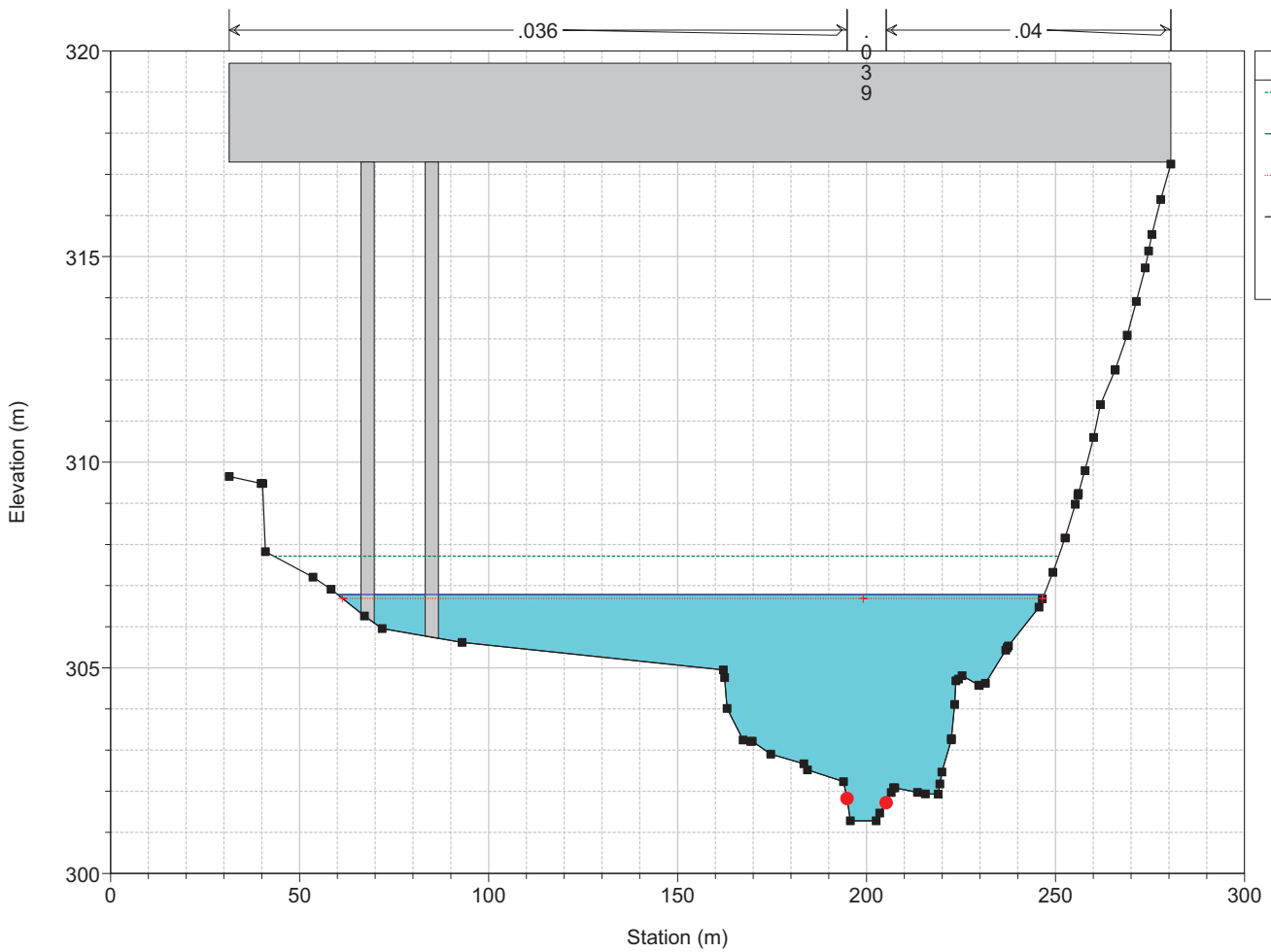
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.75*



POST OPERAM_SALSO

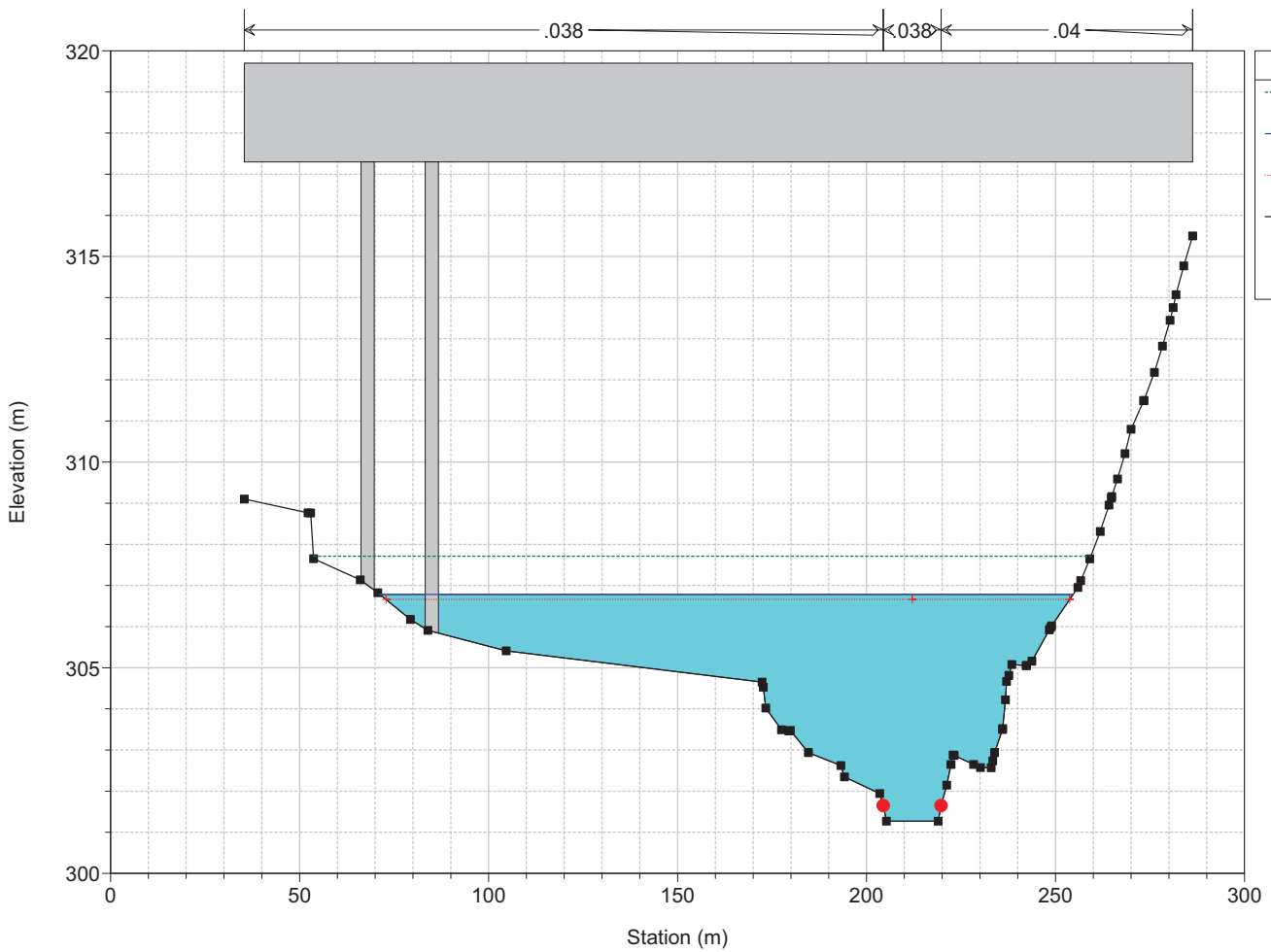
River = SALSO Reach = SALSO RS = 35.625 BR



Legend	
EG PF 1	(dotted green line)
WS PF 1	(solid blue line)
Crit PF 1	(red line with cross)
Ground	(black line with square)
Bank Sta	(red circle)

POST OPERAM_SALSO

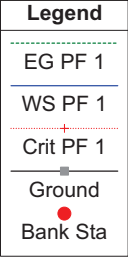
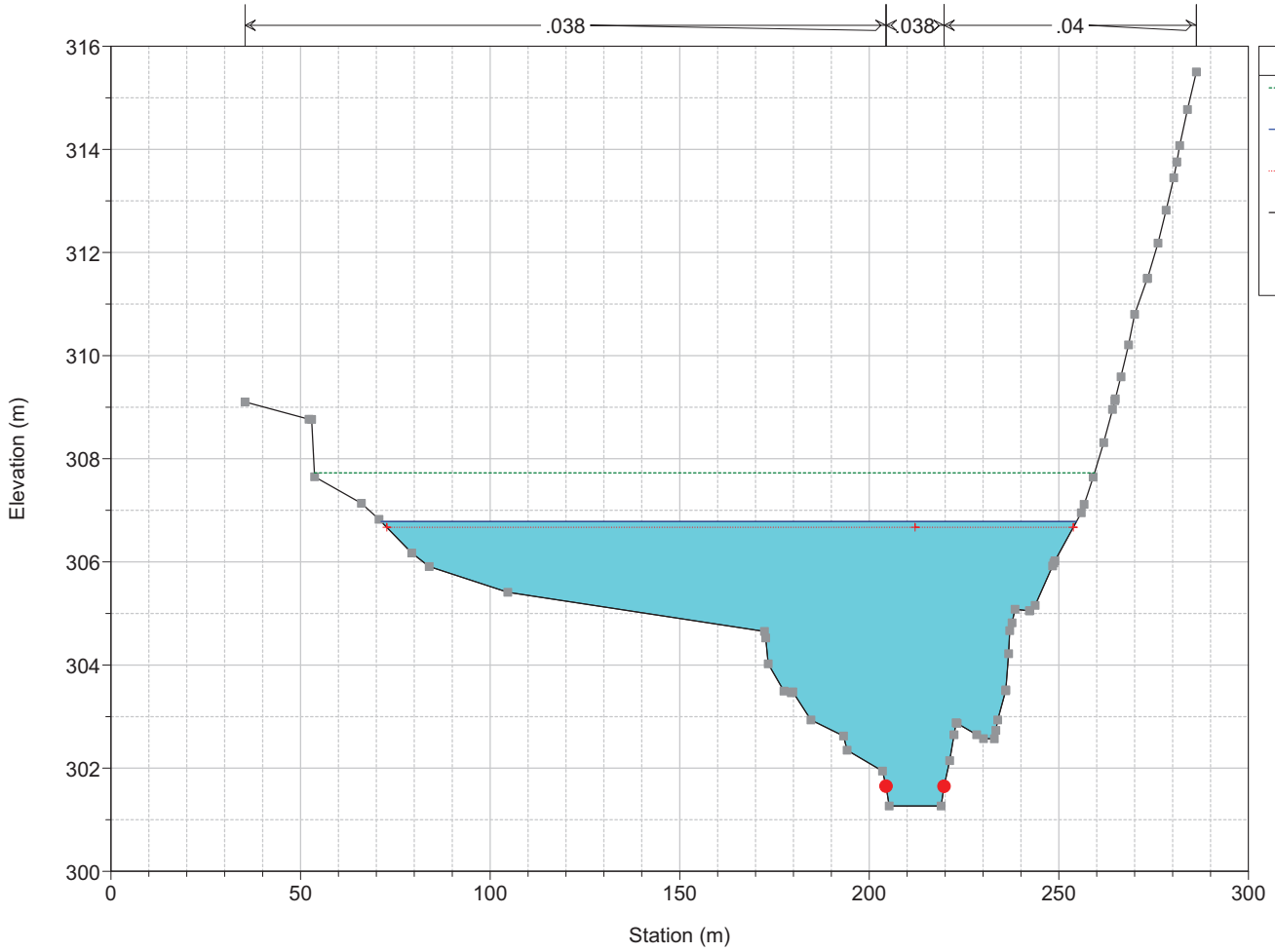
River = SALSO Reach = SALSO RS = 35.625 BR



Legend	
EG PF 1	(dotted green line)
WS PF 1	(solid blue line)
Crit PF 1	(red line with cross)
Ground	(black line with square)
Bank Sta	(red circle)

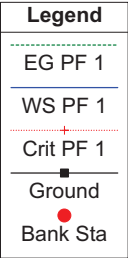
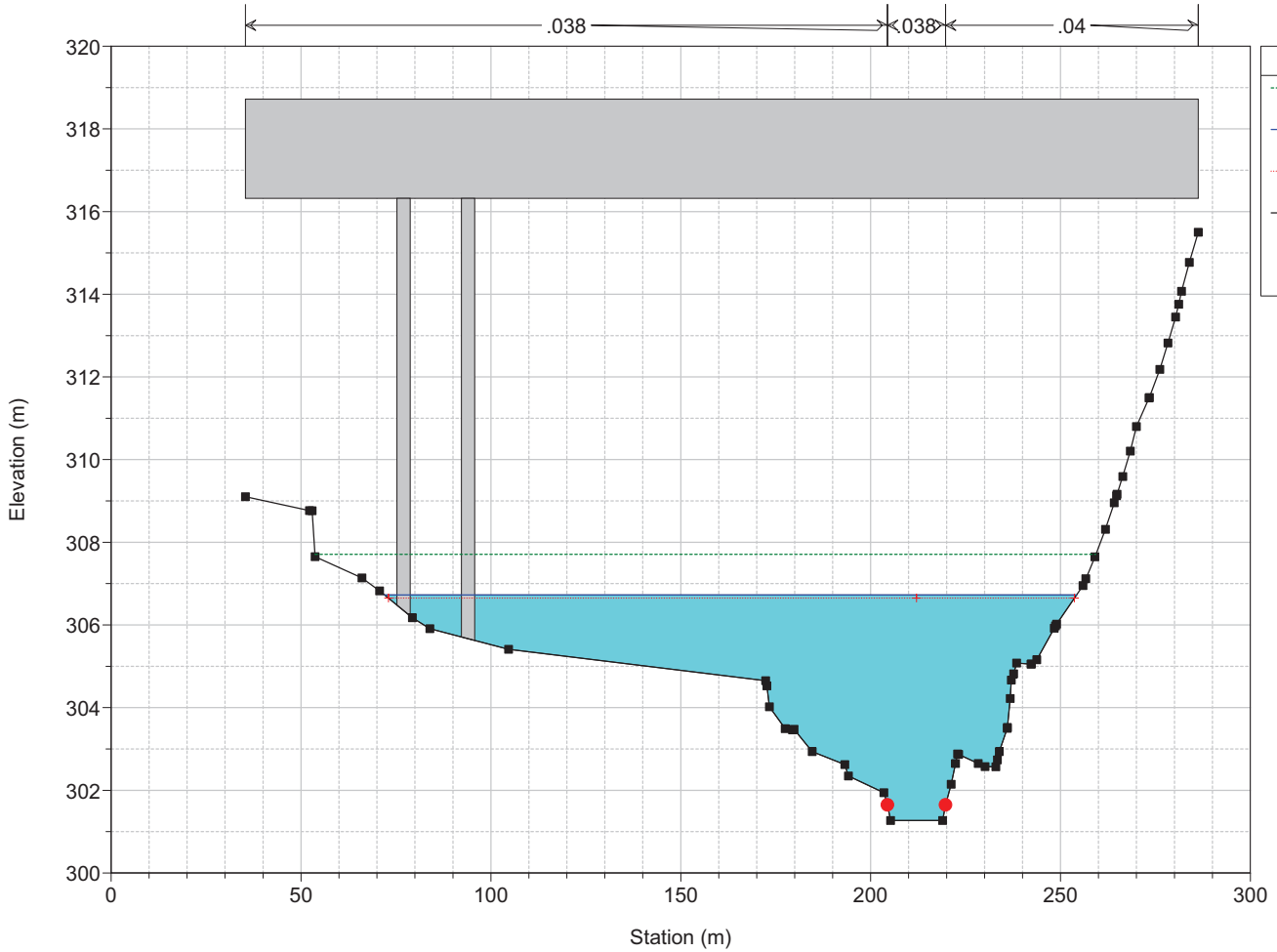
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.5*



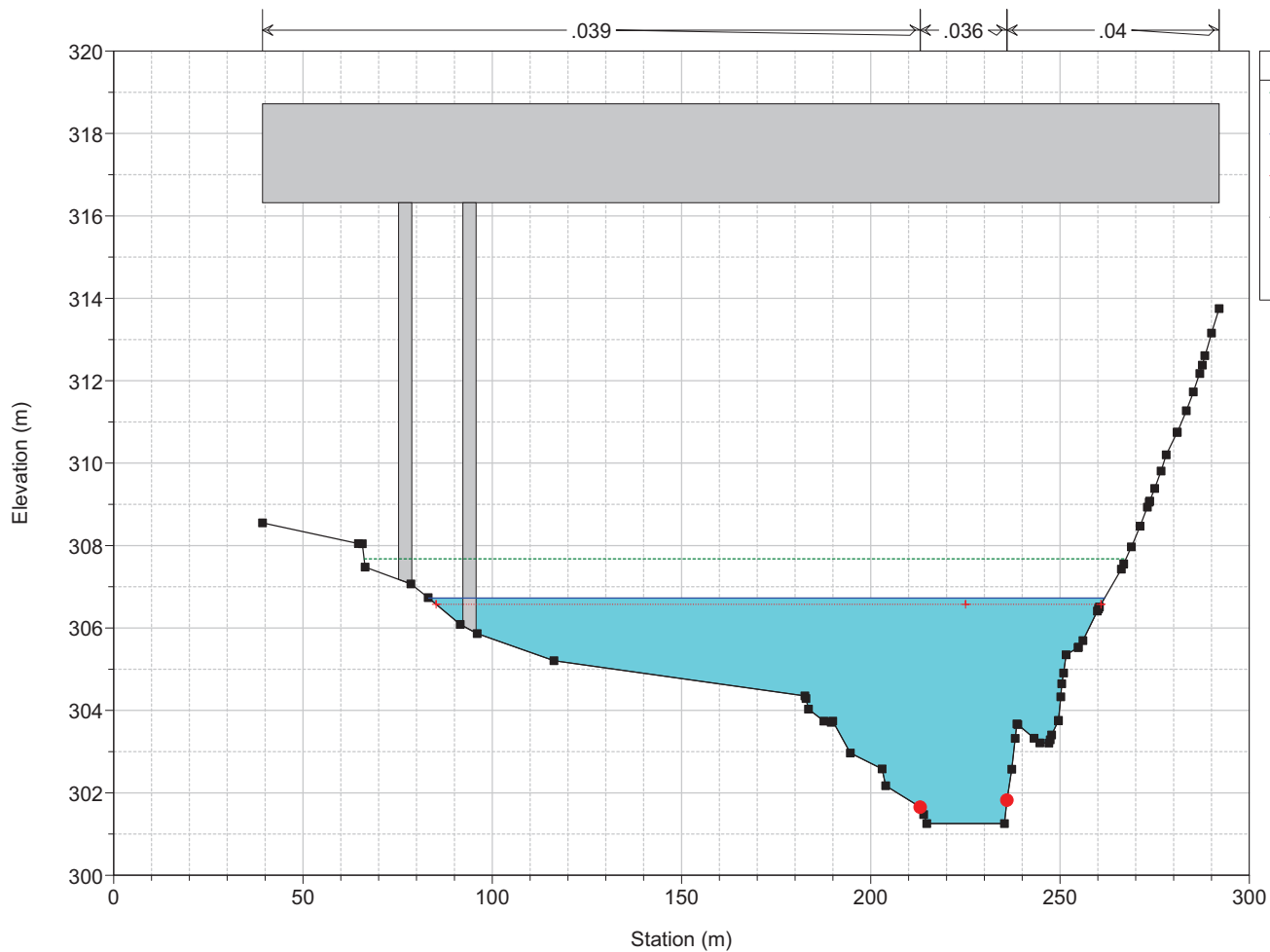
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.375 BR



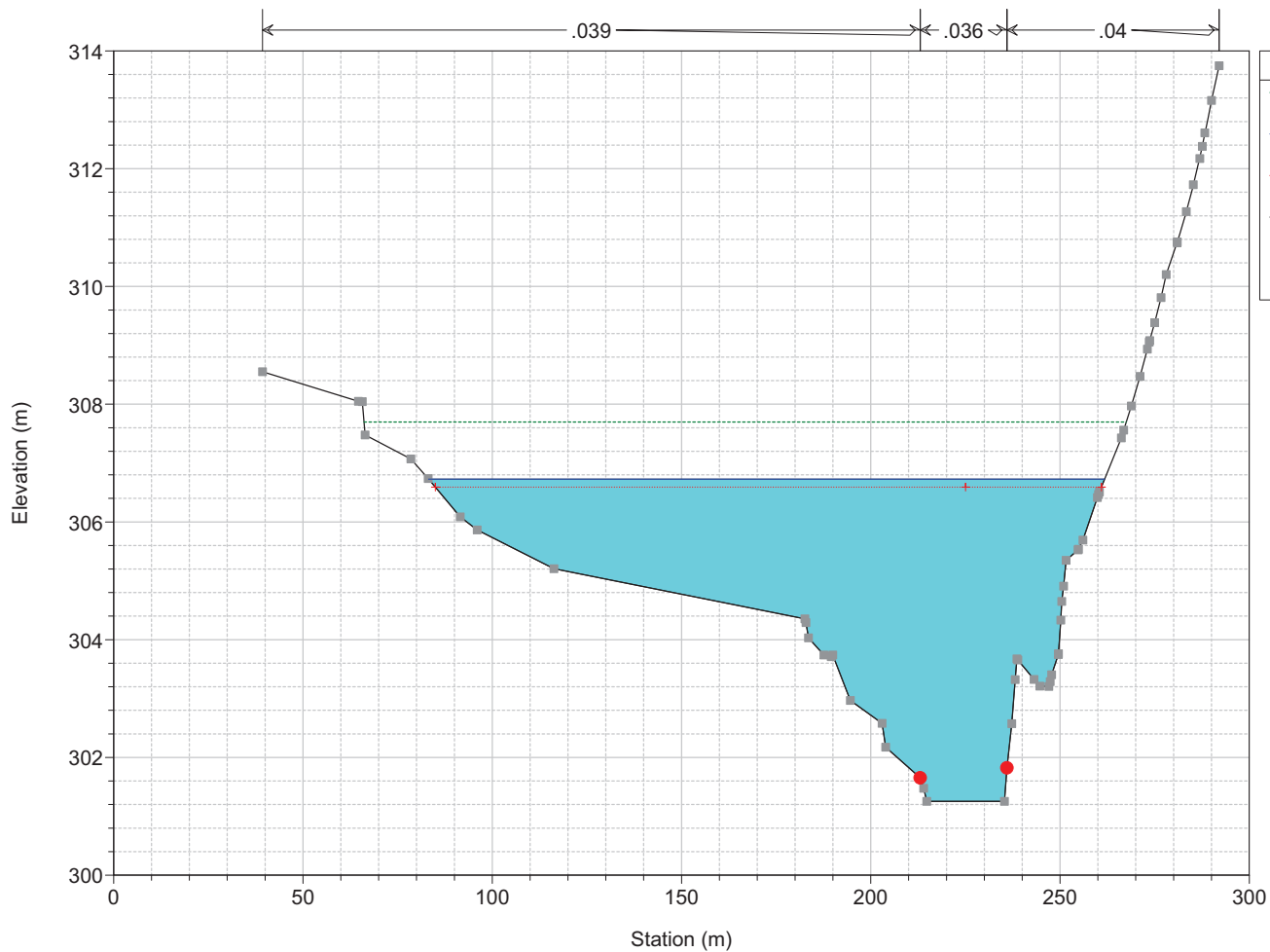
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.375 BR



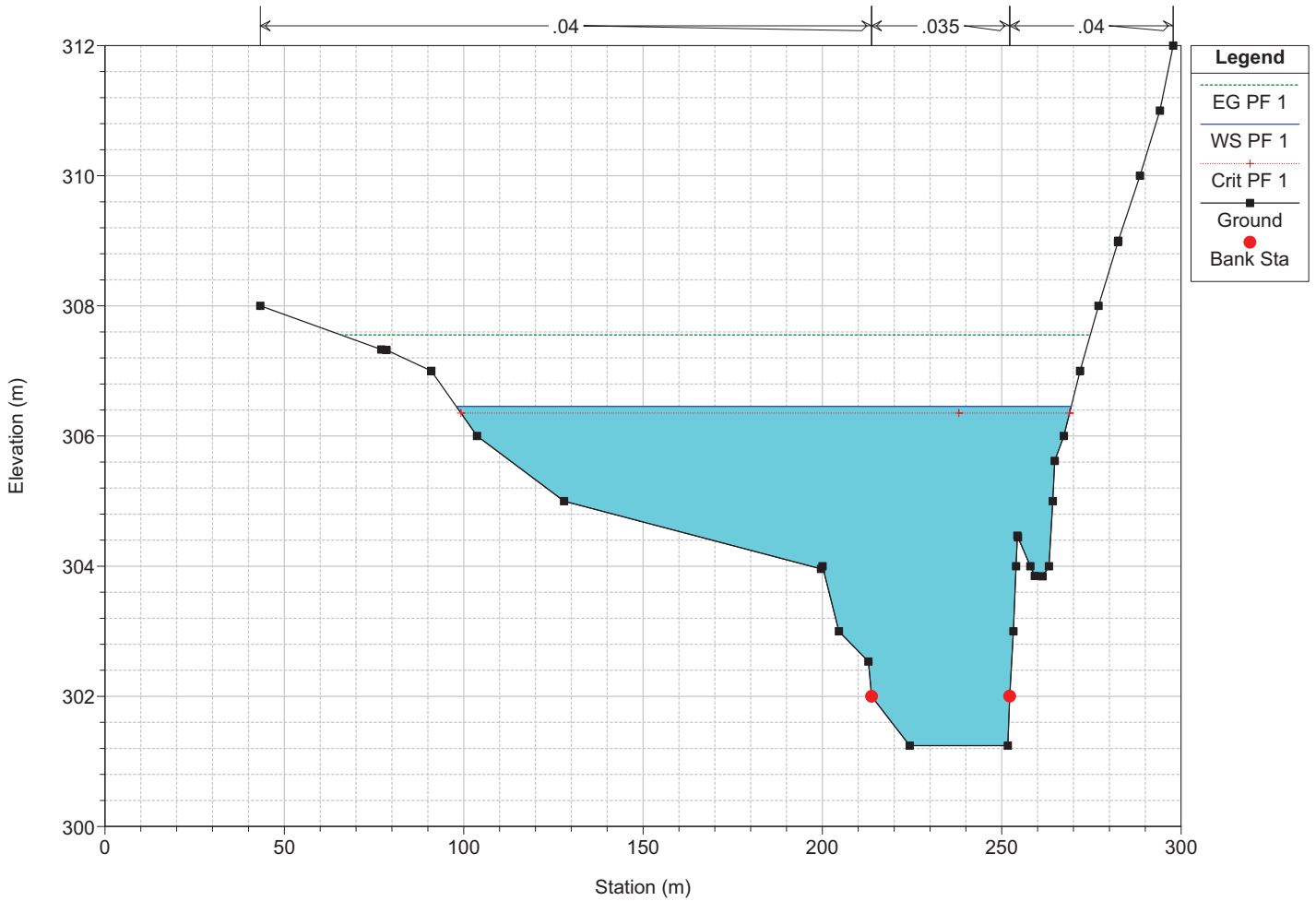
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35.25*



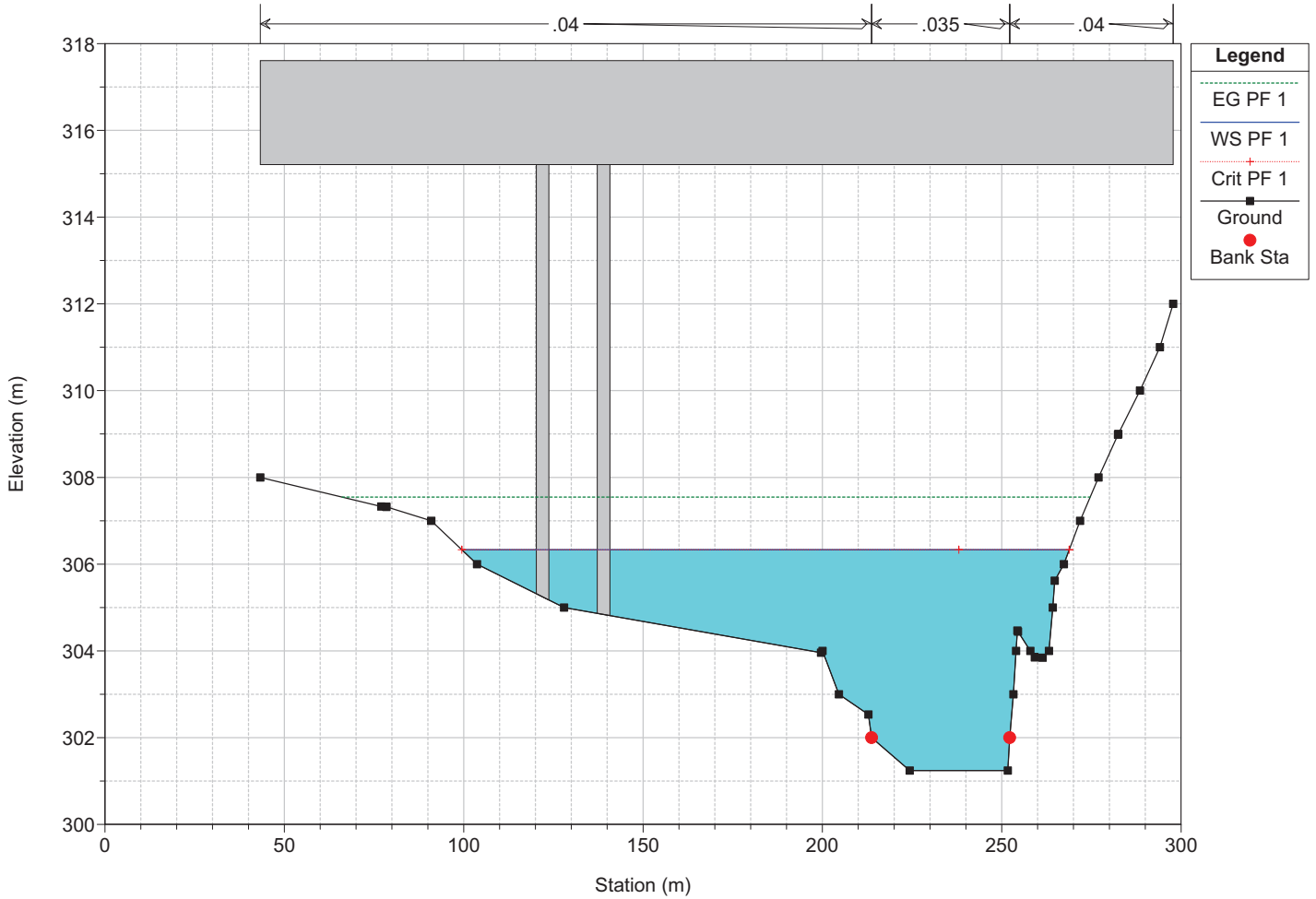
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 35



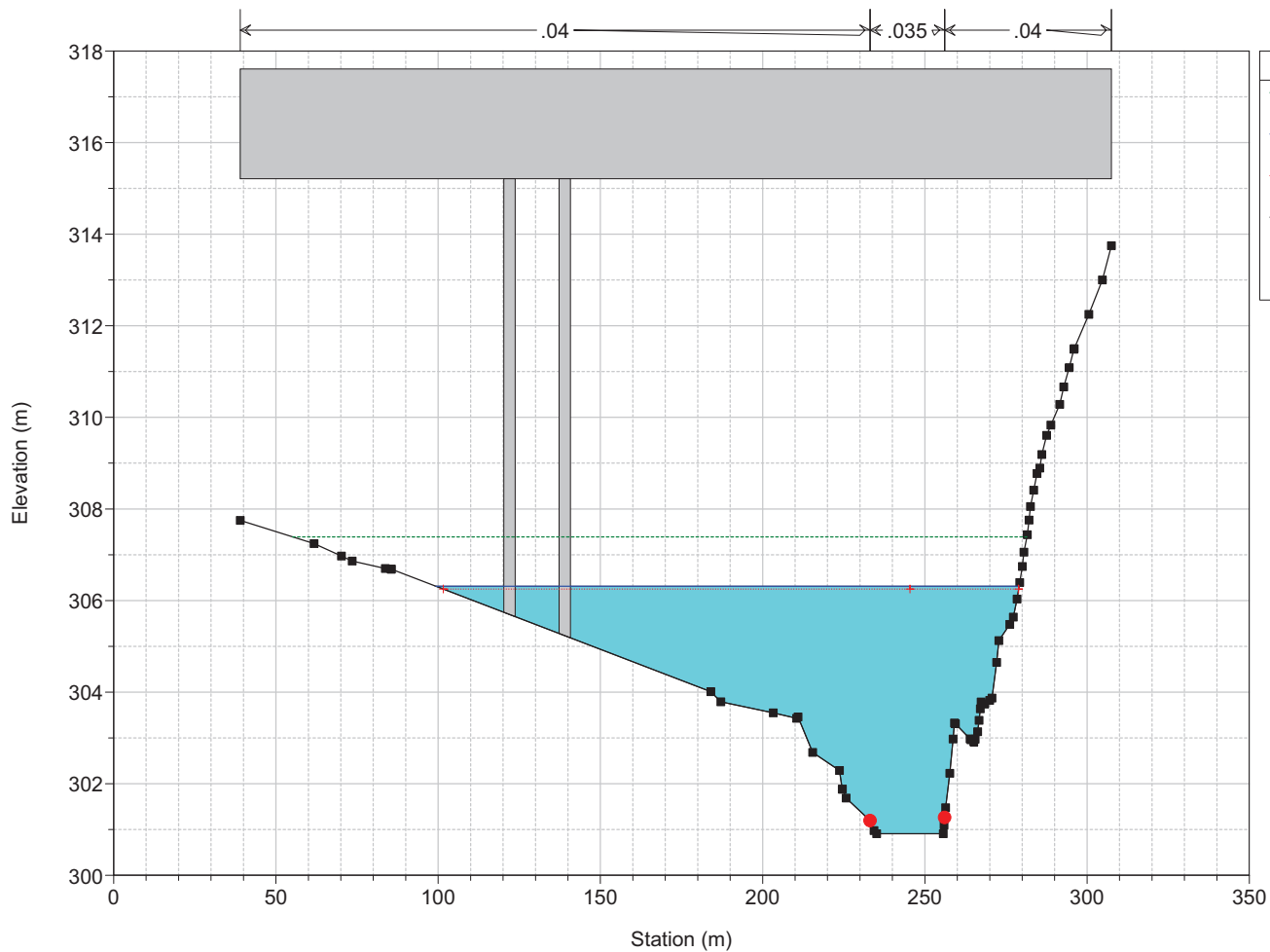
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.875 BR



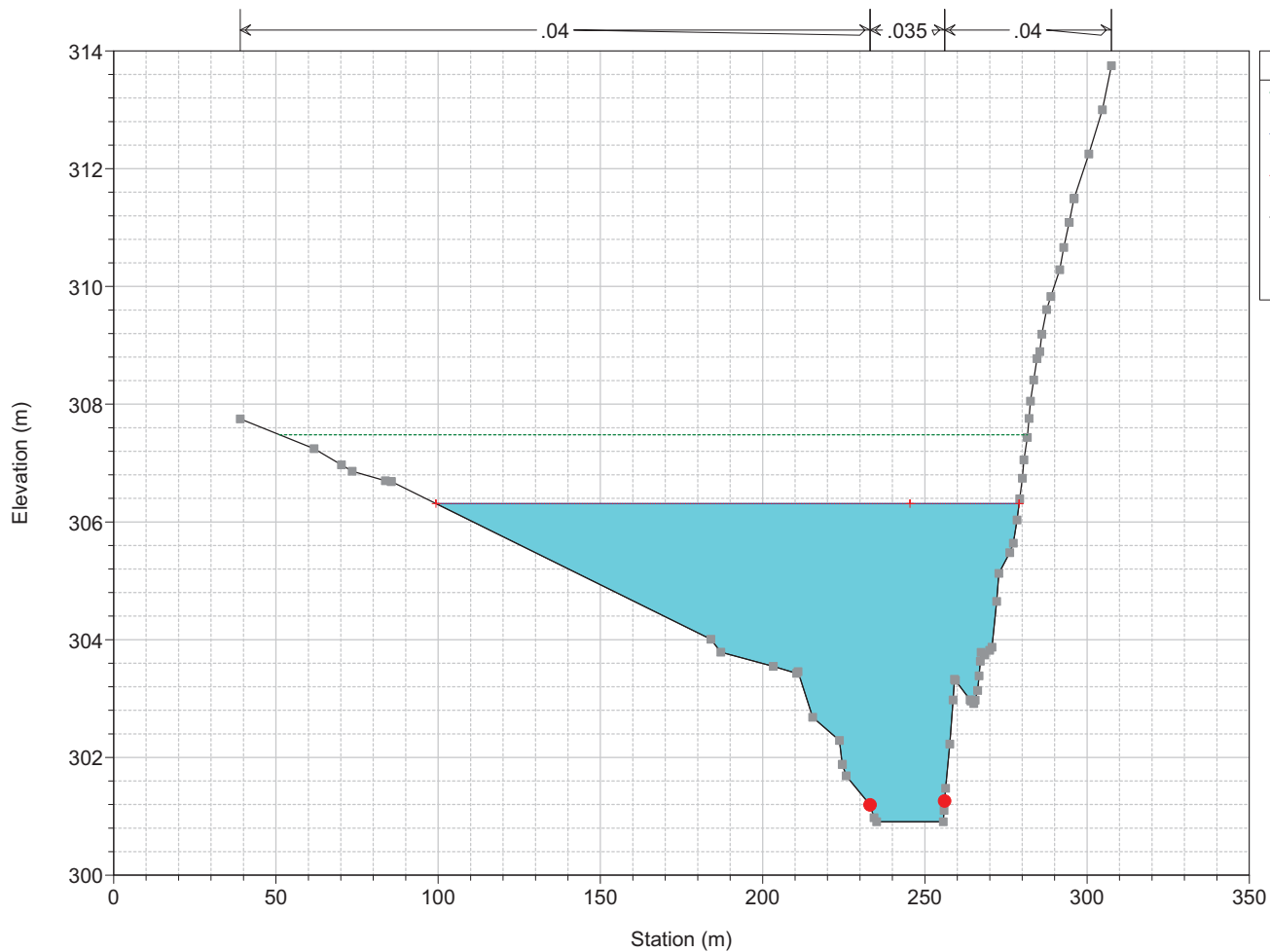
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.875 BR



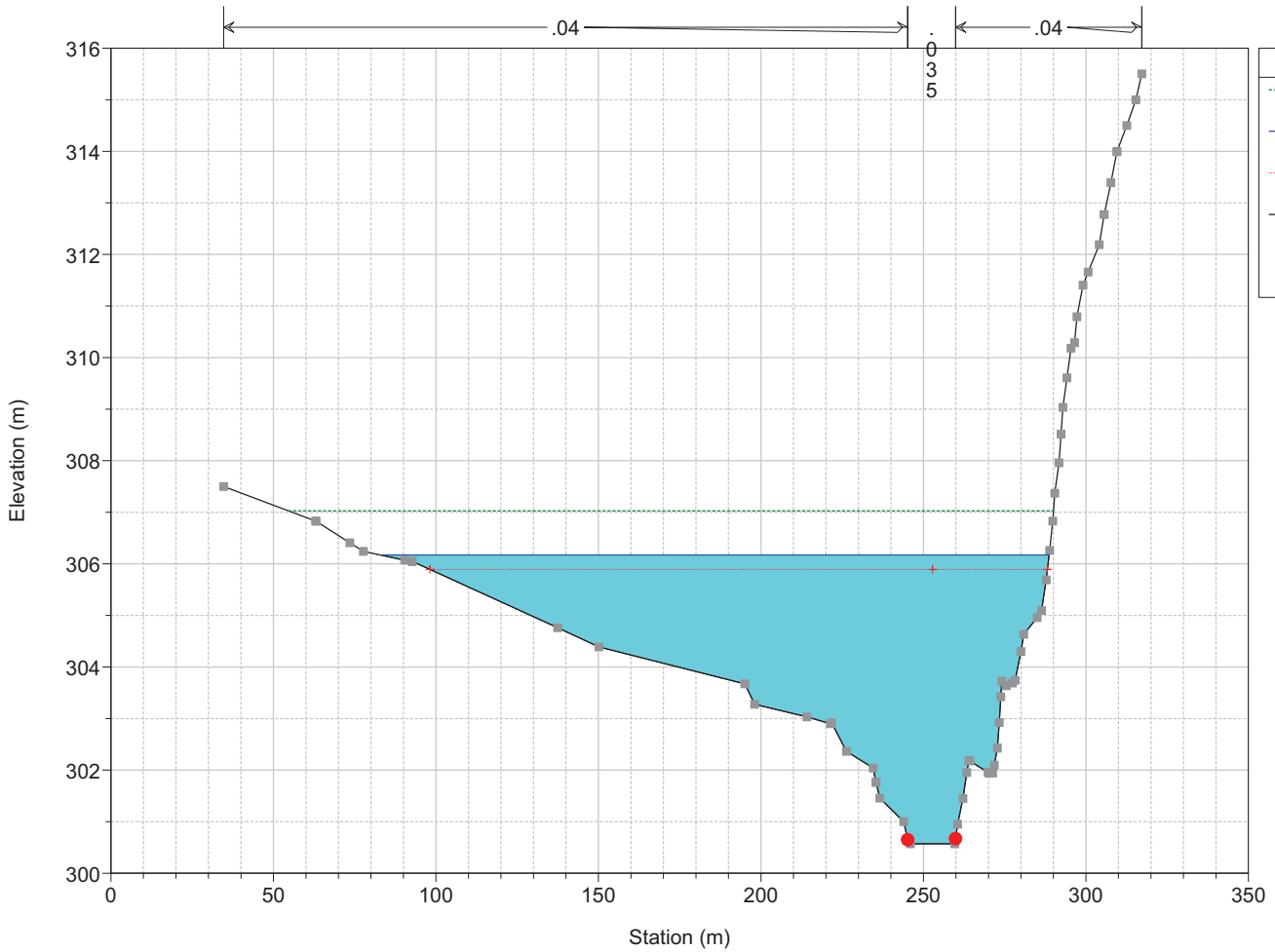
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.75*



POST OPERAM_SALSO

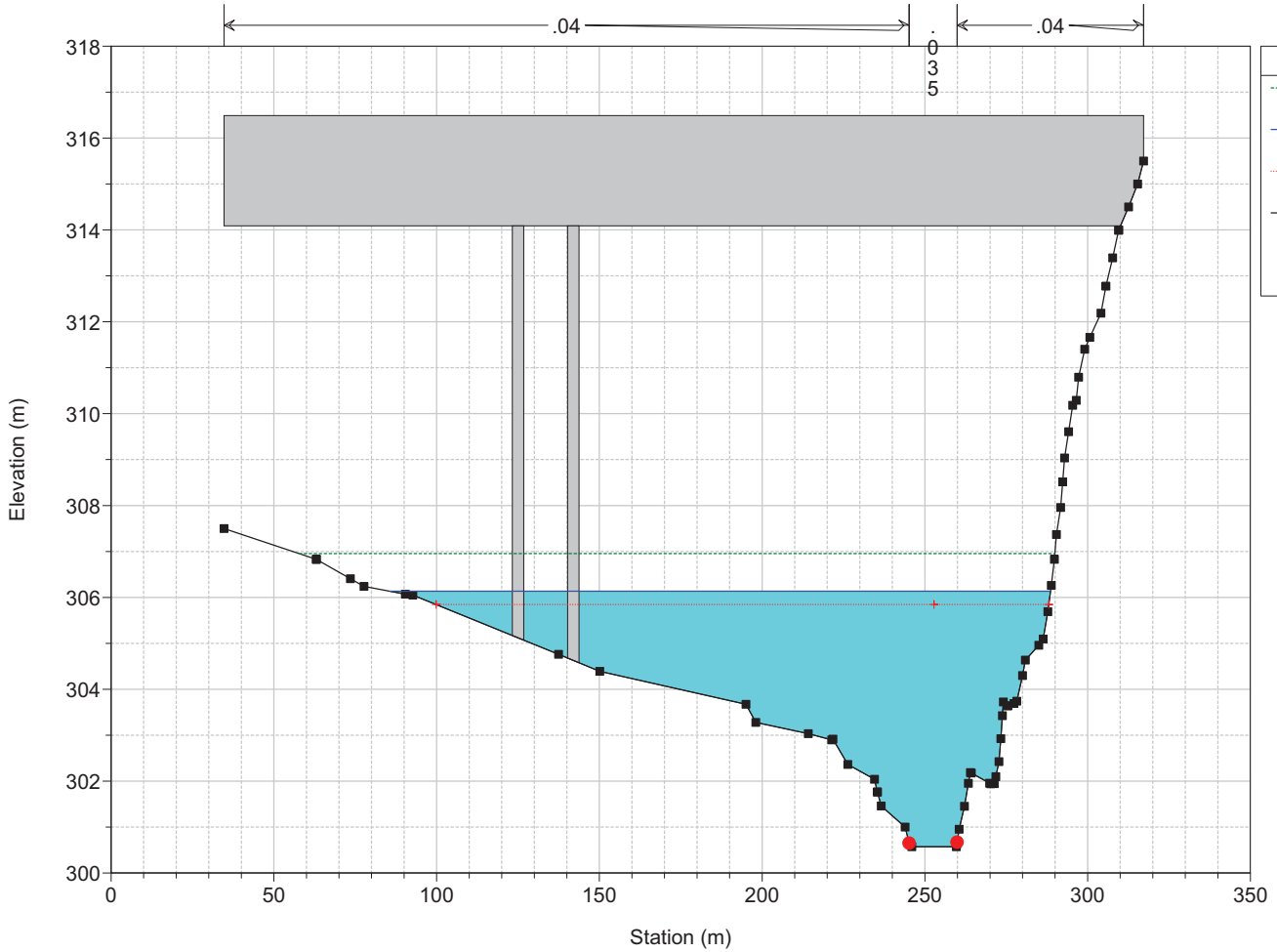
River = SALSO Reach = SALSO RS = 34.5*



Legend	
EG PF 1	(Green dashed line)
WS PF 1	(Red dashed line with +)
Crit PF 1	(Red dashed line with +)
Ground	(Black line with square)
Bank Sta	(Red dot)

POST OPERAM_SALSO

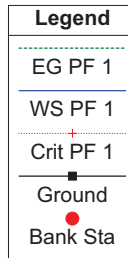
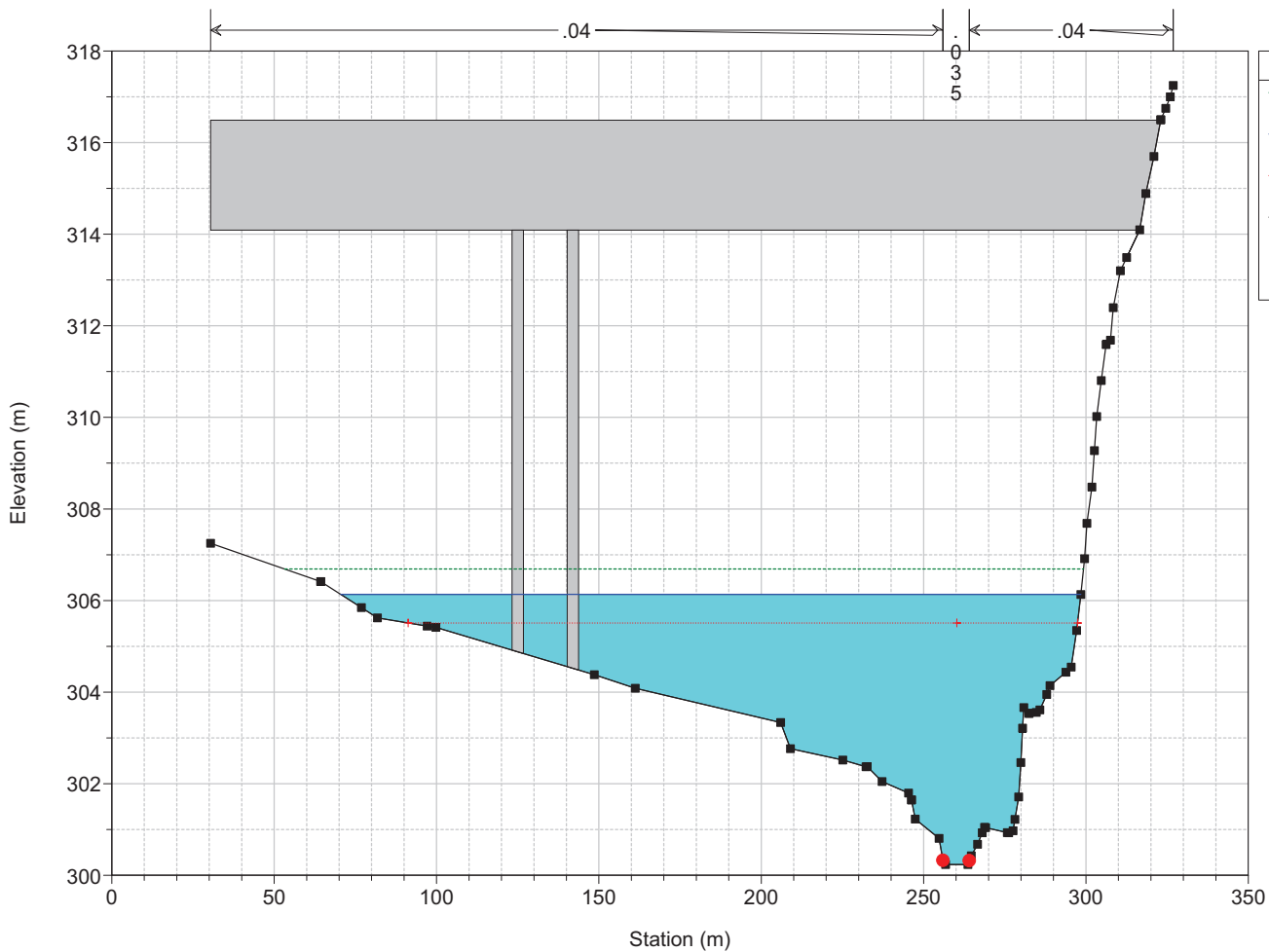
River = SALSO Reach = SALSO RS = 34.375 BR



Legend	
EG PF 1	(Green dashed line)
WS PF 1	(Red dashed line with +)
Crit PF 1	(Red dashed line with +)
Ground	(Black line with square)
Bank Sta	(Red dot)

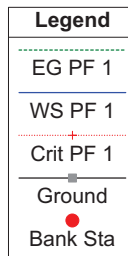
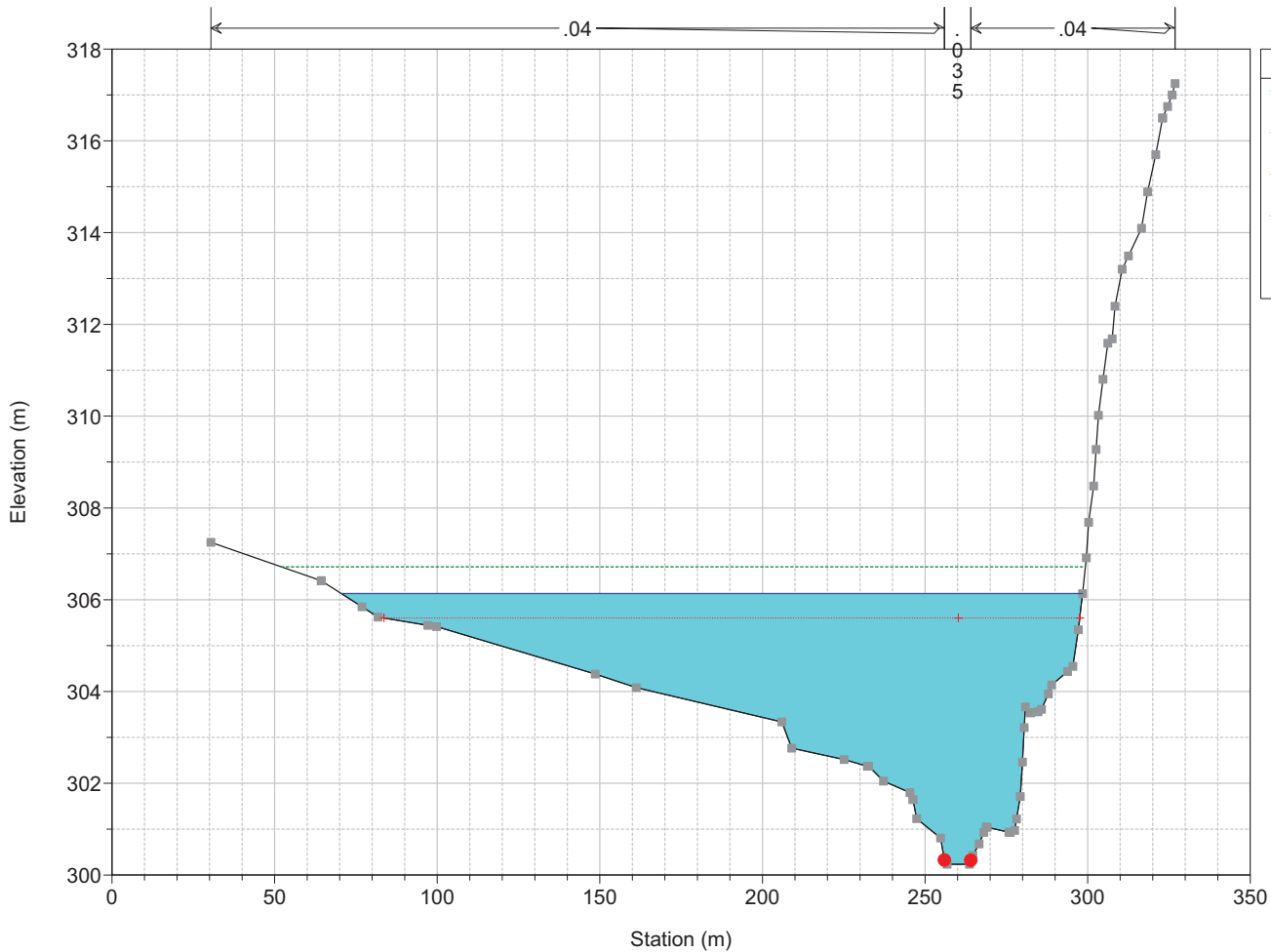
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.375 BR



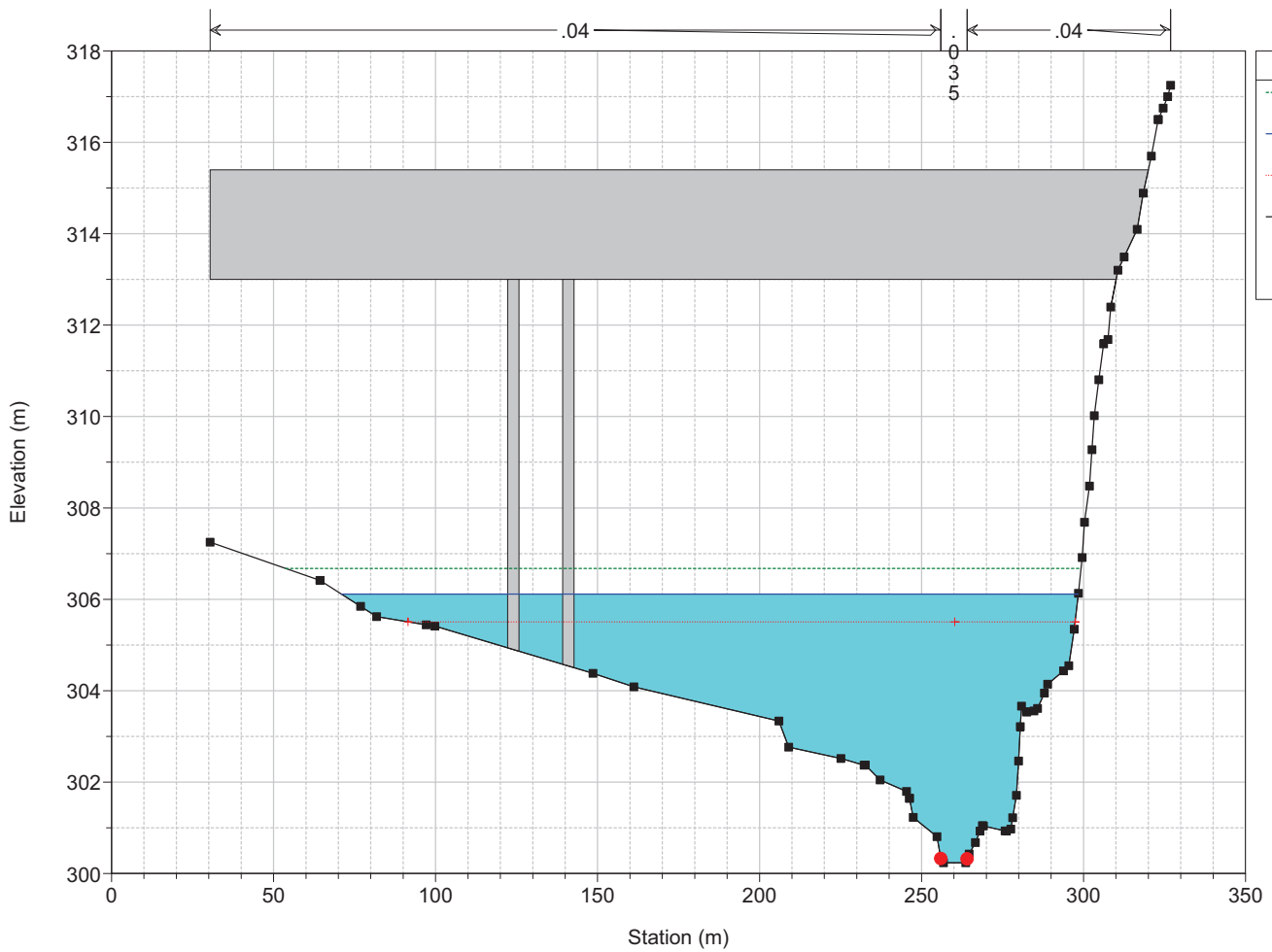
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.25*



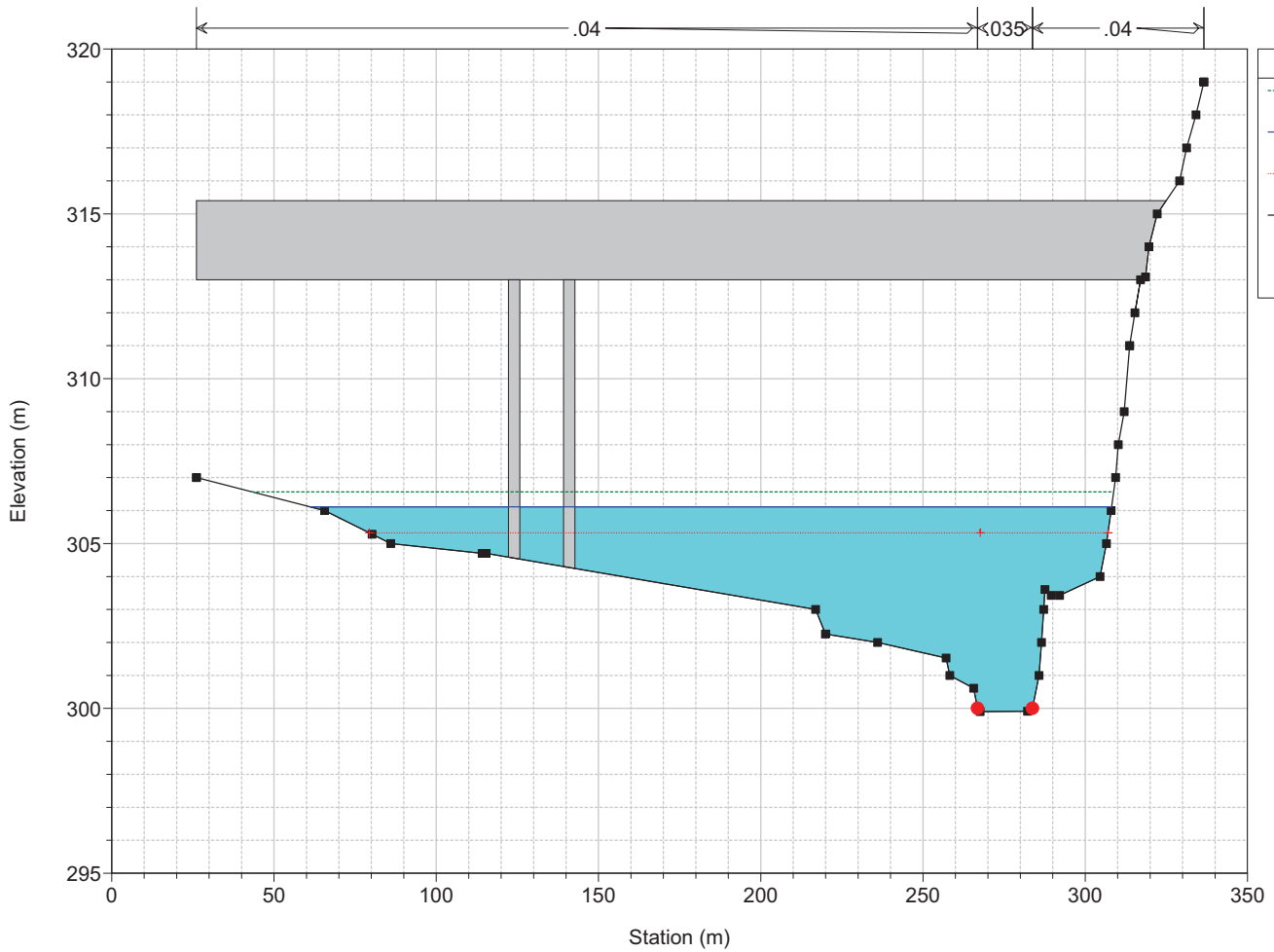
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.125 BR



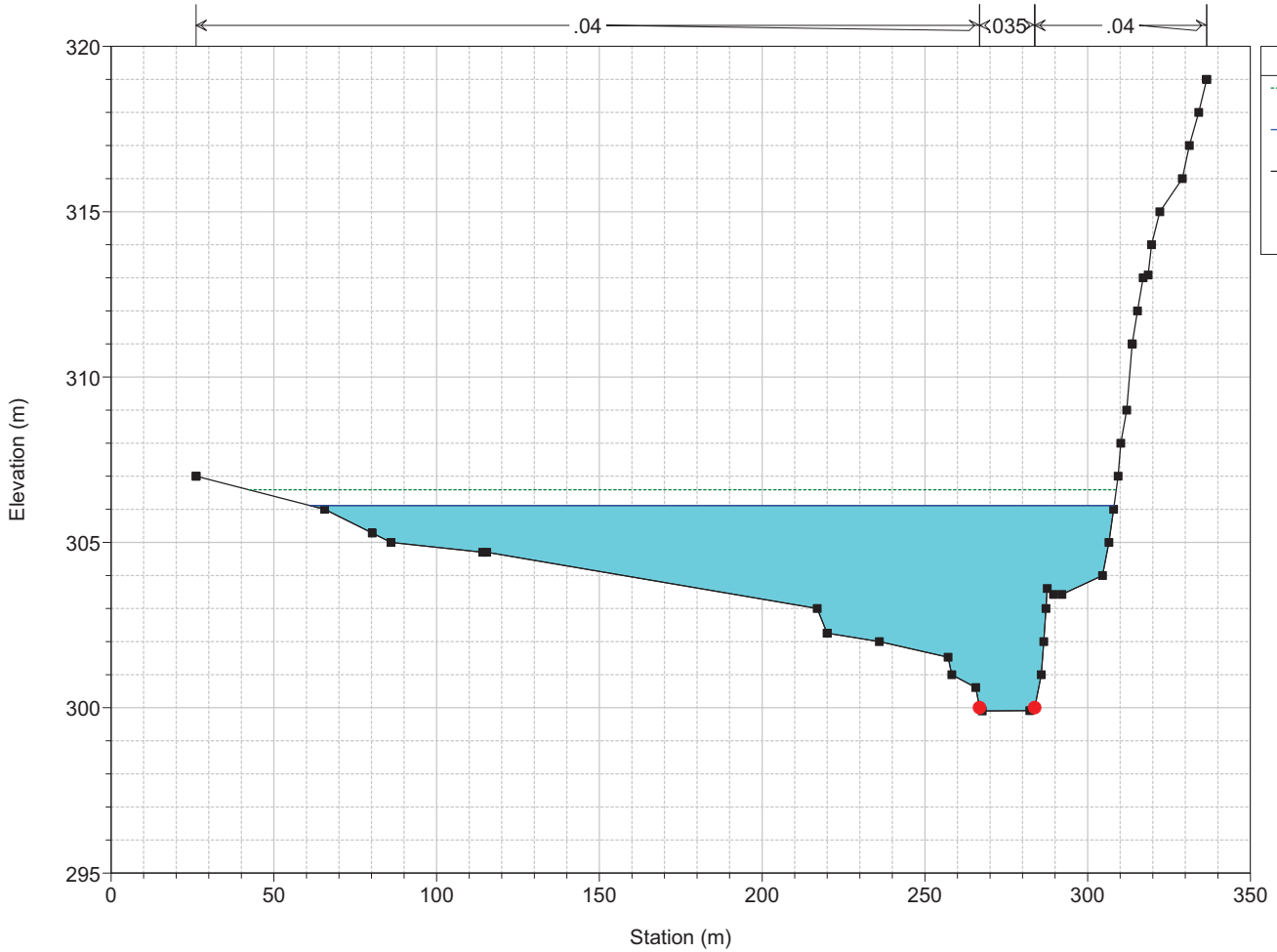
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34.125 BR



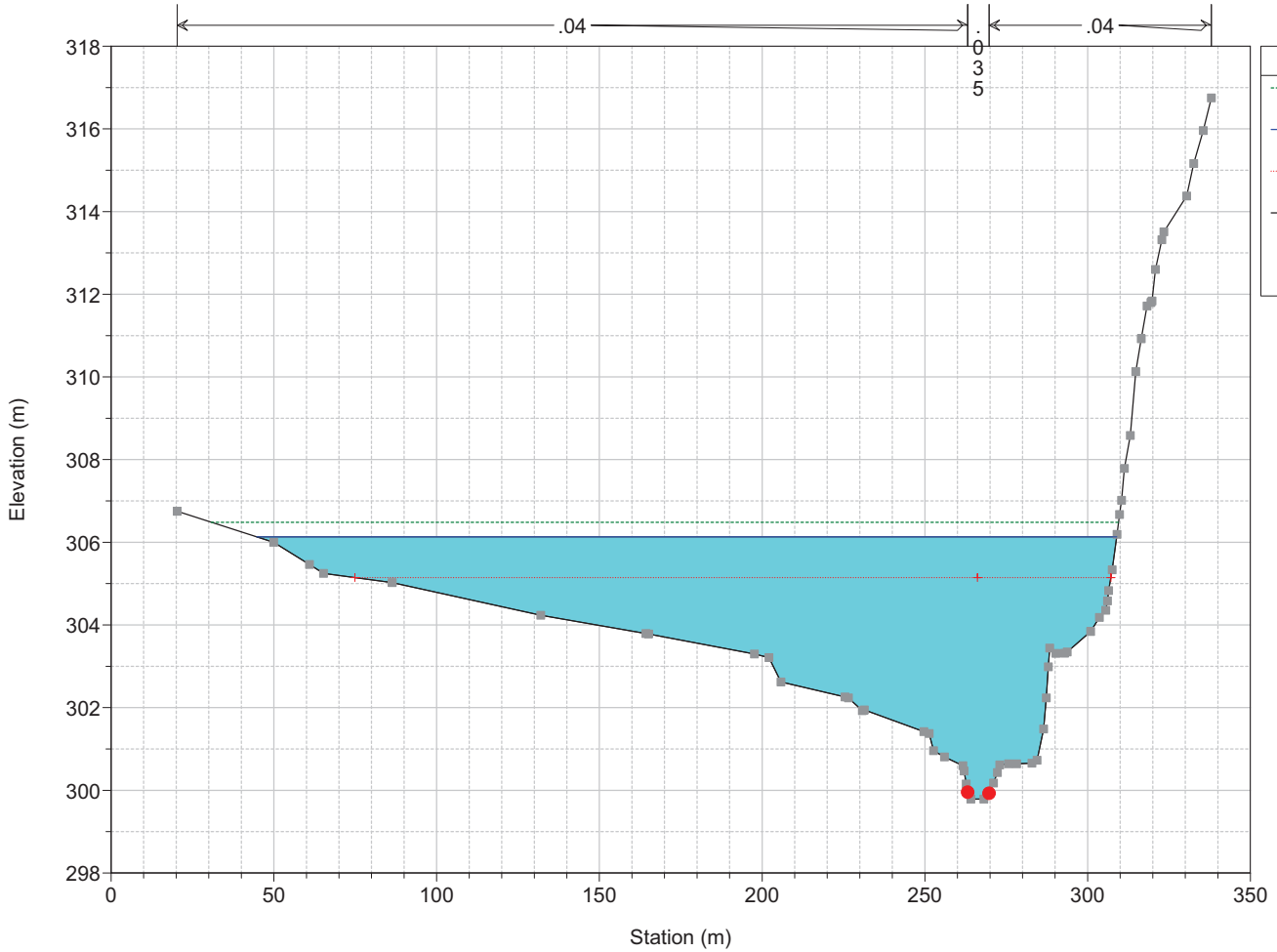
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 34



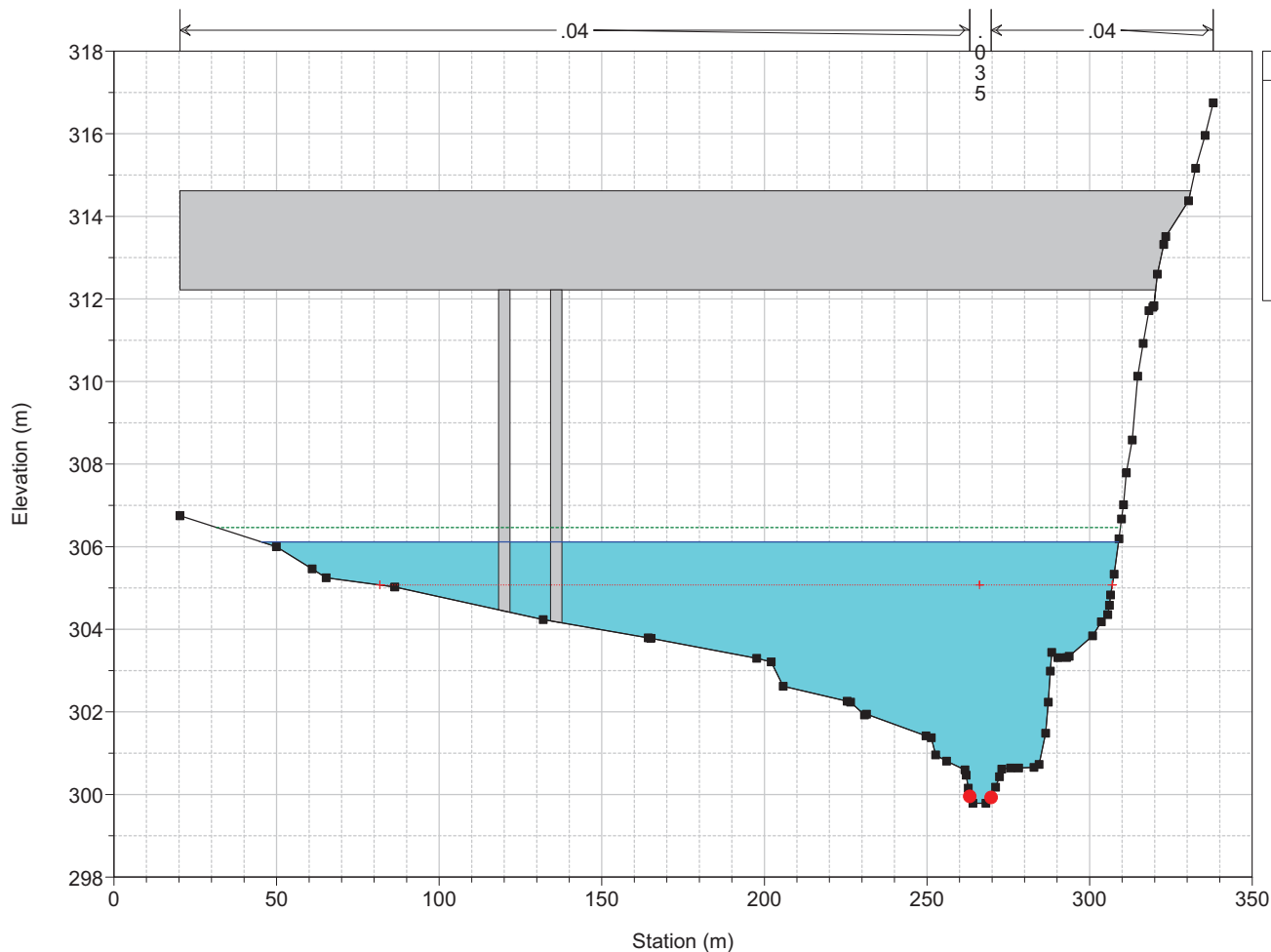
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 33.75*



POST OPERAM_SALSO

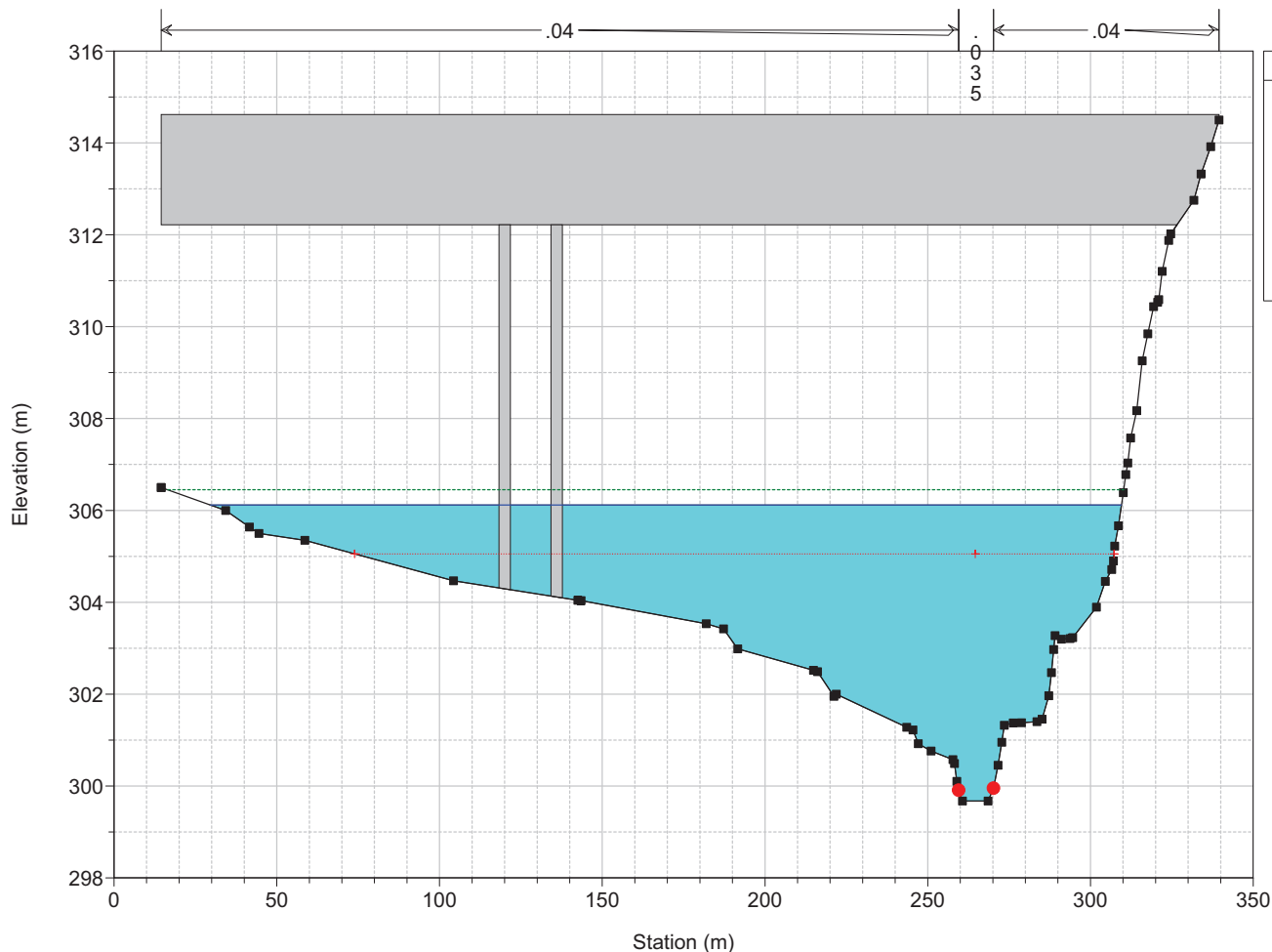
River = SALSO Reach = SALSO RS = 33.625 BR



Legend	
EG PF 1	— (green dashed line)
WS PF 1	— (red line with +)
Crit PF 1	— (black line with +)
Ground	— (black line with square)
Bank Sta	● (red circle)

POST OPERAM_SALSO

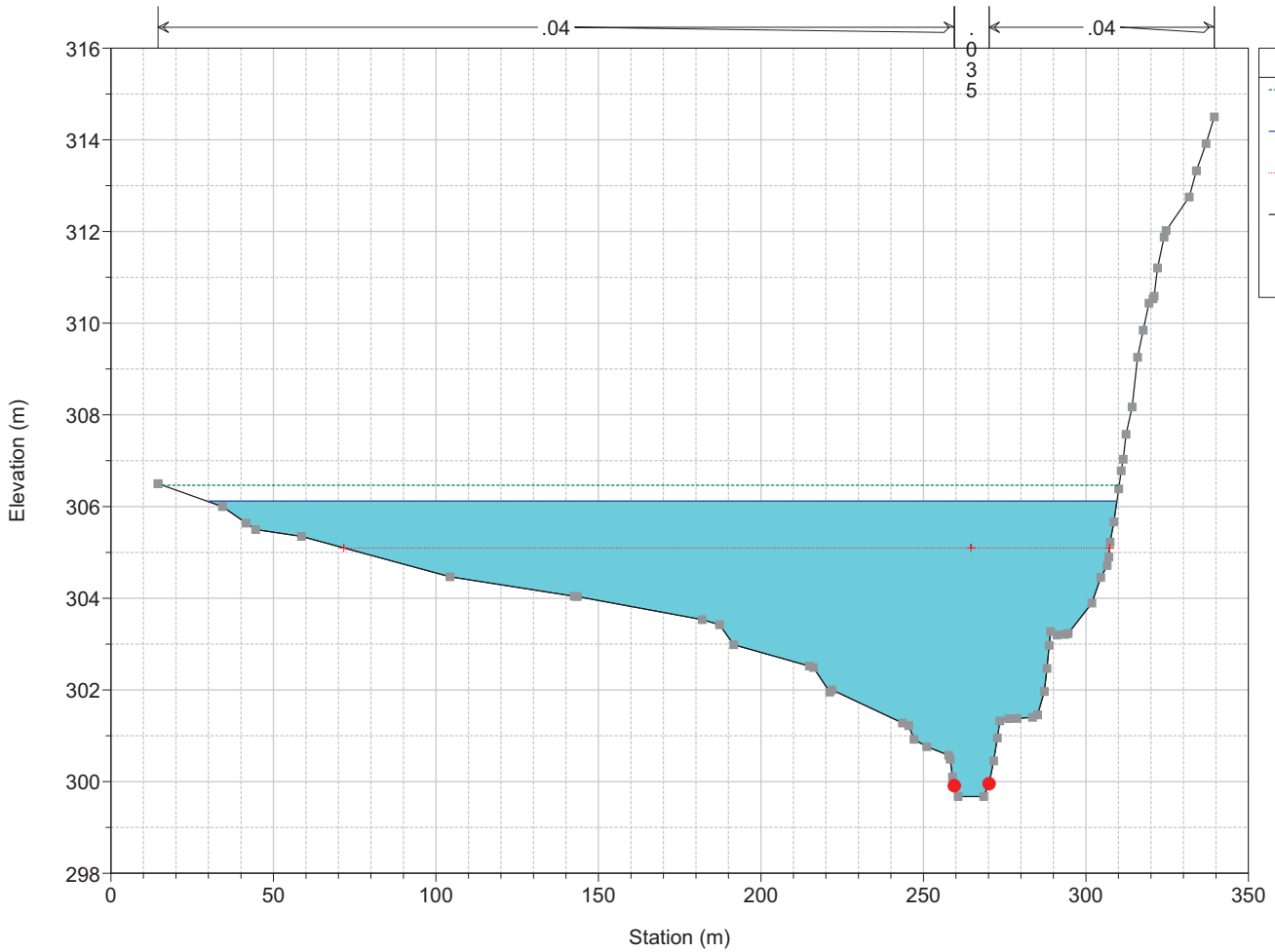
River = SALSO Reach = SALSO RS = 33.625 BR



Legend	
EG PF 1	— (green dashed line)
WS PF 1	— (red line with +)
Crit PF 1	— (black line with +)
Ground	— (black line with square)
Bank Sta	● (red circle)

POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 33.5*

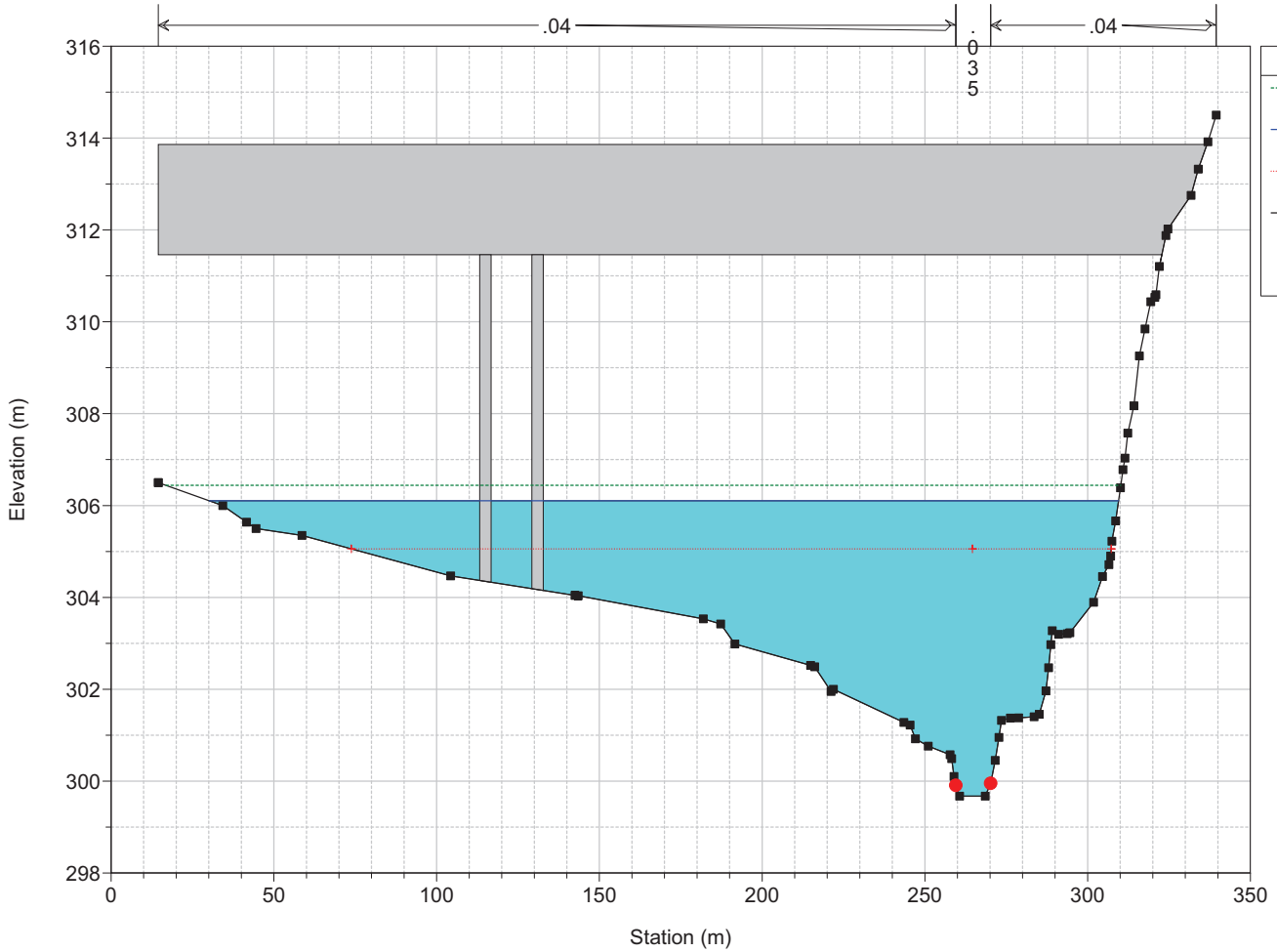


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 33.375 BR

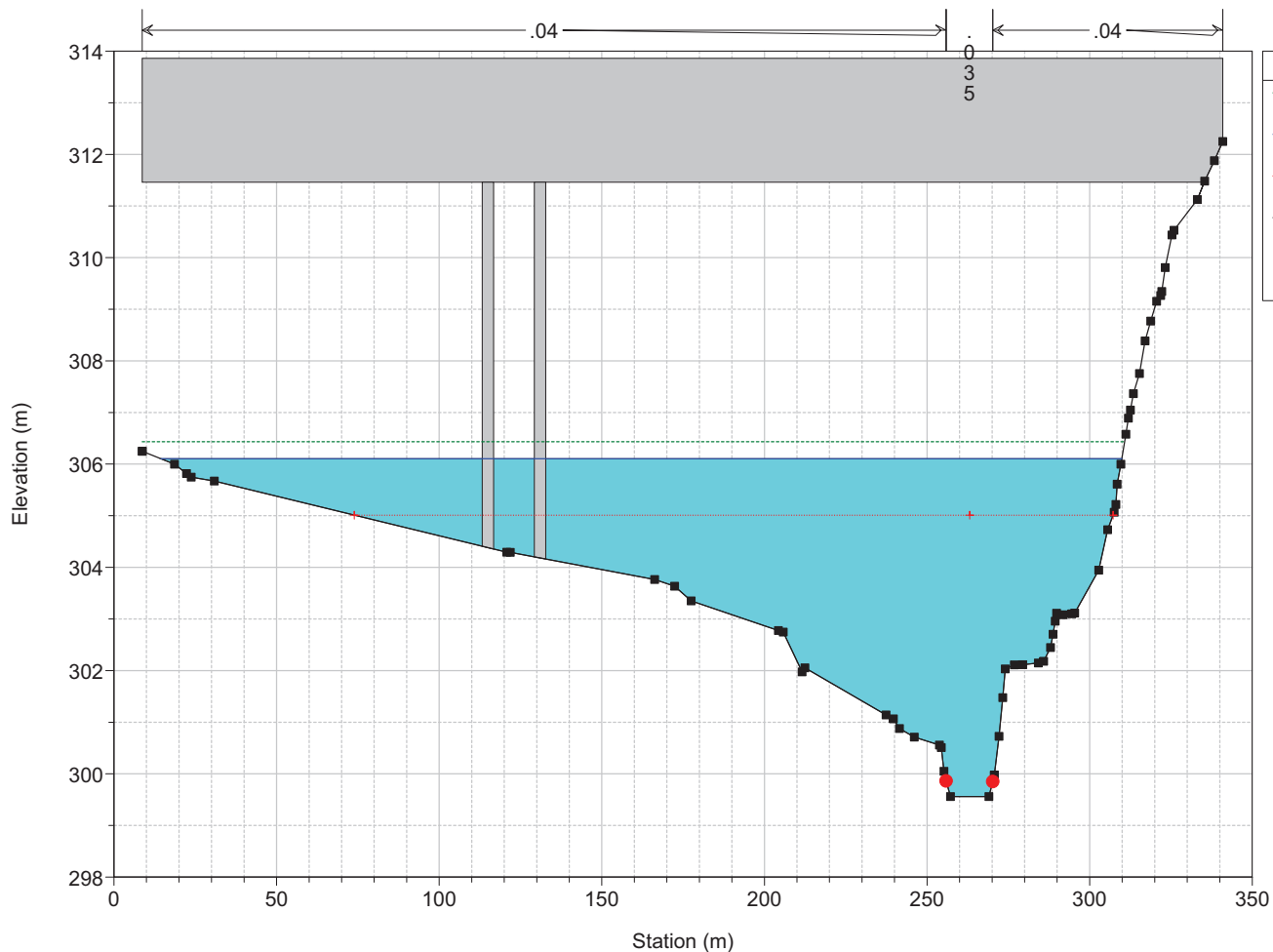


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

POST OPERAM_SALSO

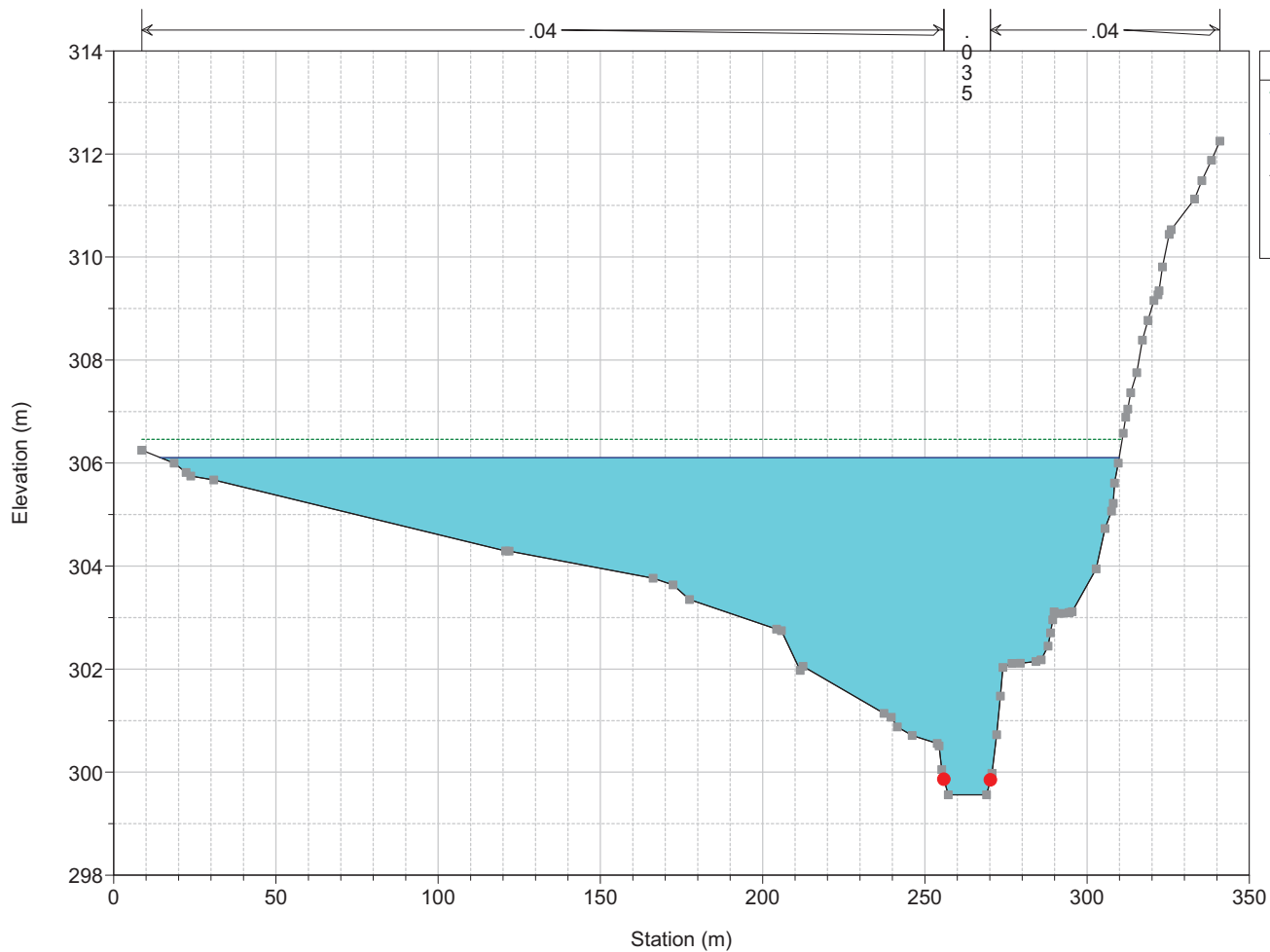
River = SALSO Reach = SALSO RS = 33.375 BR



Legend	
EG PF 1	
WS PF 1	
Crit PF 1	
Ground	
Bank Sta	

POST OPERAM_SALSO

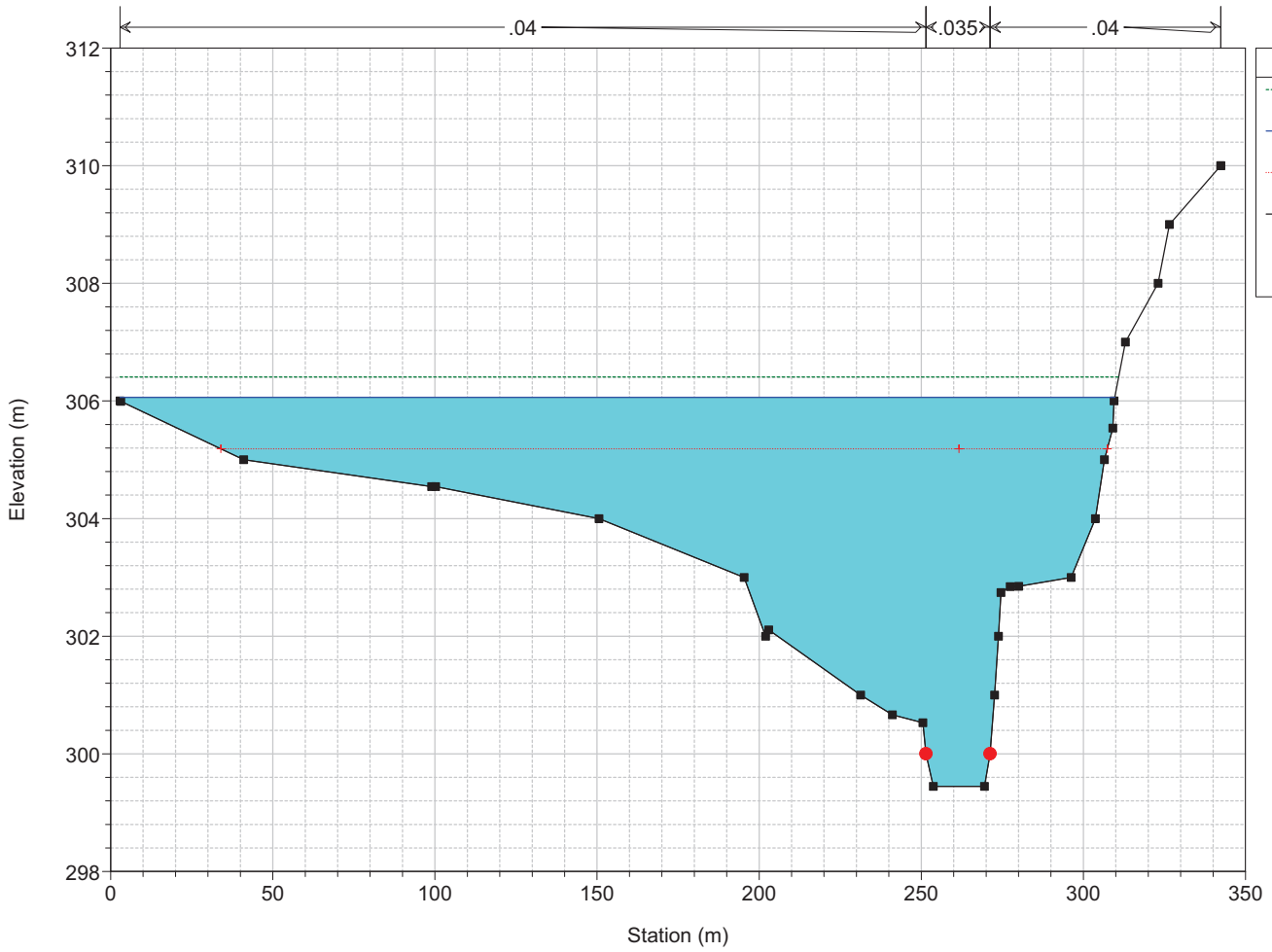
River = SALSO Reach = SALSO RS = 33.25*



Legend	
EG PF 1	
WS PF 1	
Ground	
Bank Sta	

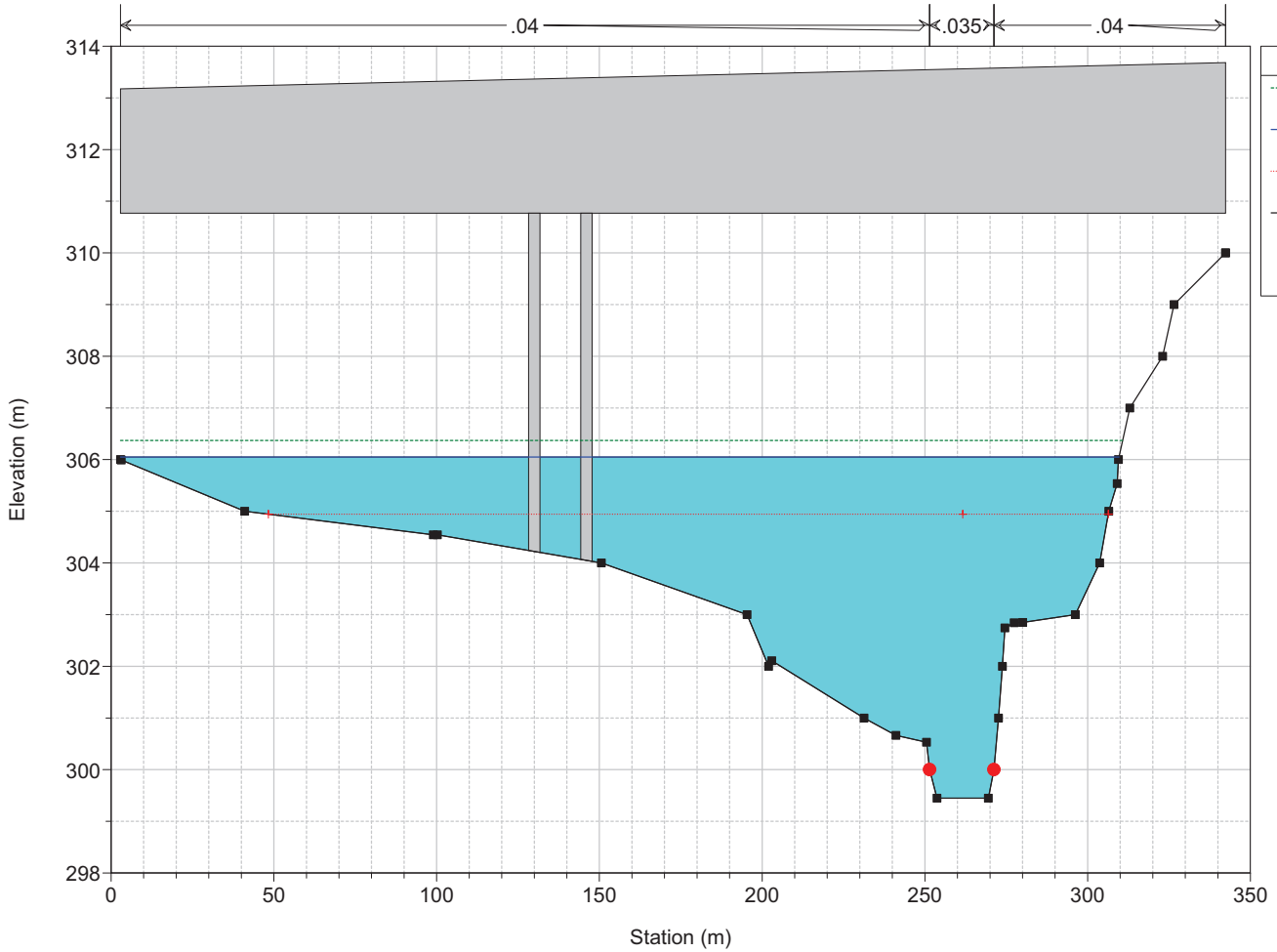
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 33



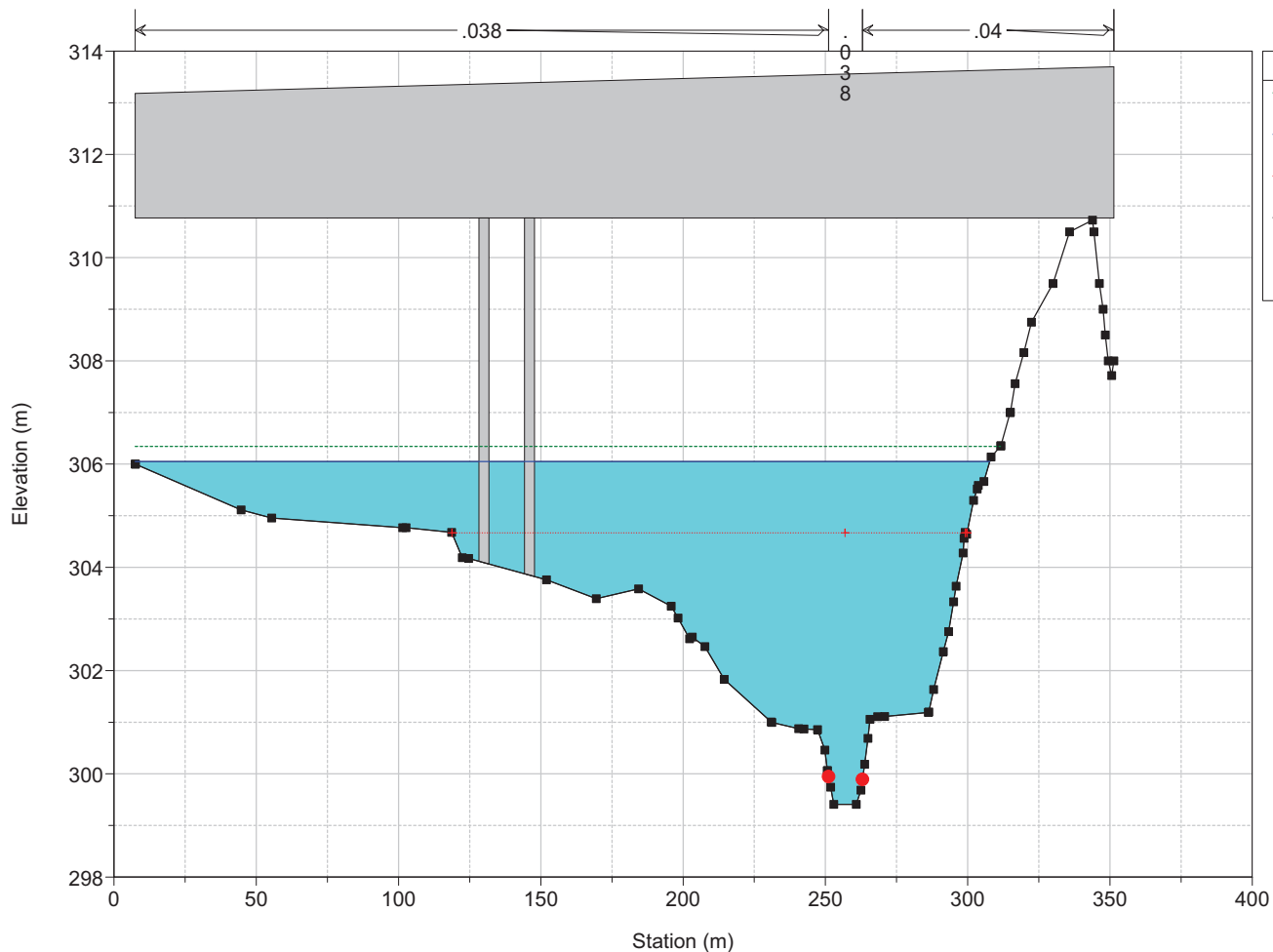
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 32.75 BR



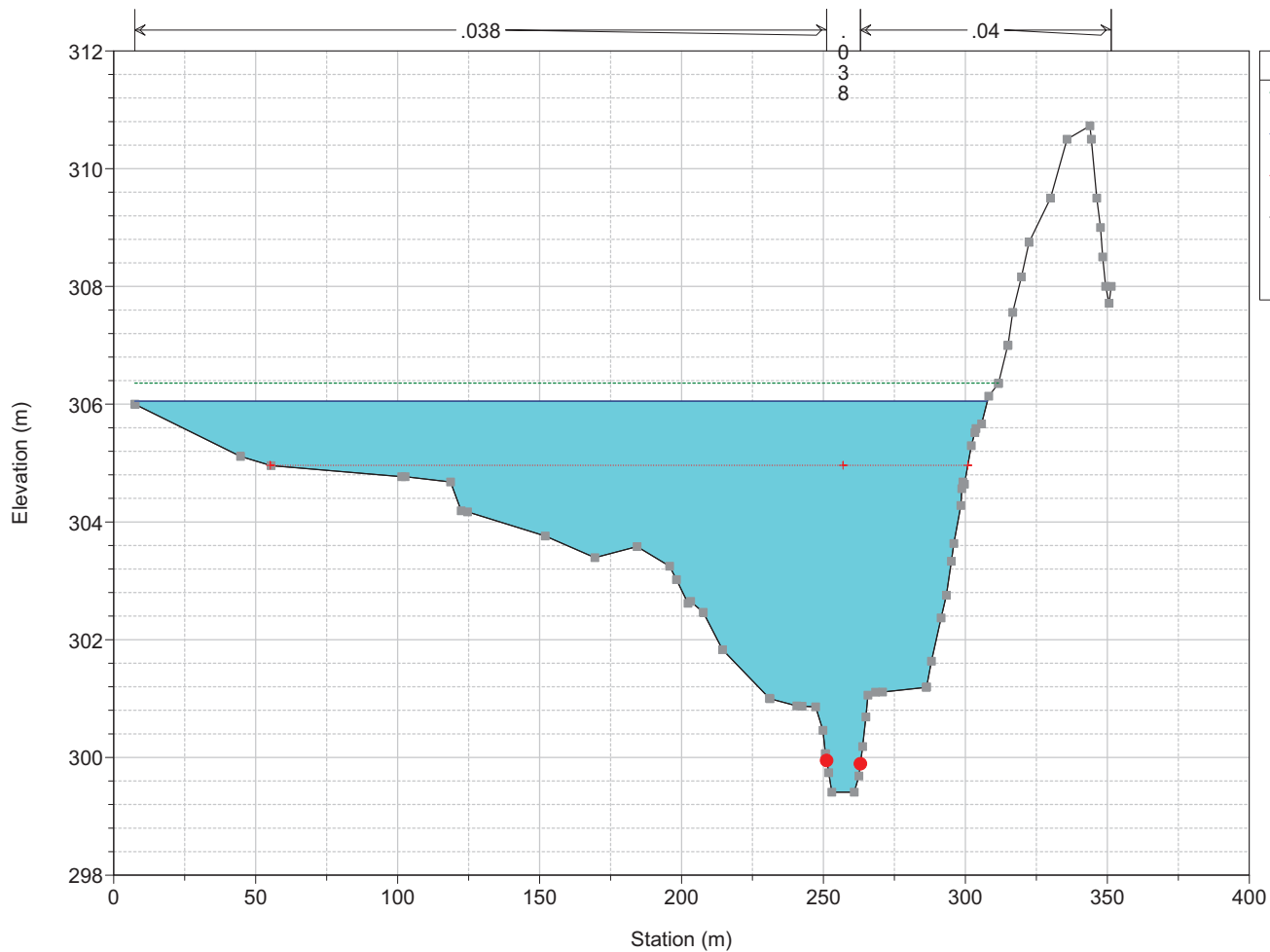
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 32.75 BR



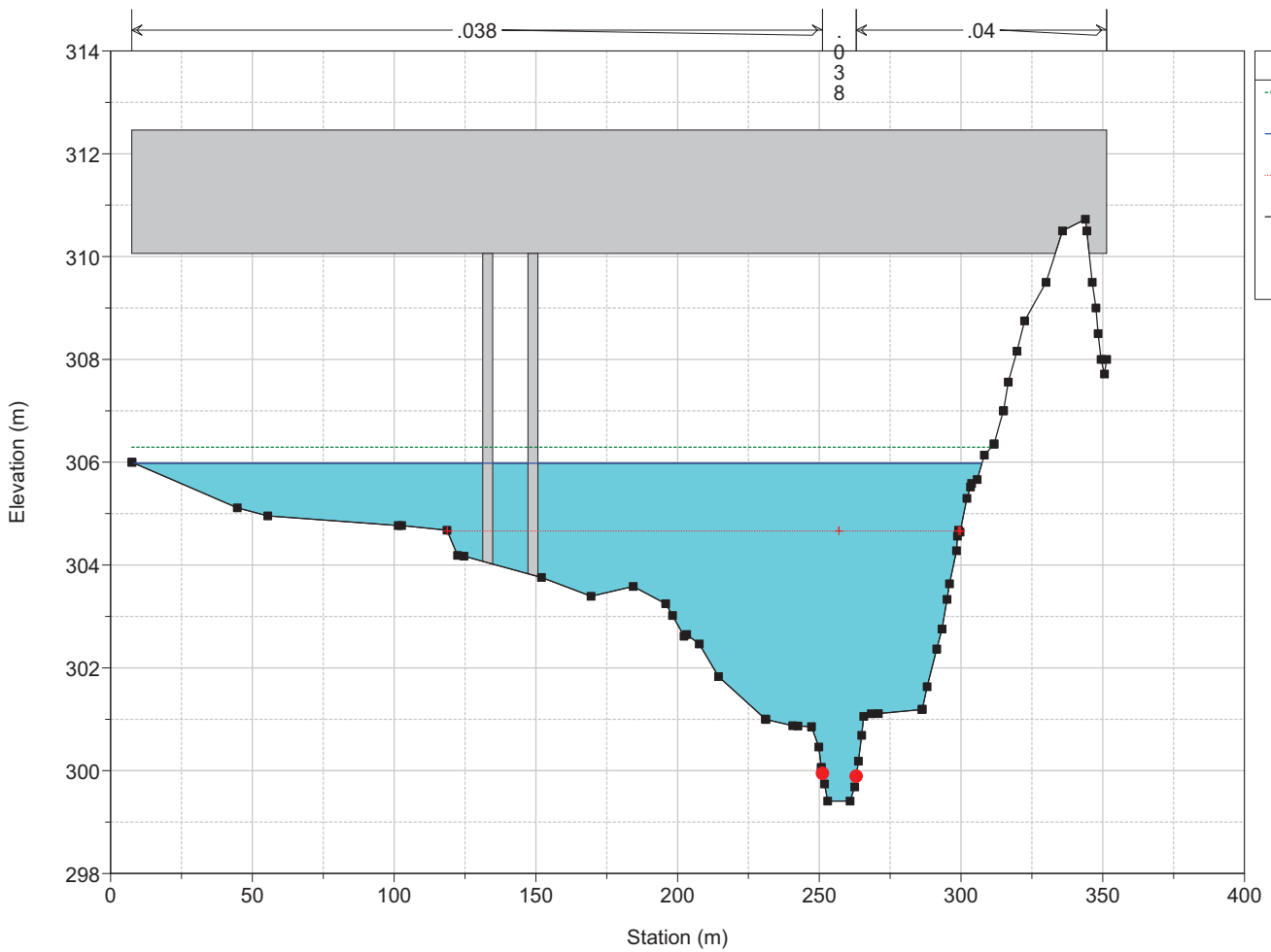
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 32.5*



POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 32.25 BR

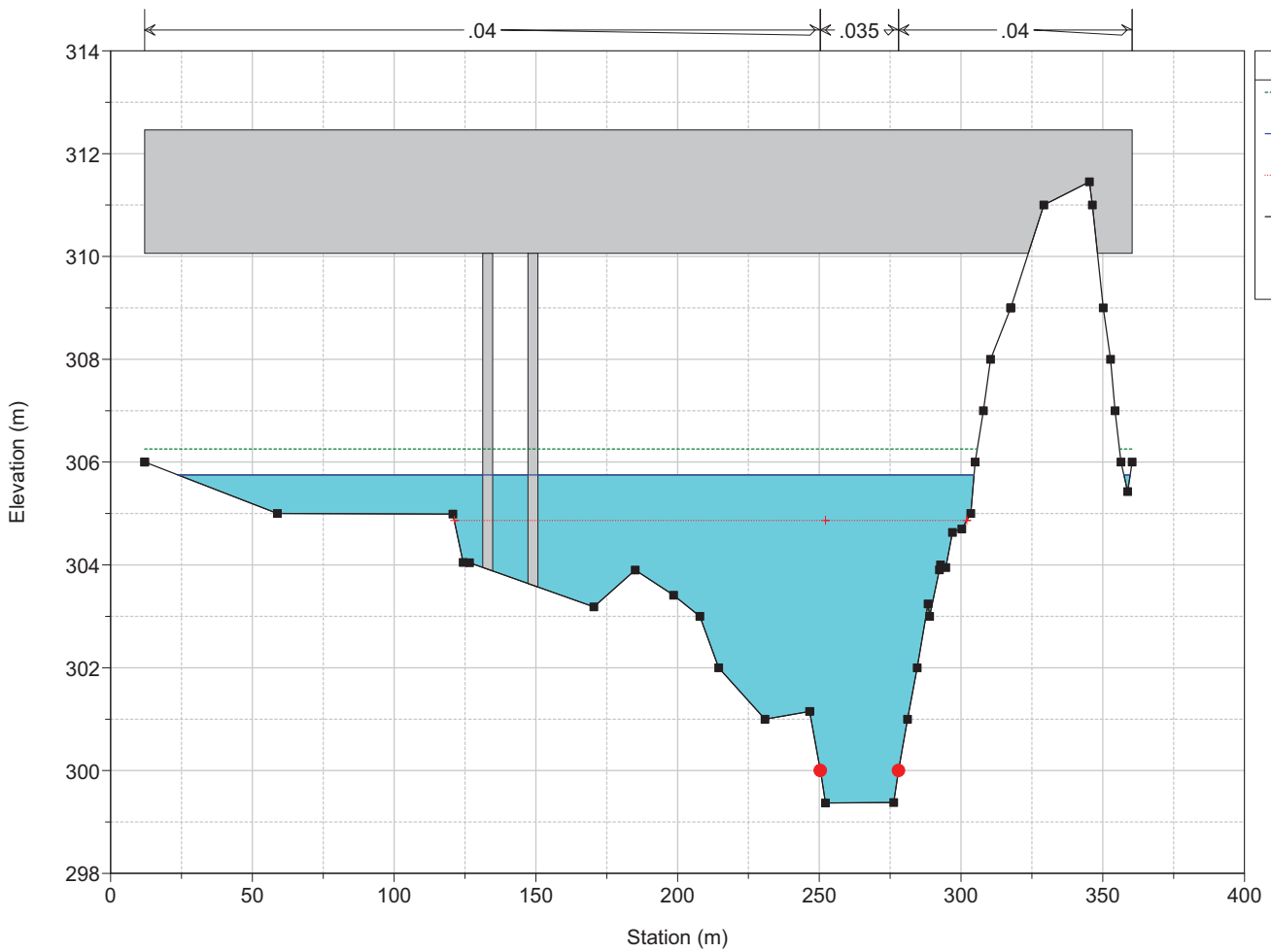


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

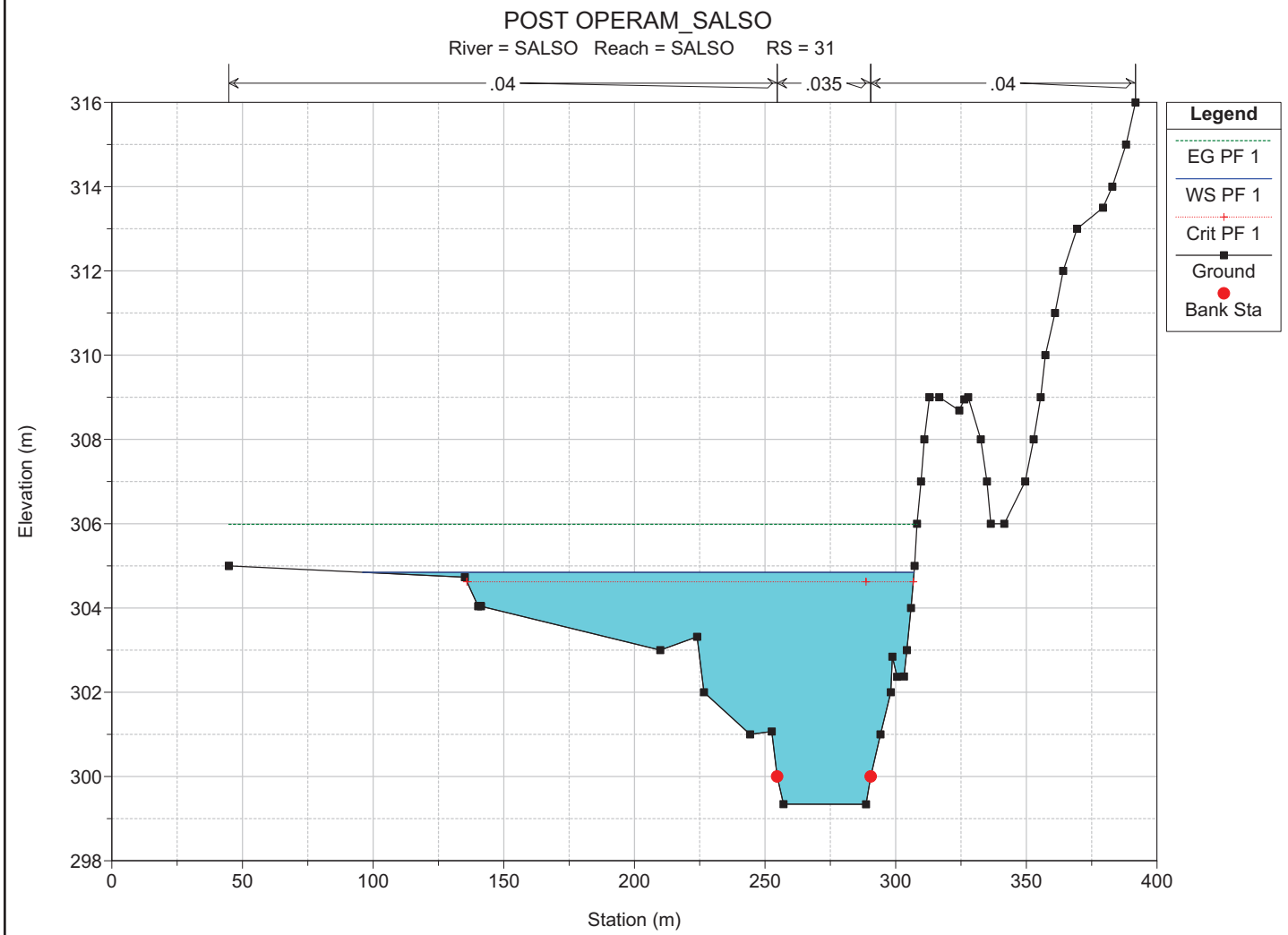
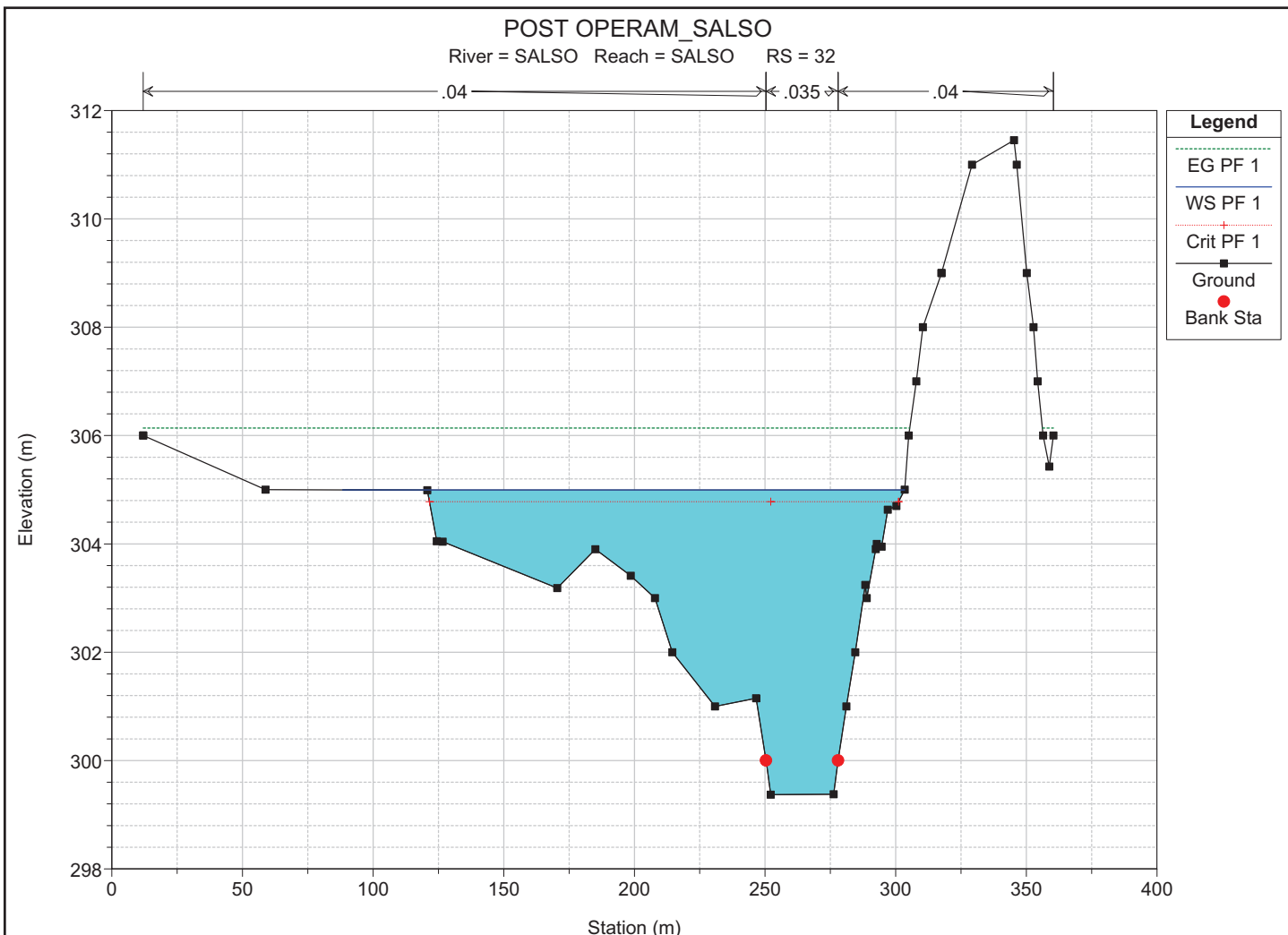
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 32.25 BR



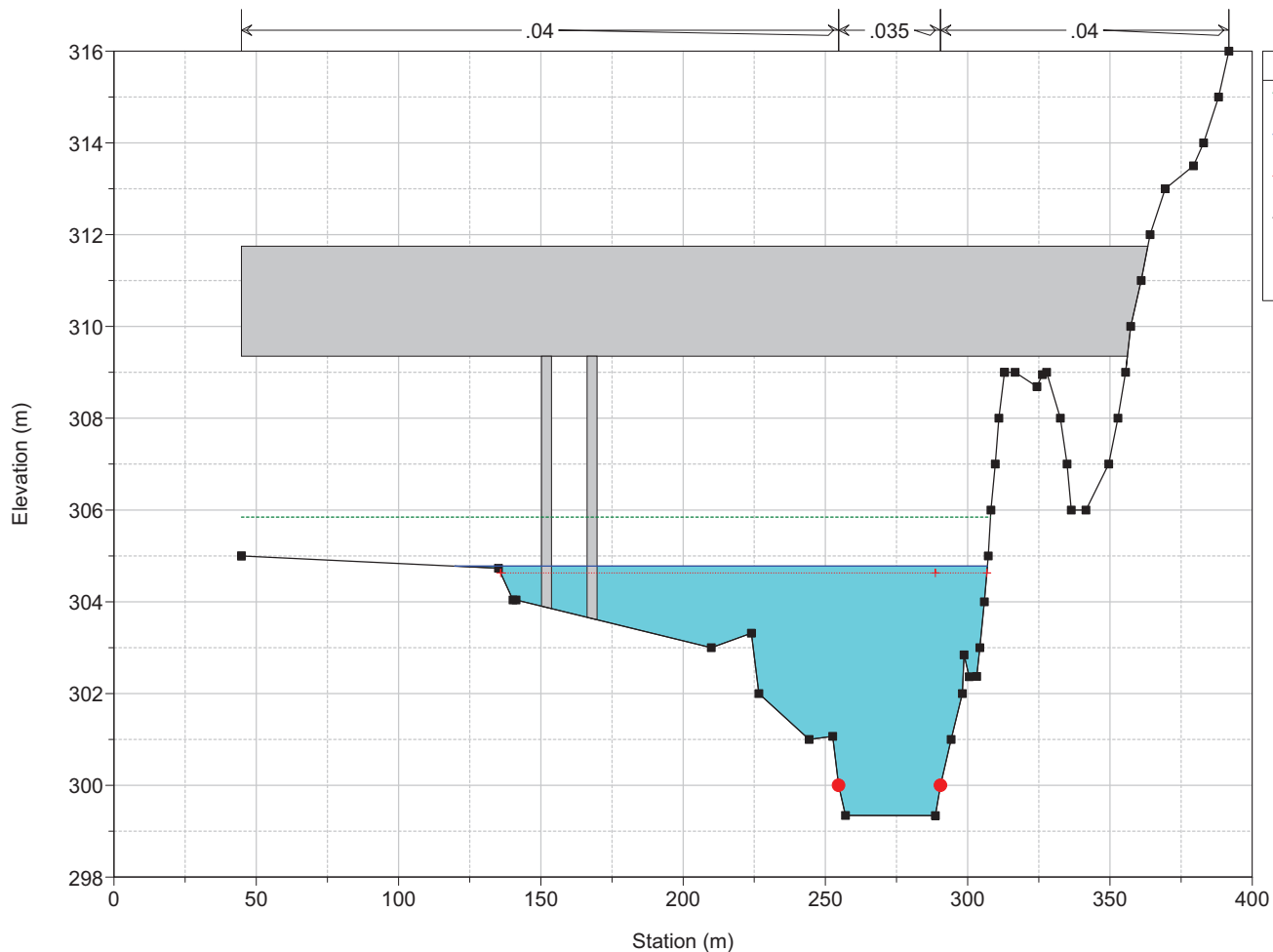
Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta



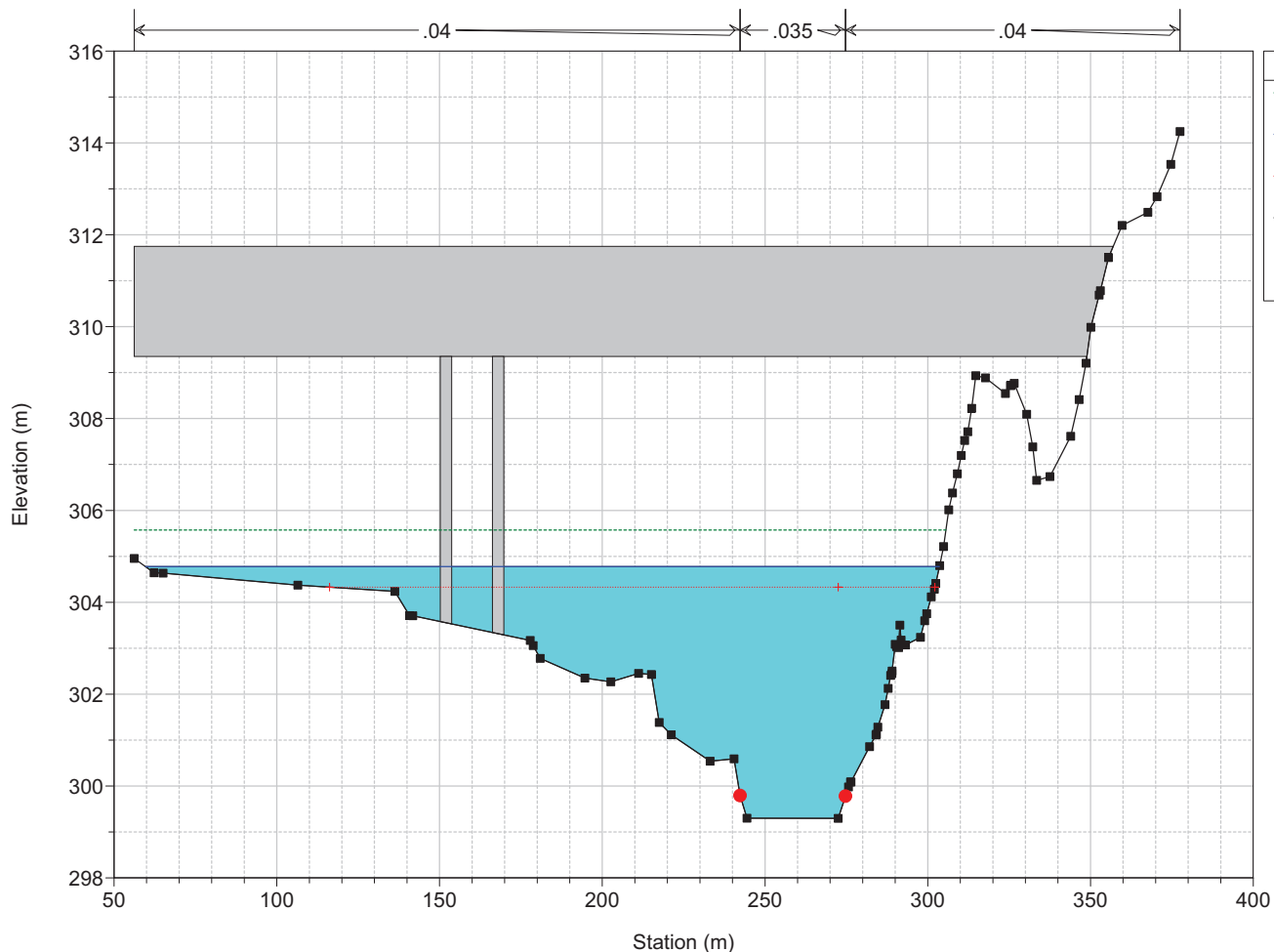
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.875 BR



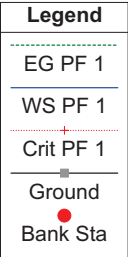
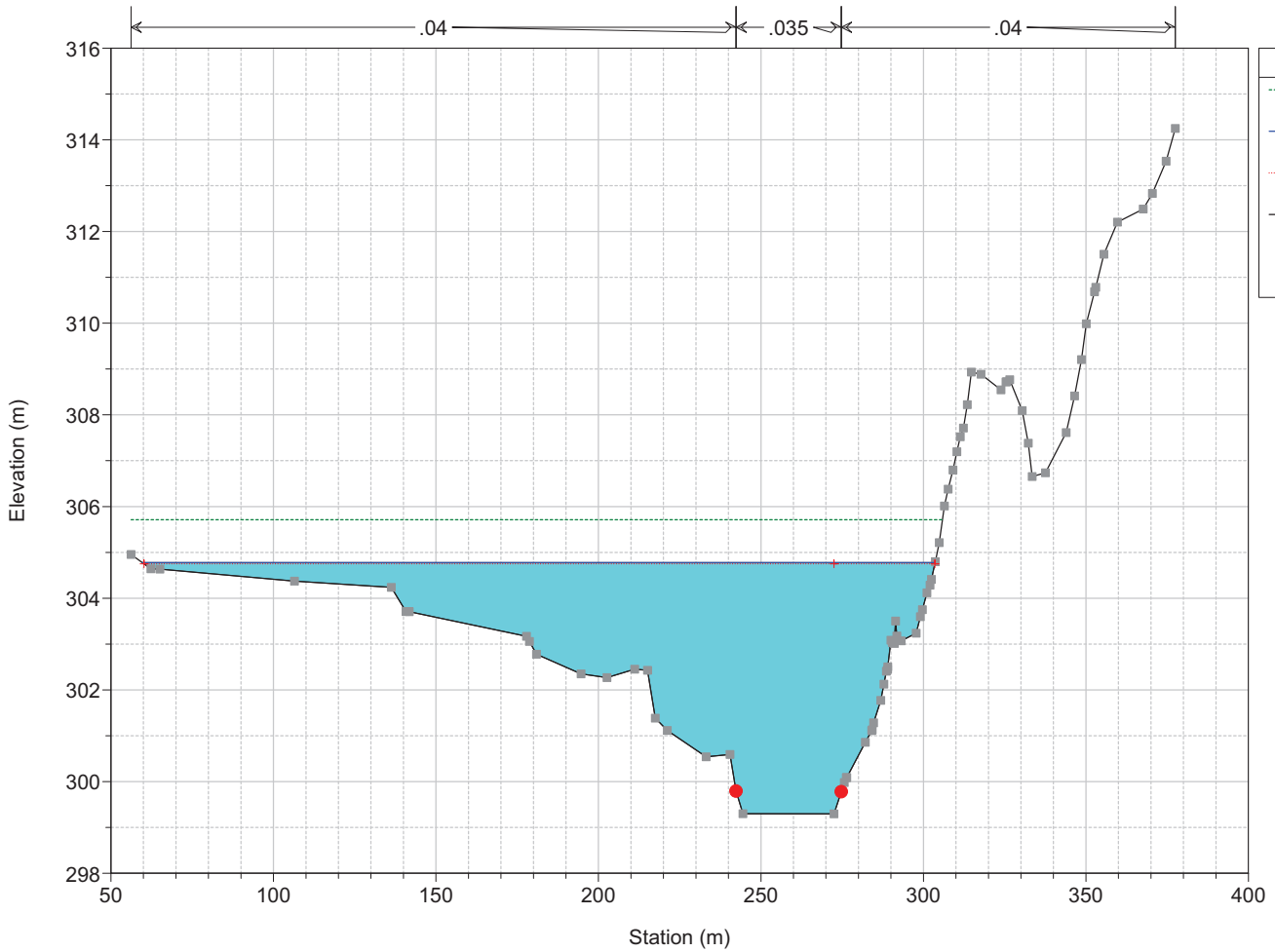
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.875 BR



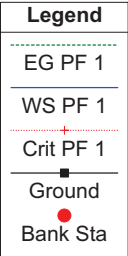
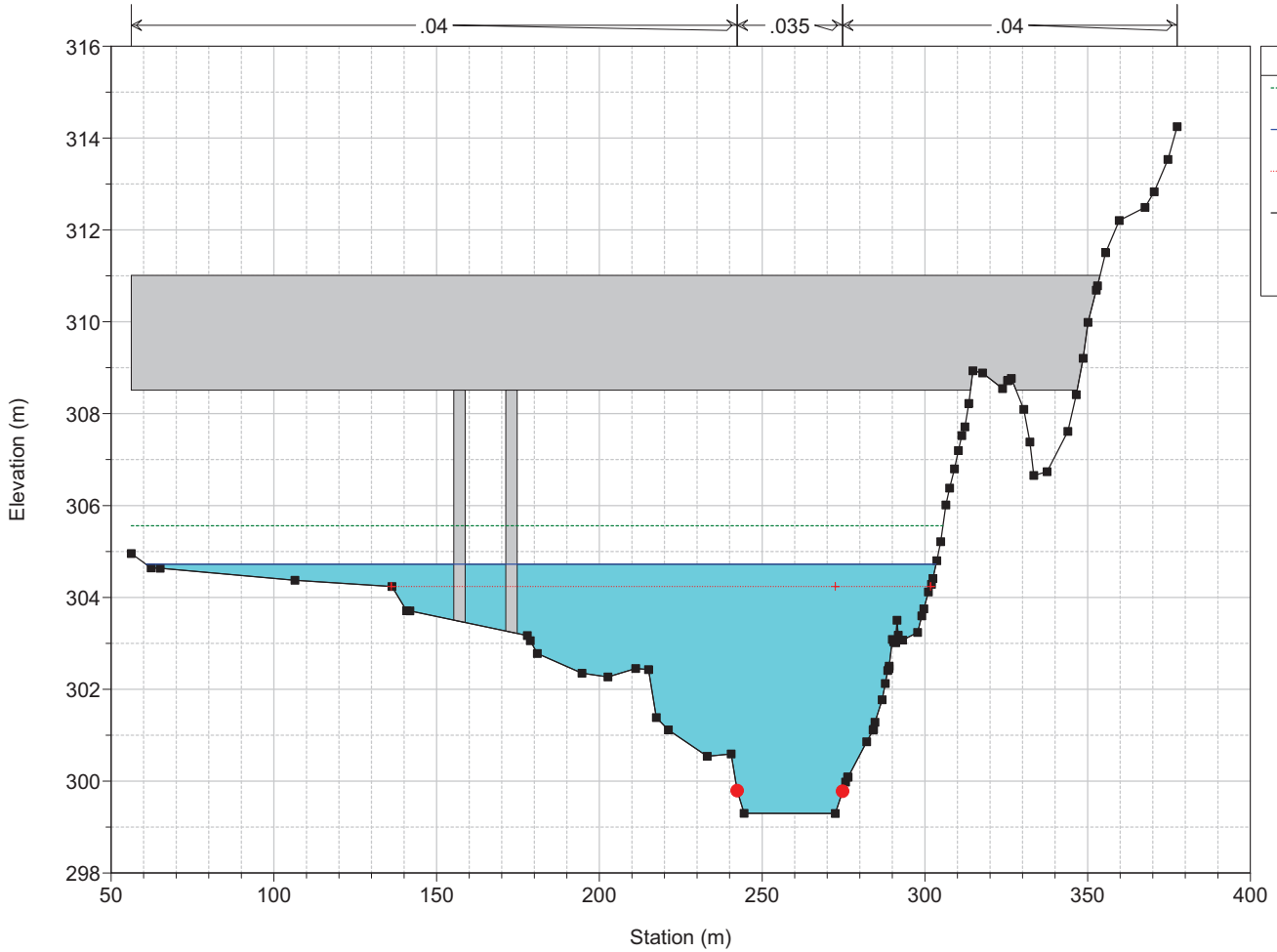
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.75*



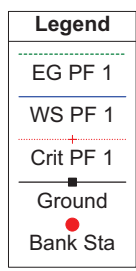
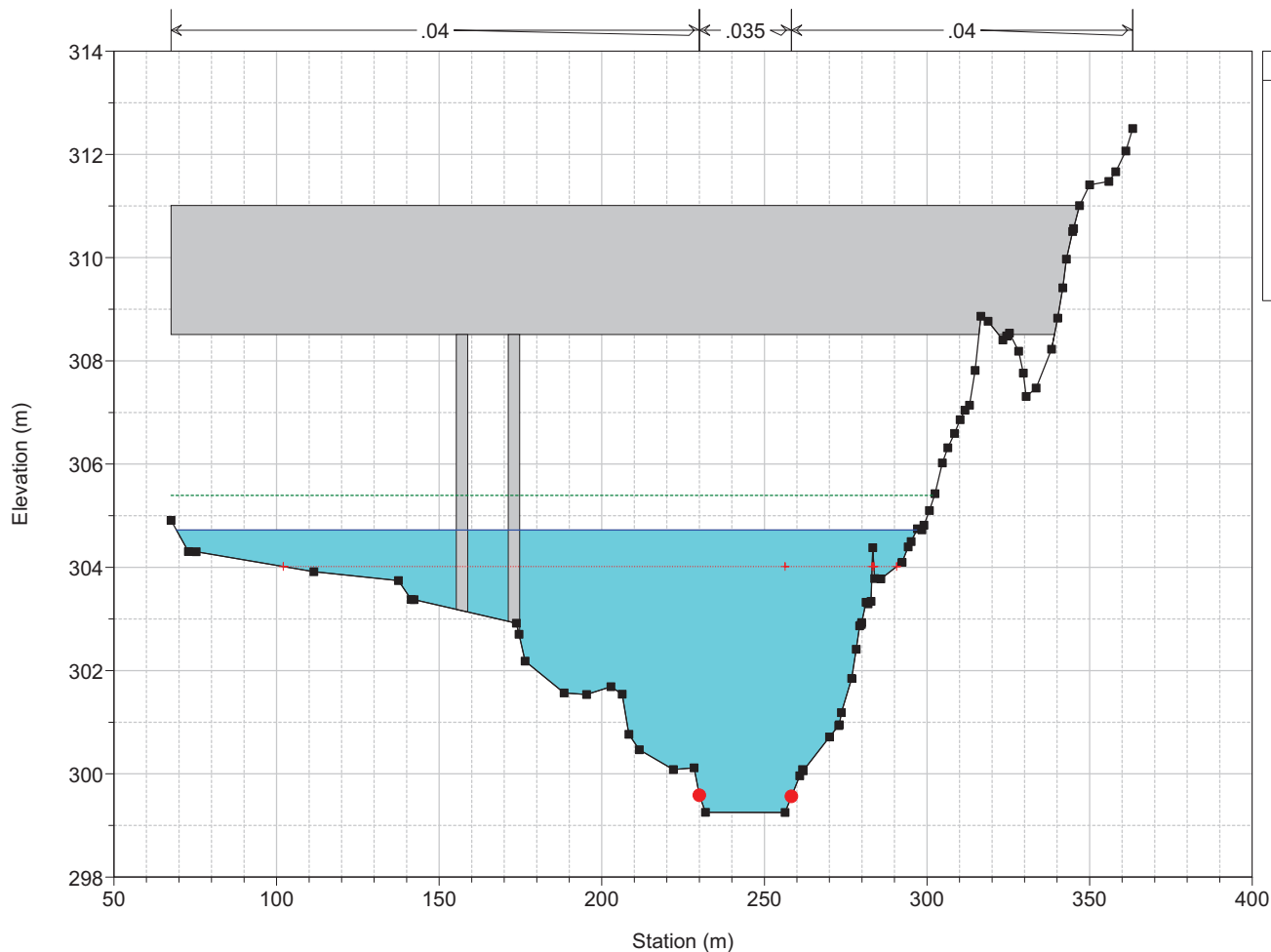
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.625 BR



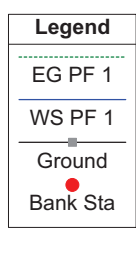
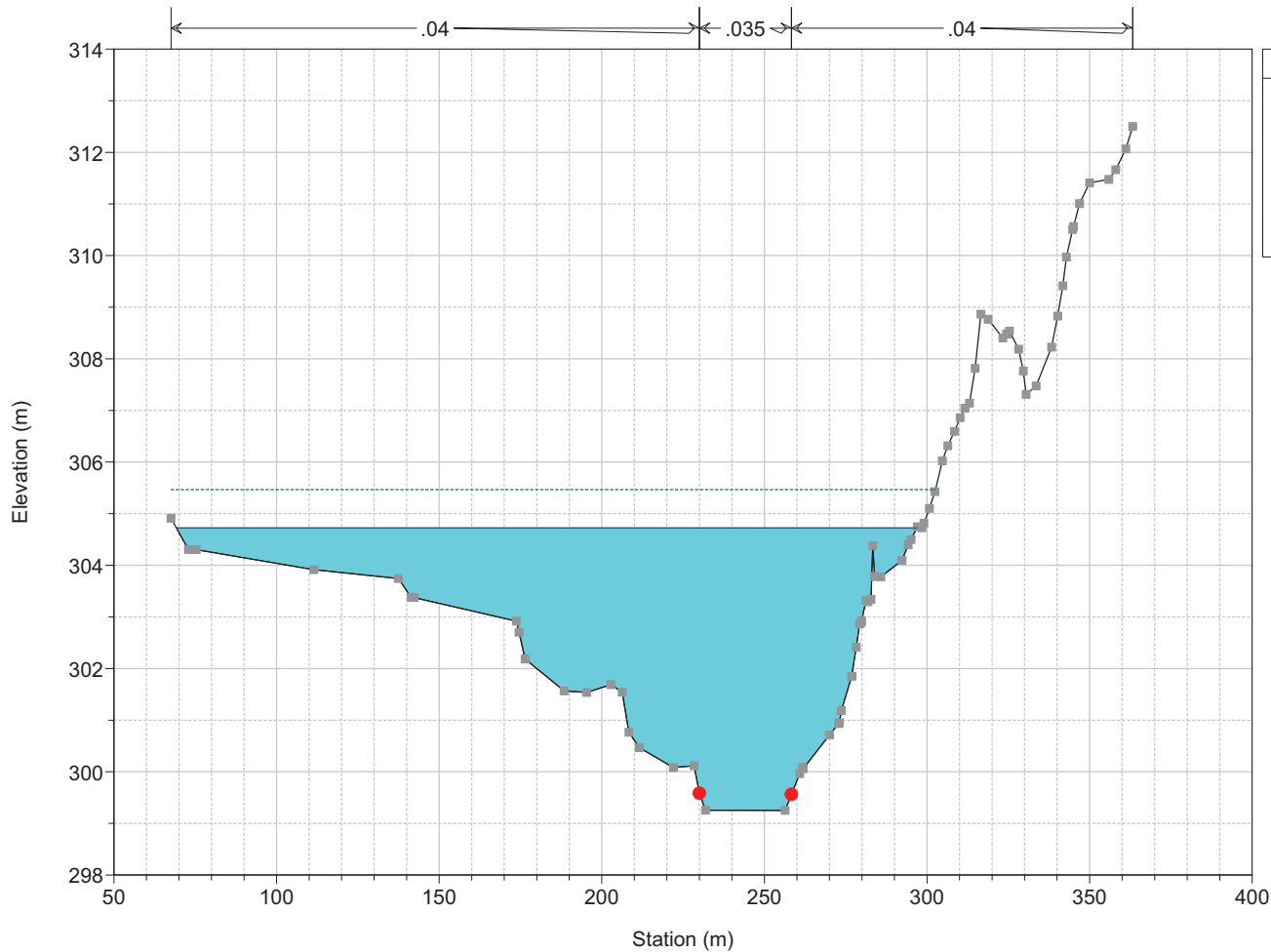
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.625 BR



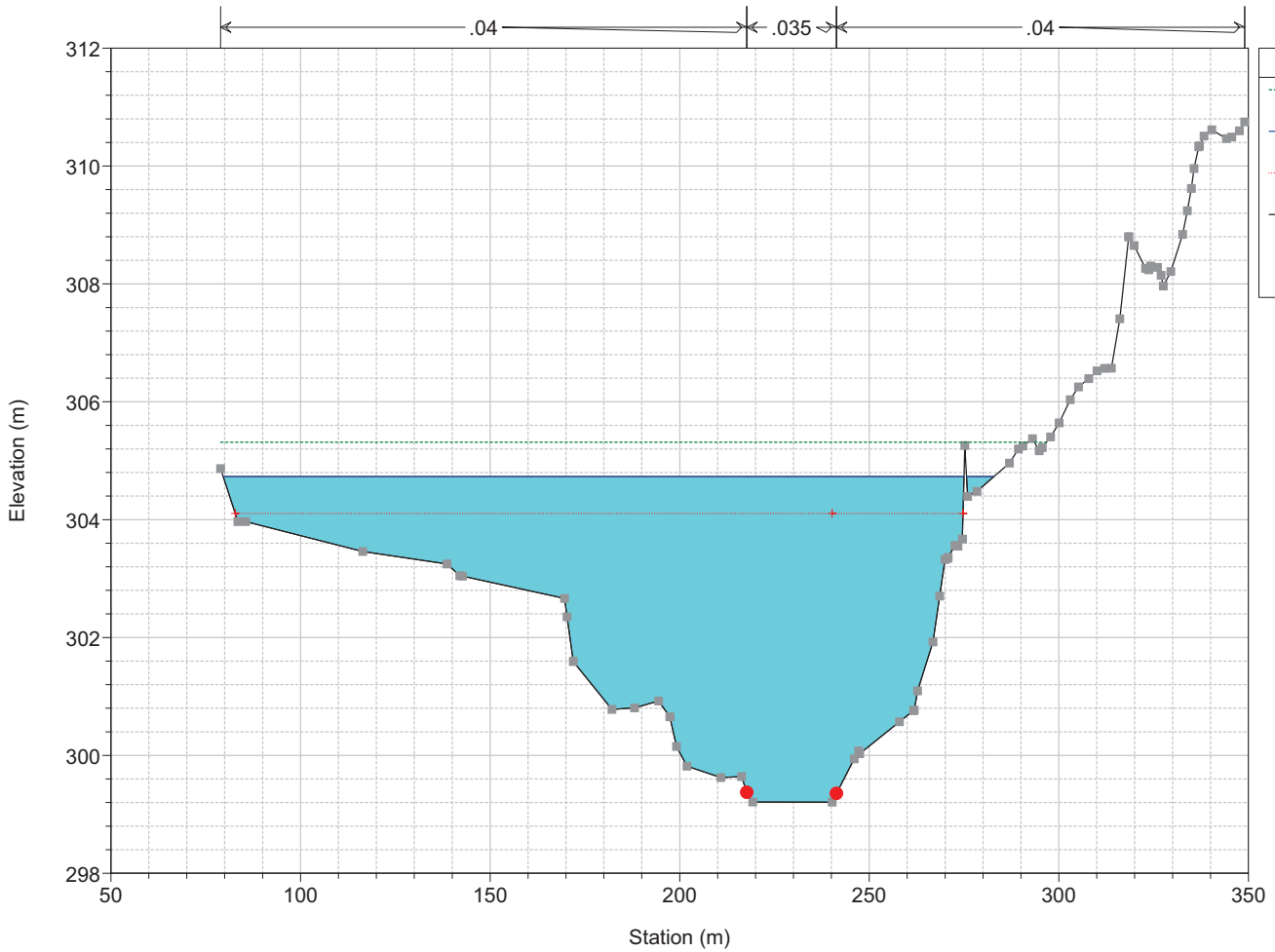
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.5*



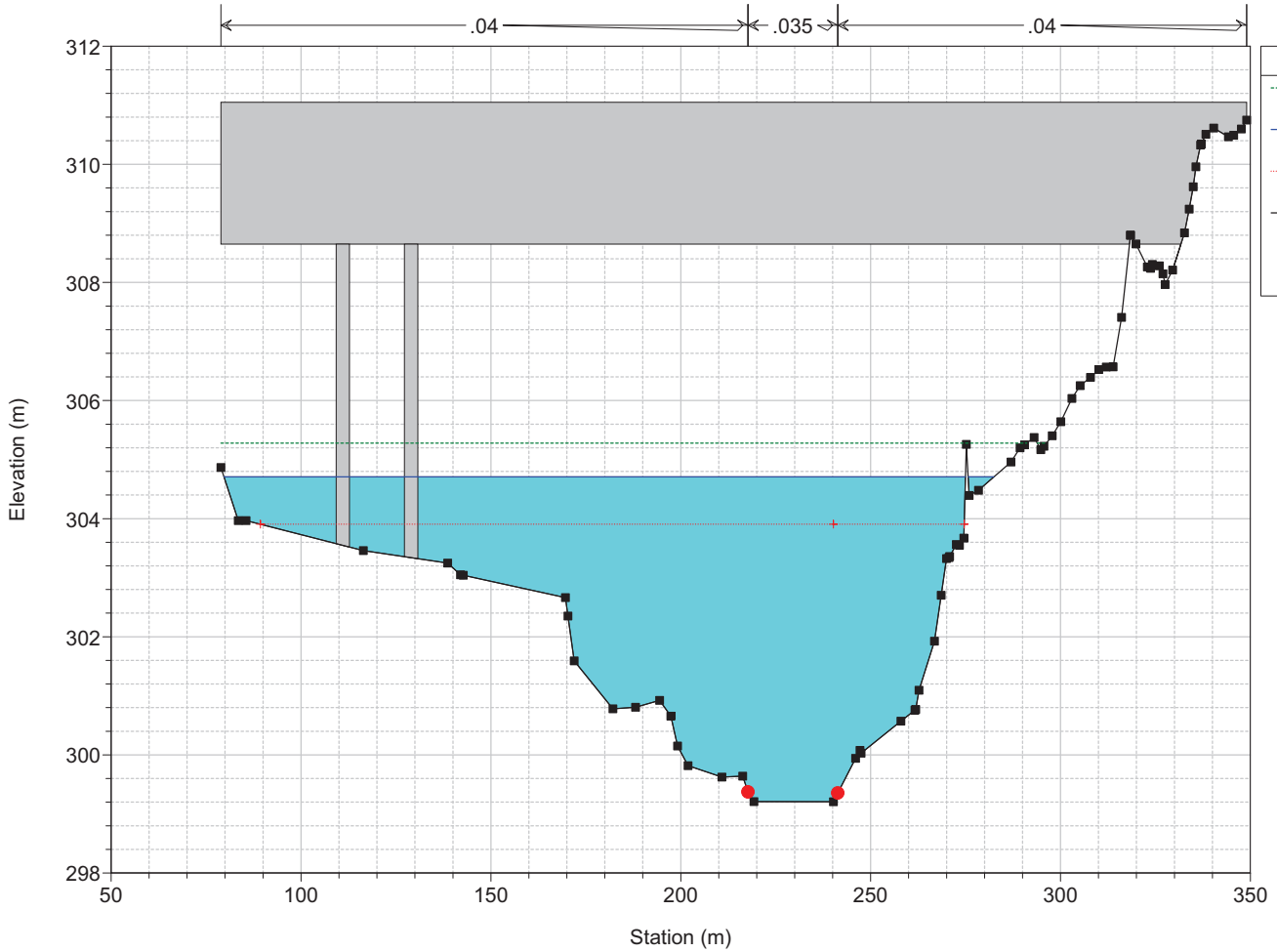
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.25*



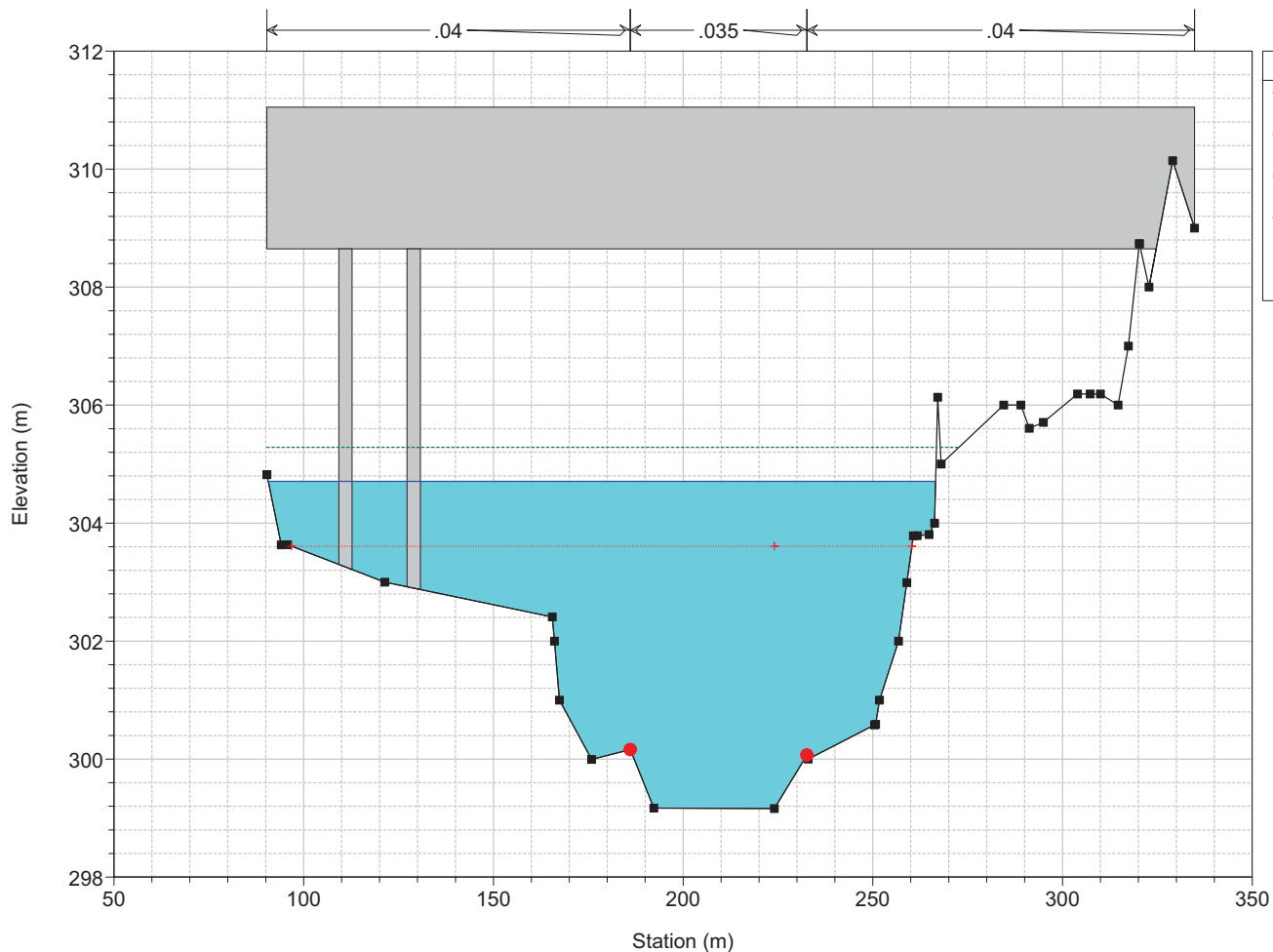
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.125 BR



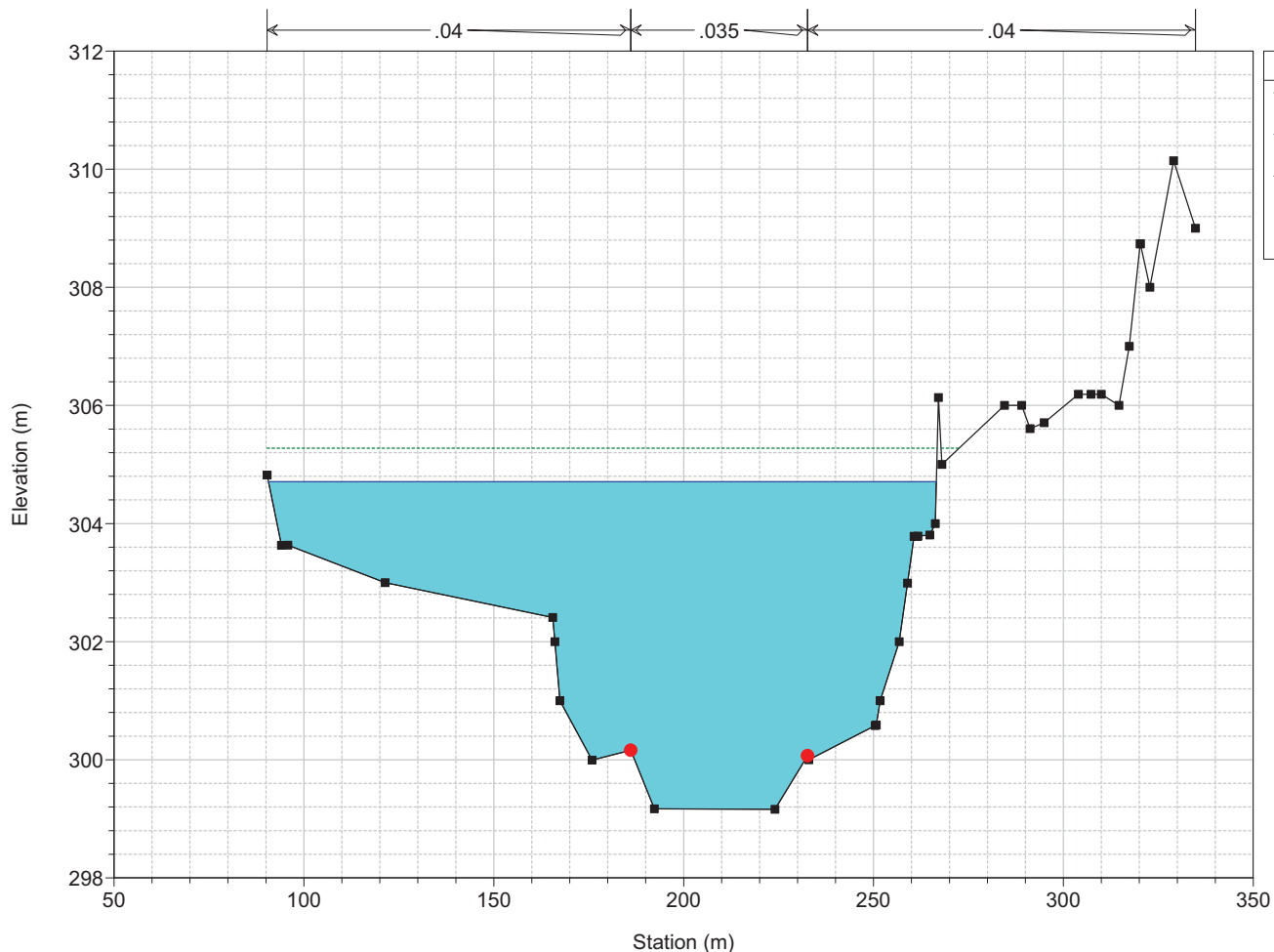
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30.125 BR



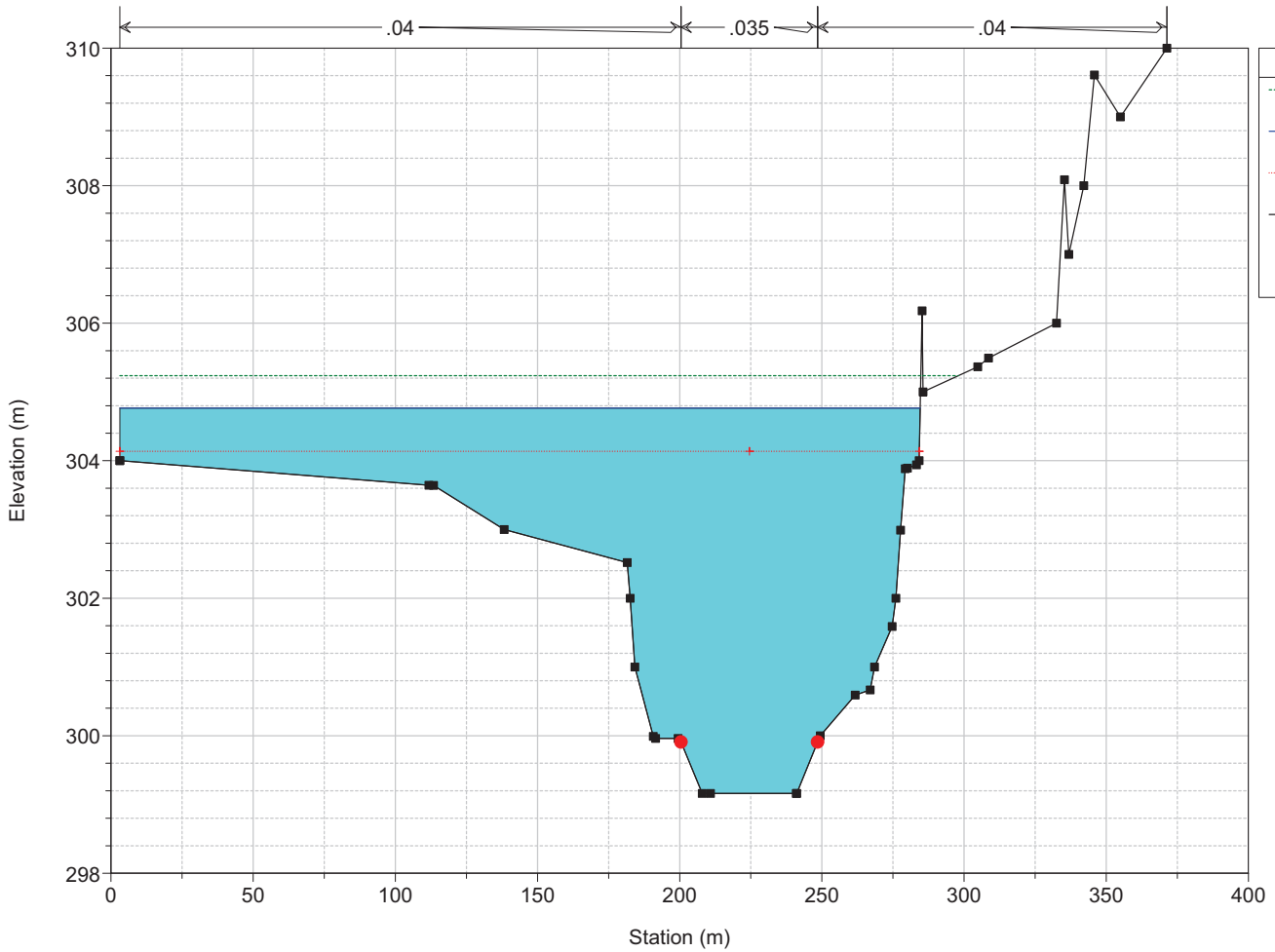
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 30



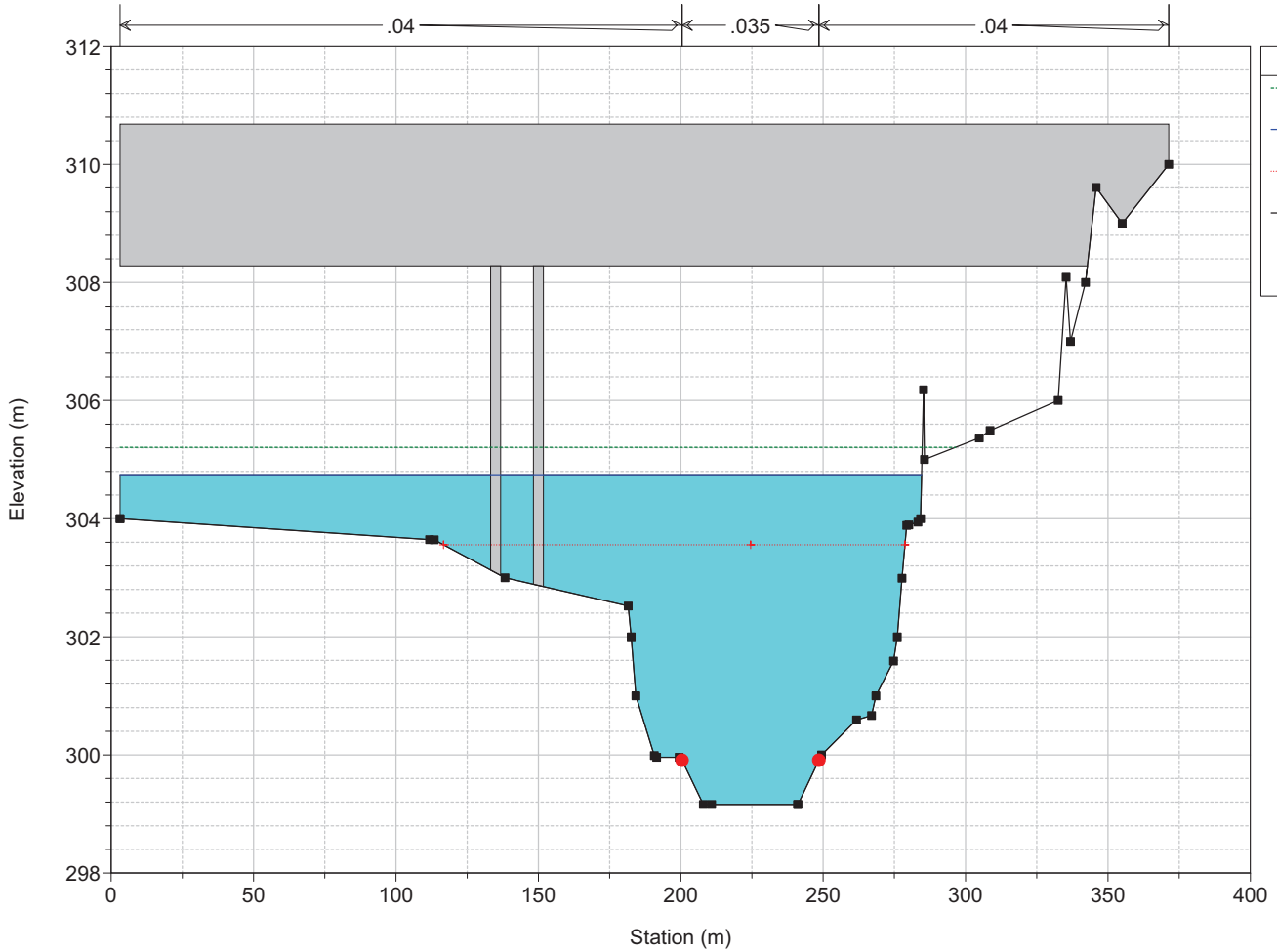
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 29



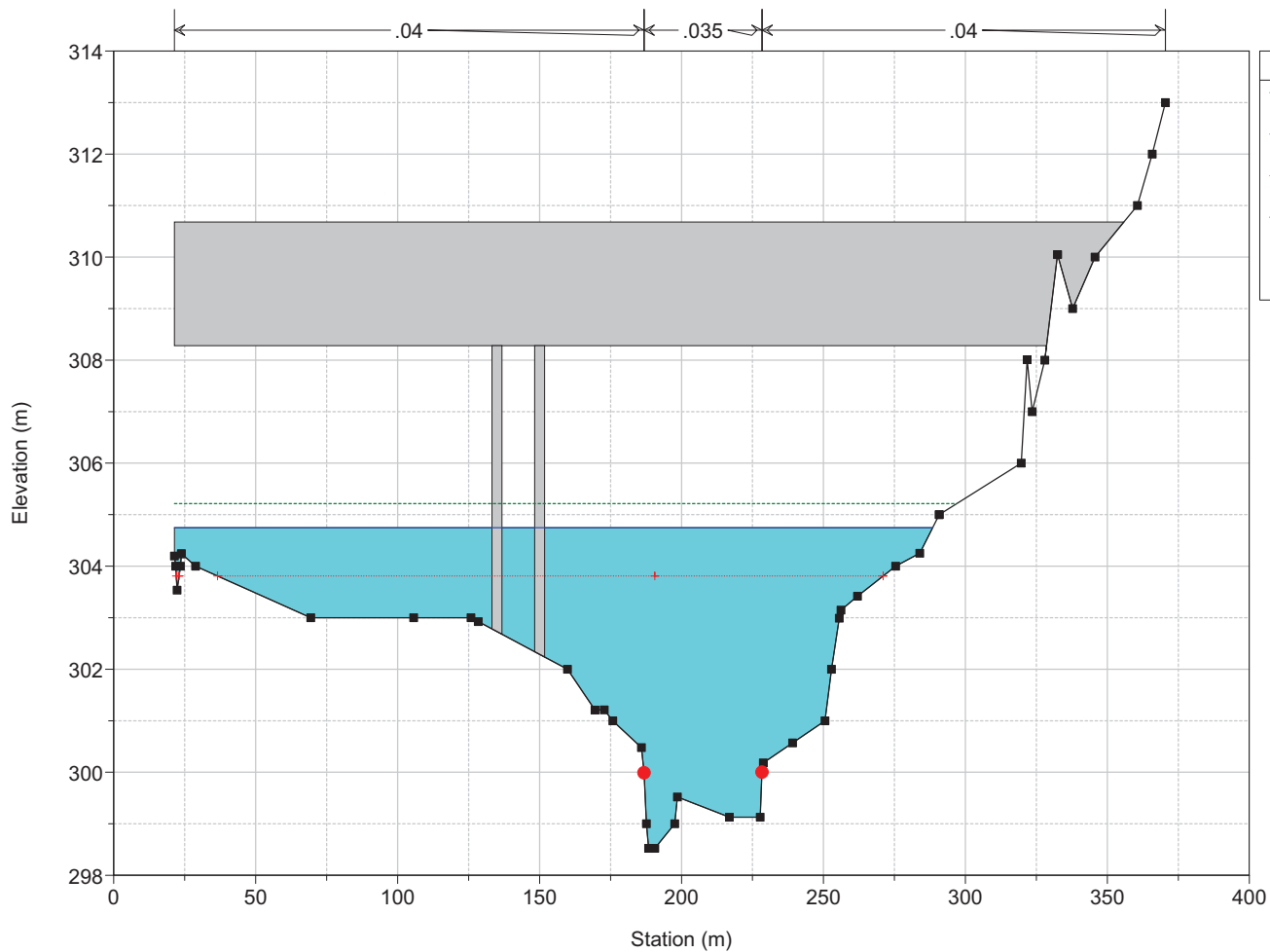
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 28.5 BR



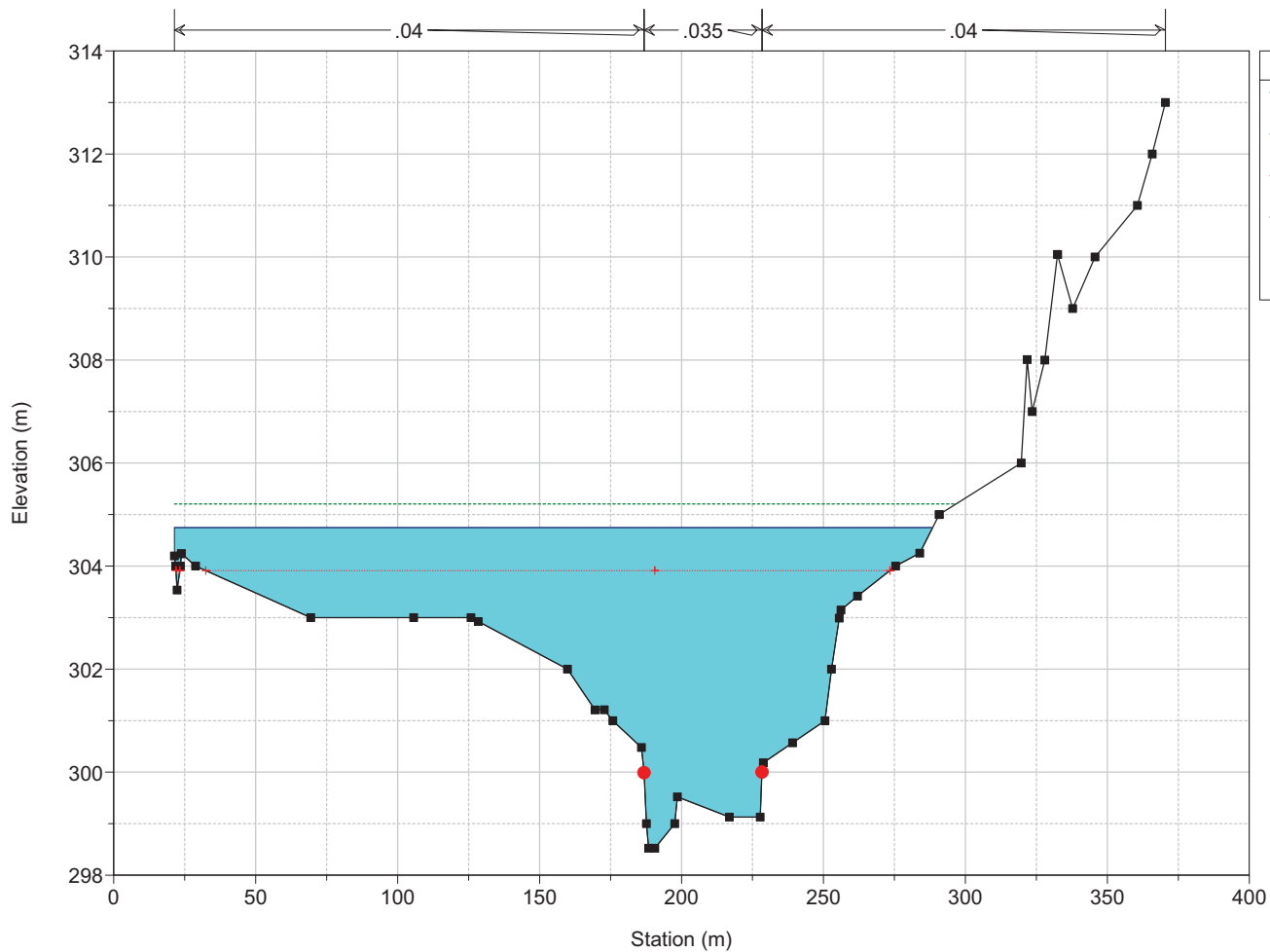
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 28.5 BR



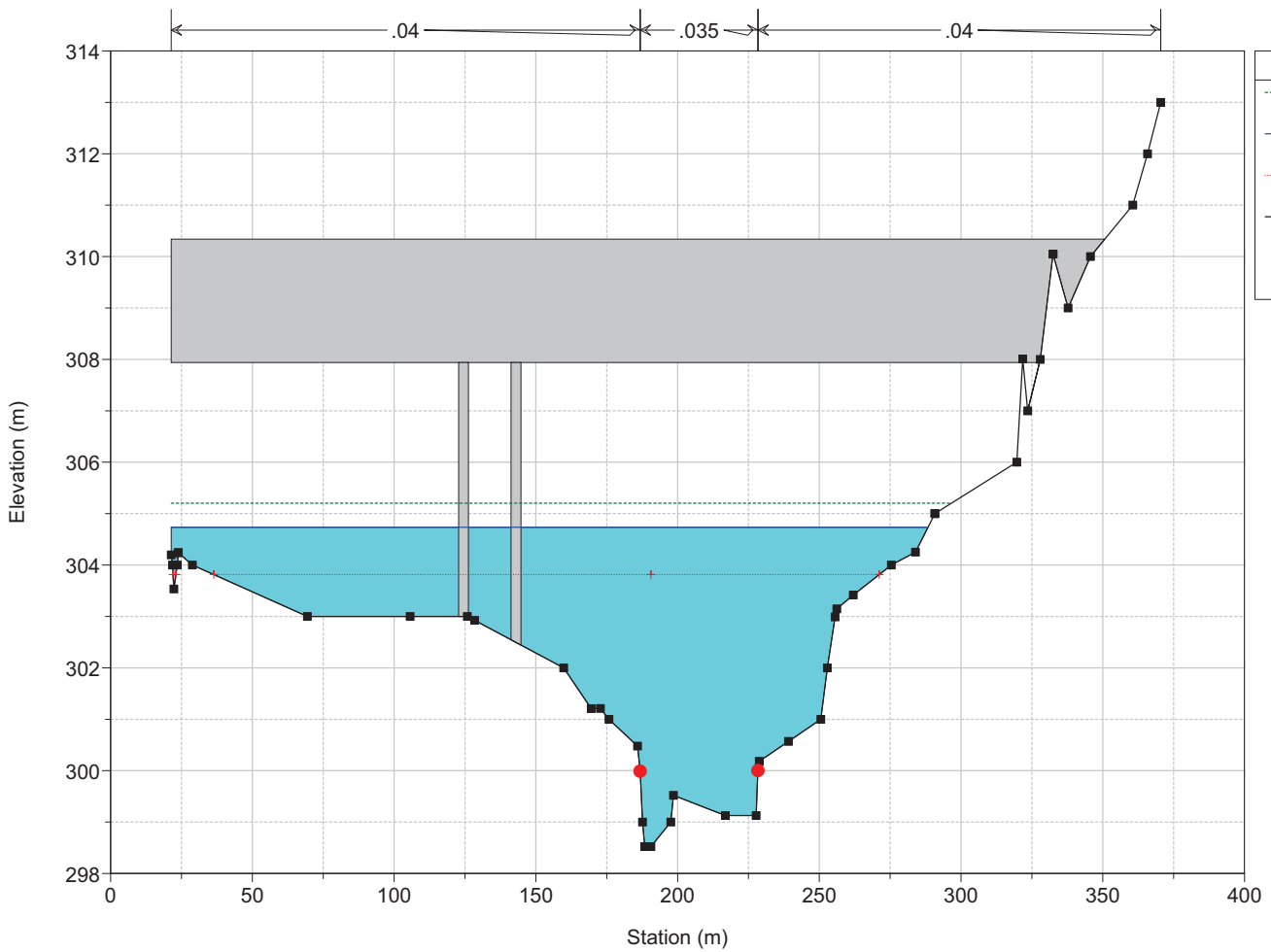
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 28



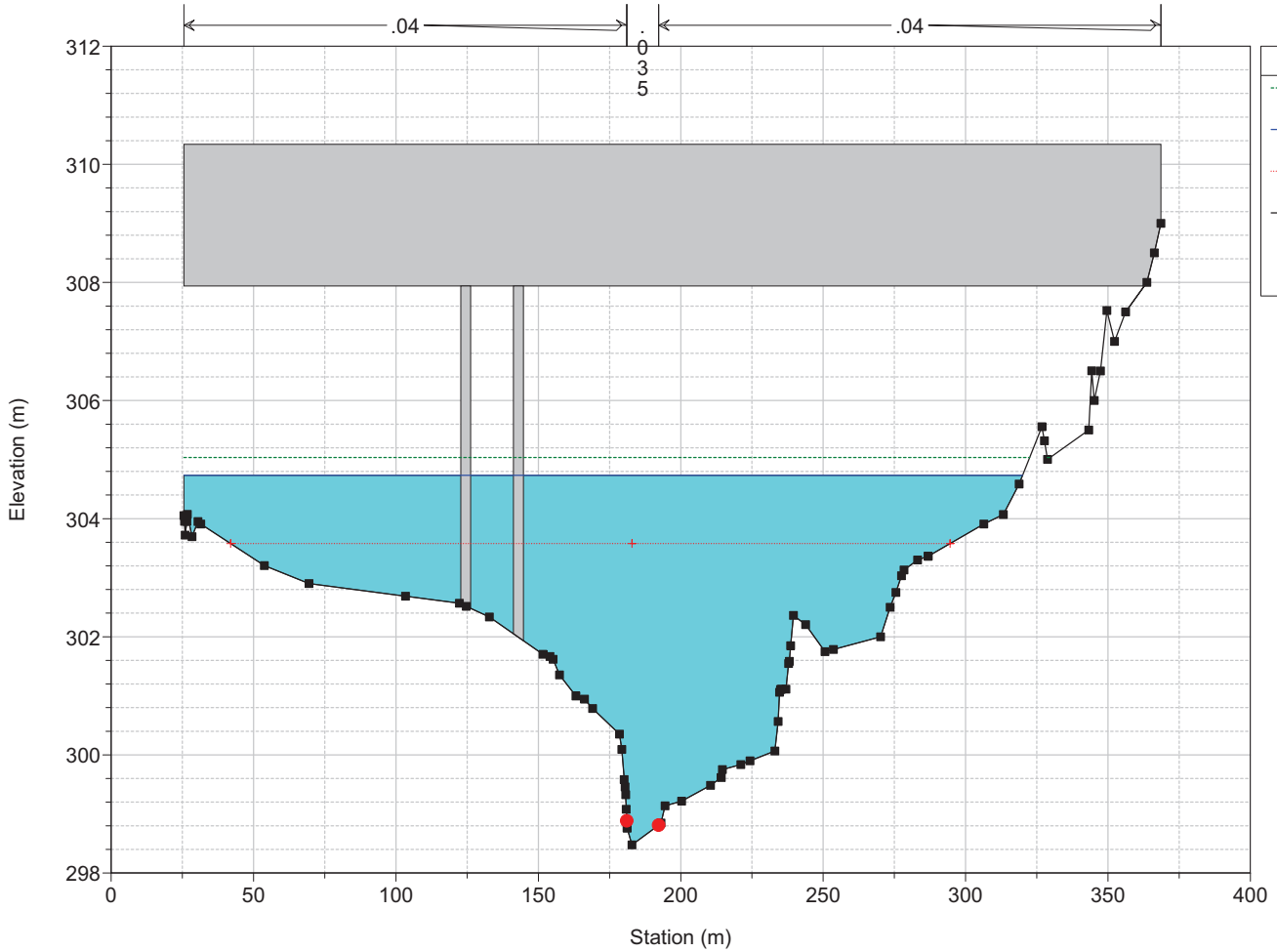
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 27.75 BR



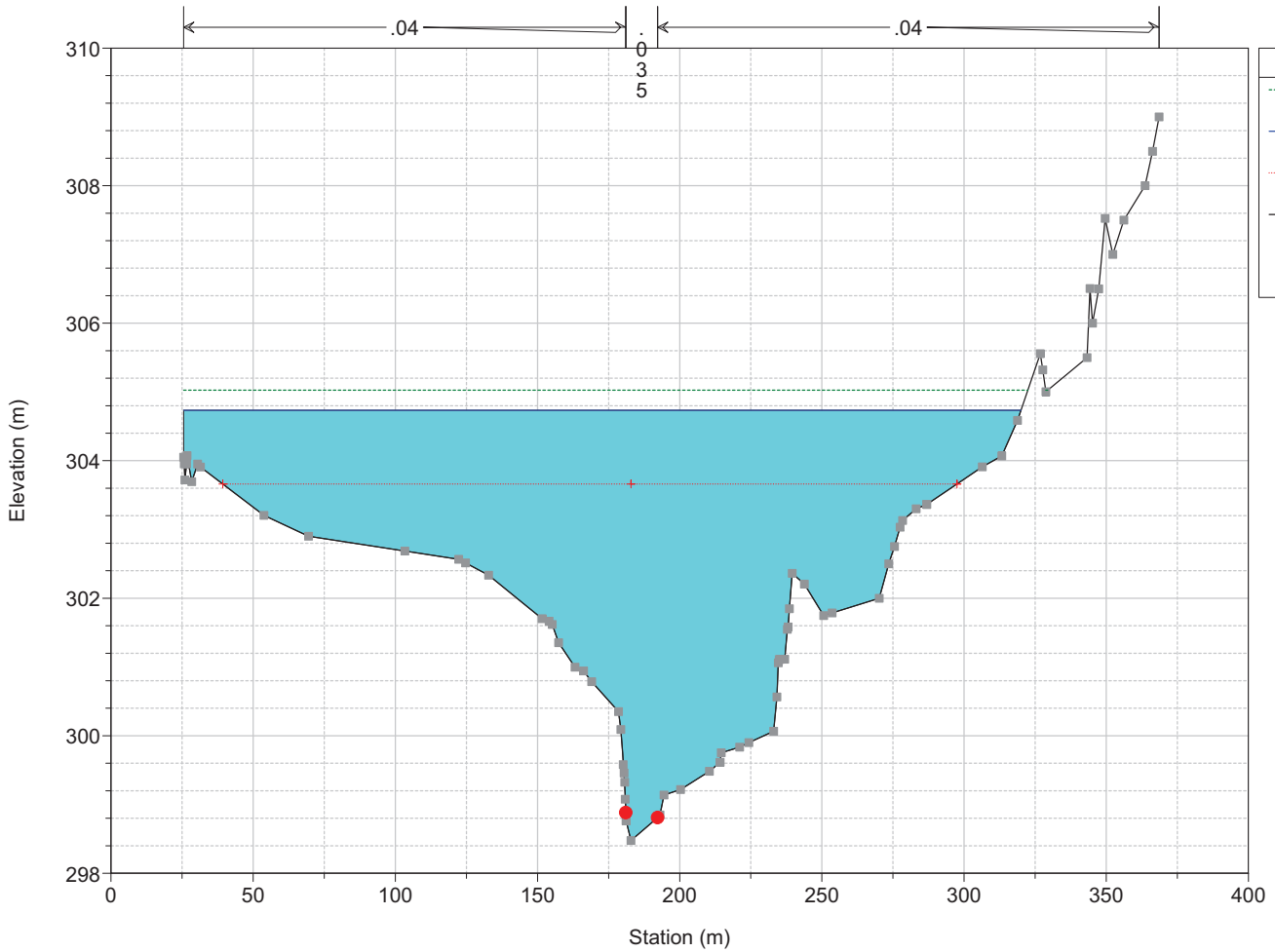
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 27.75 BR



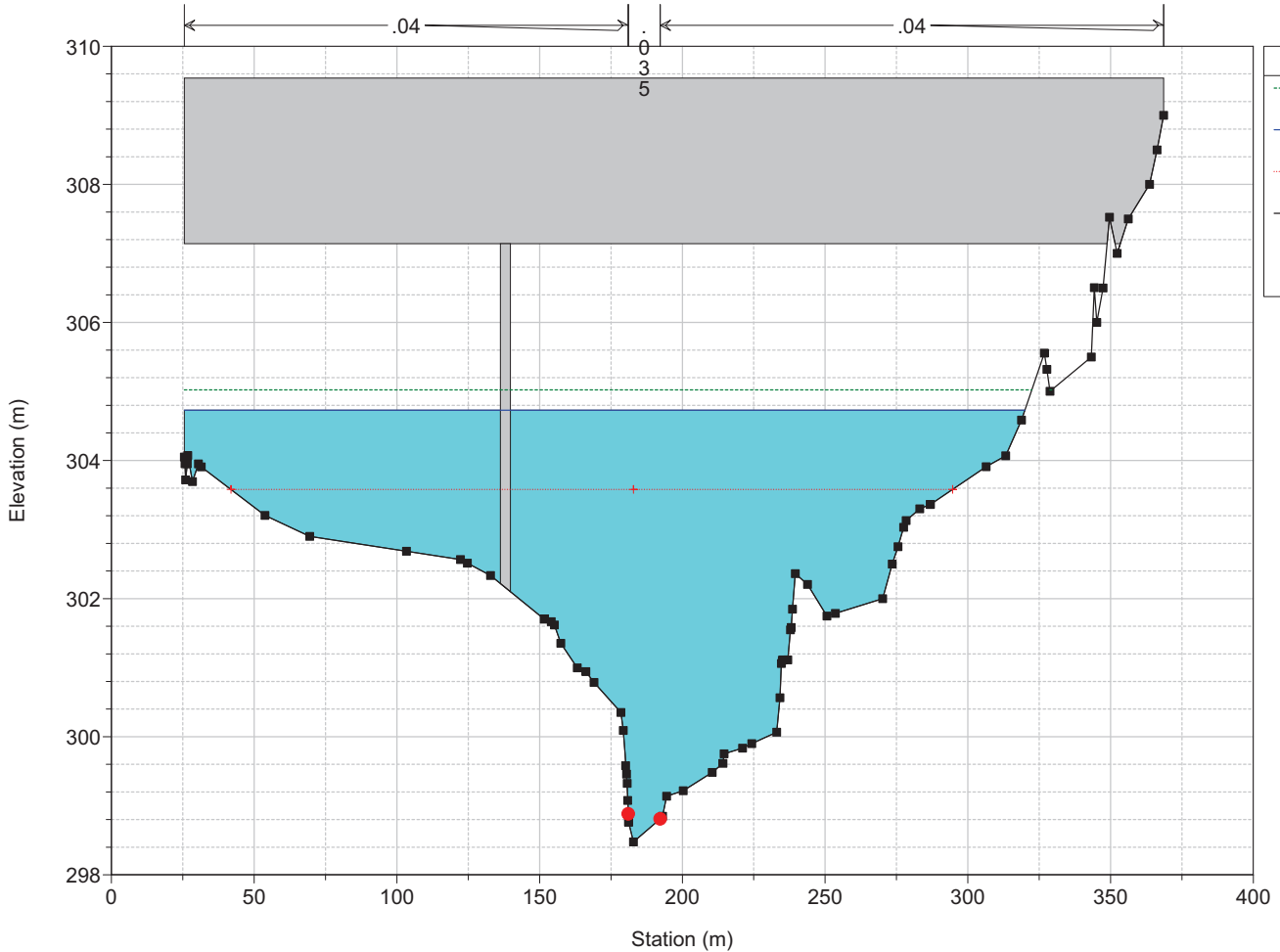
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 27.5*



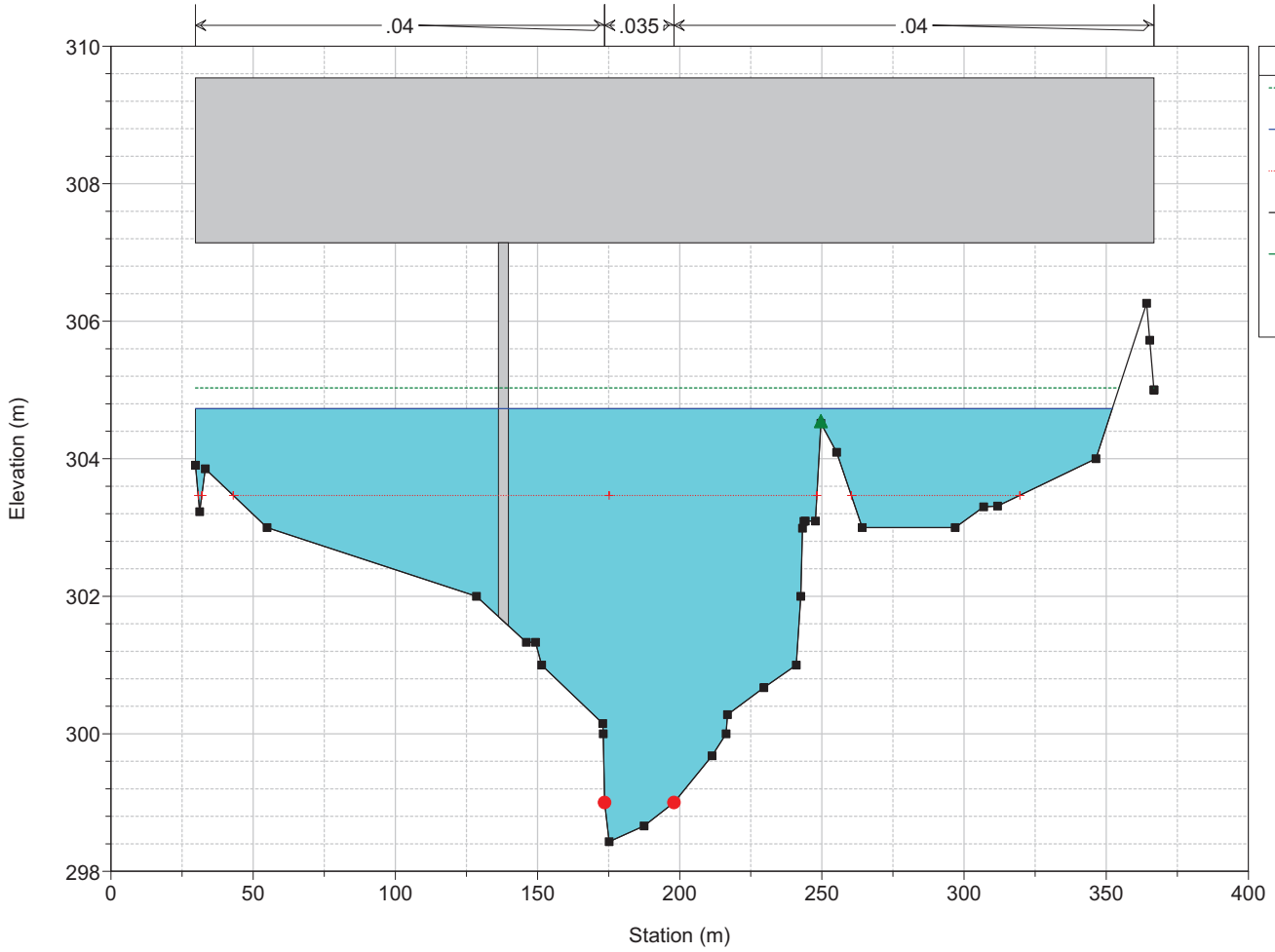
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 27.25 BR



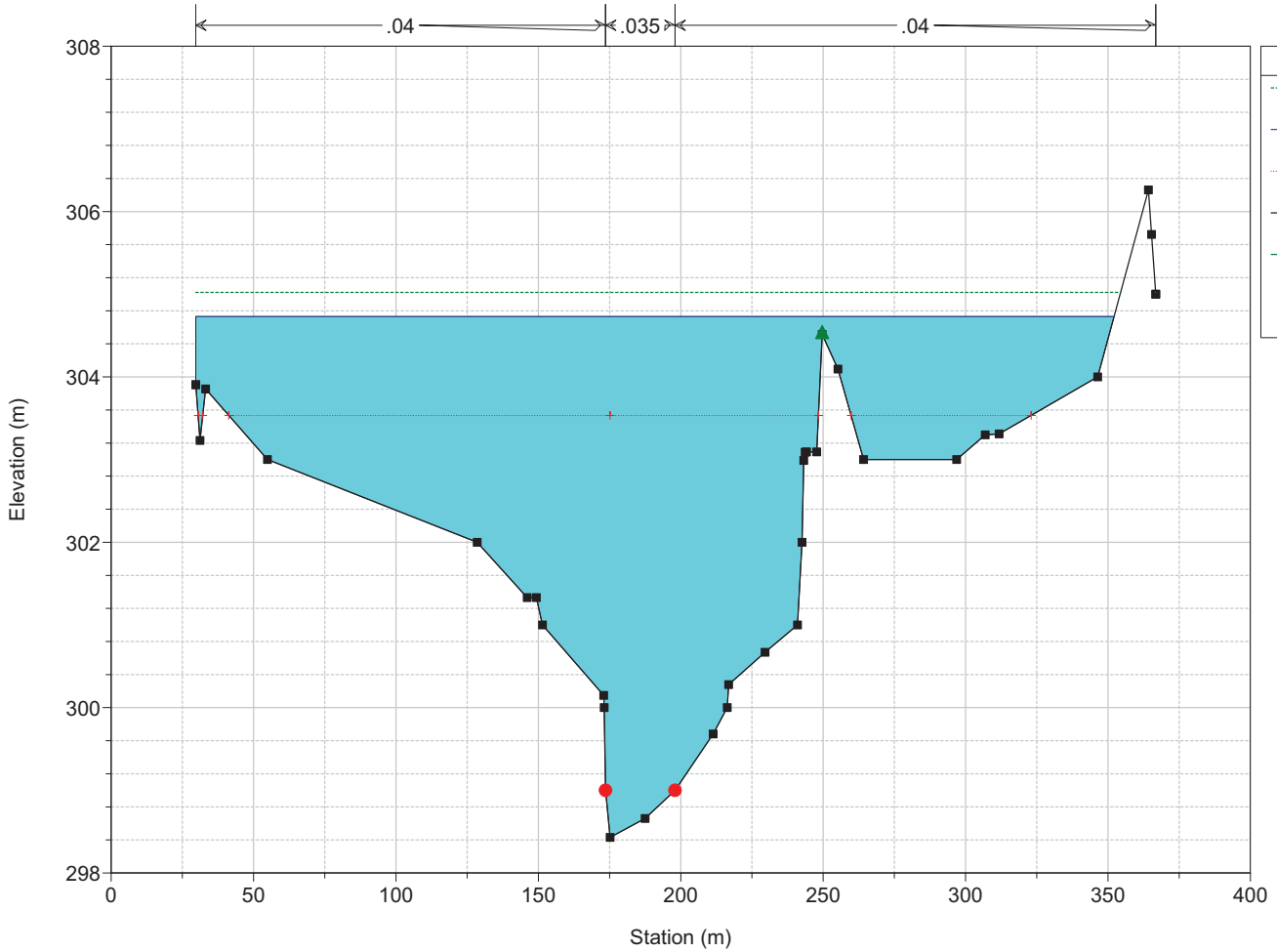
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 27.25 BR



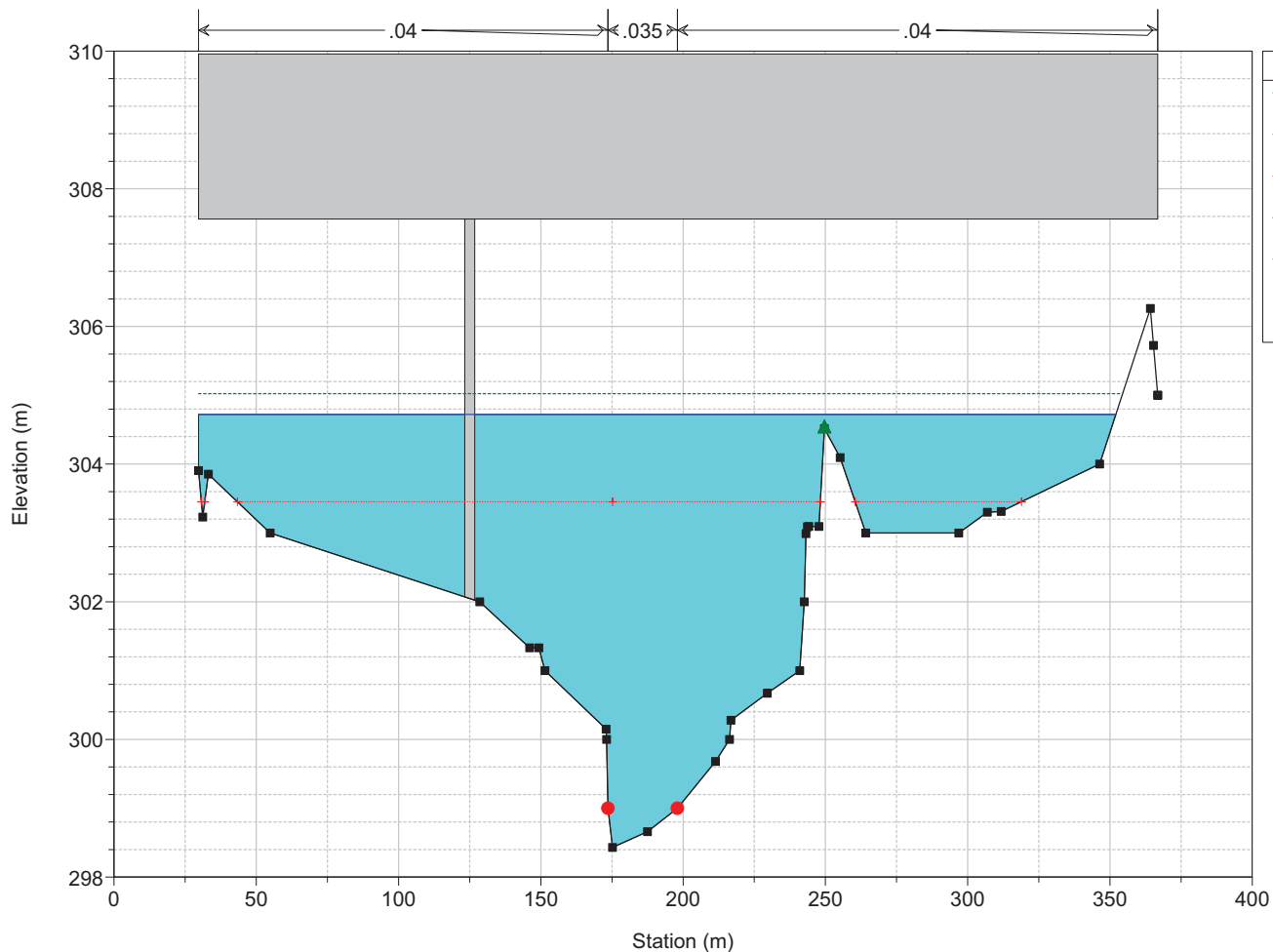
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 27



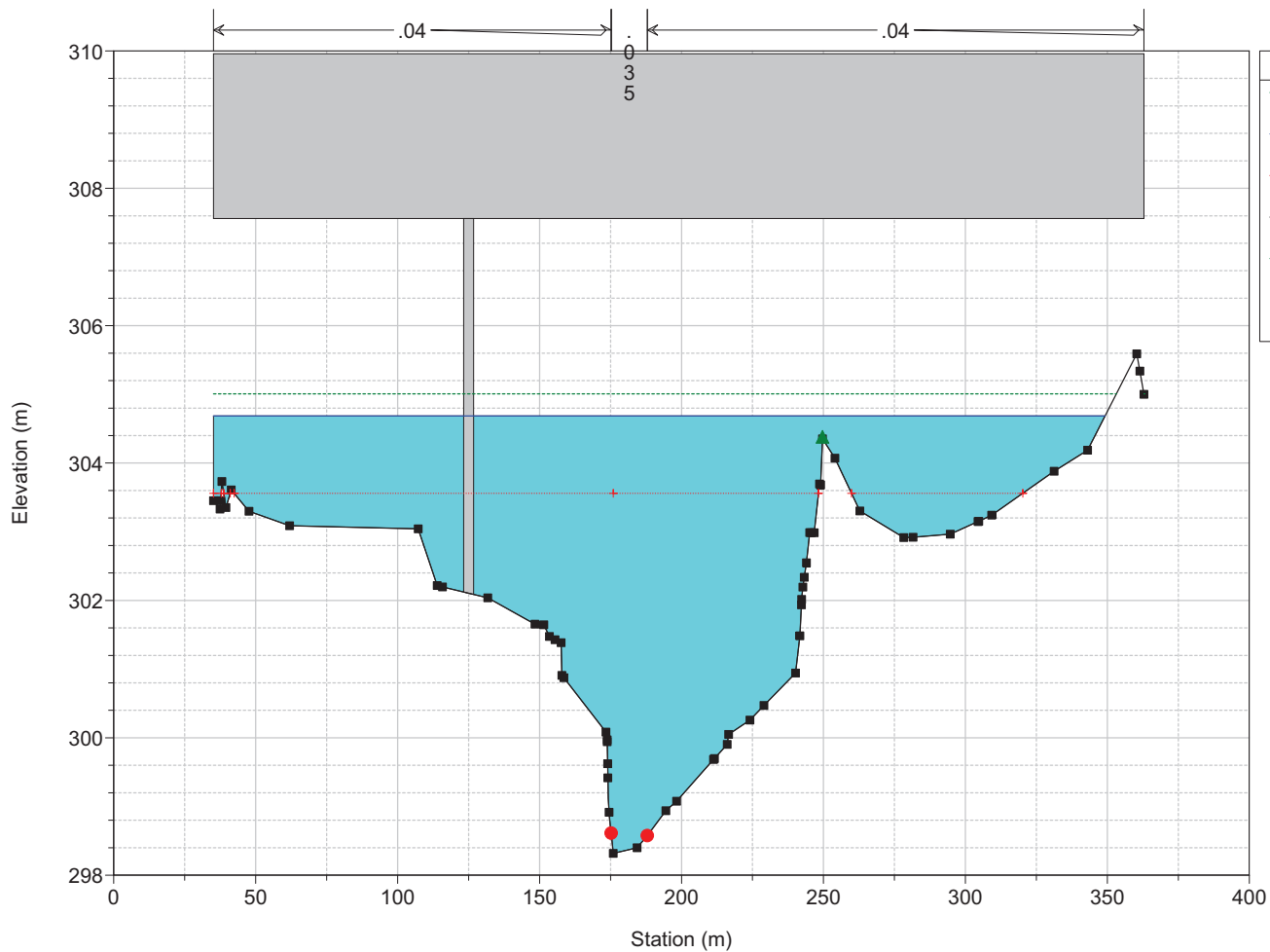
POST OPERAM_SALSO

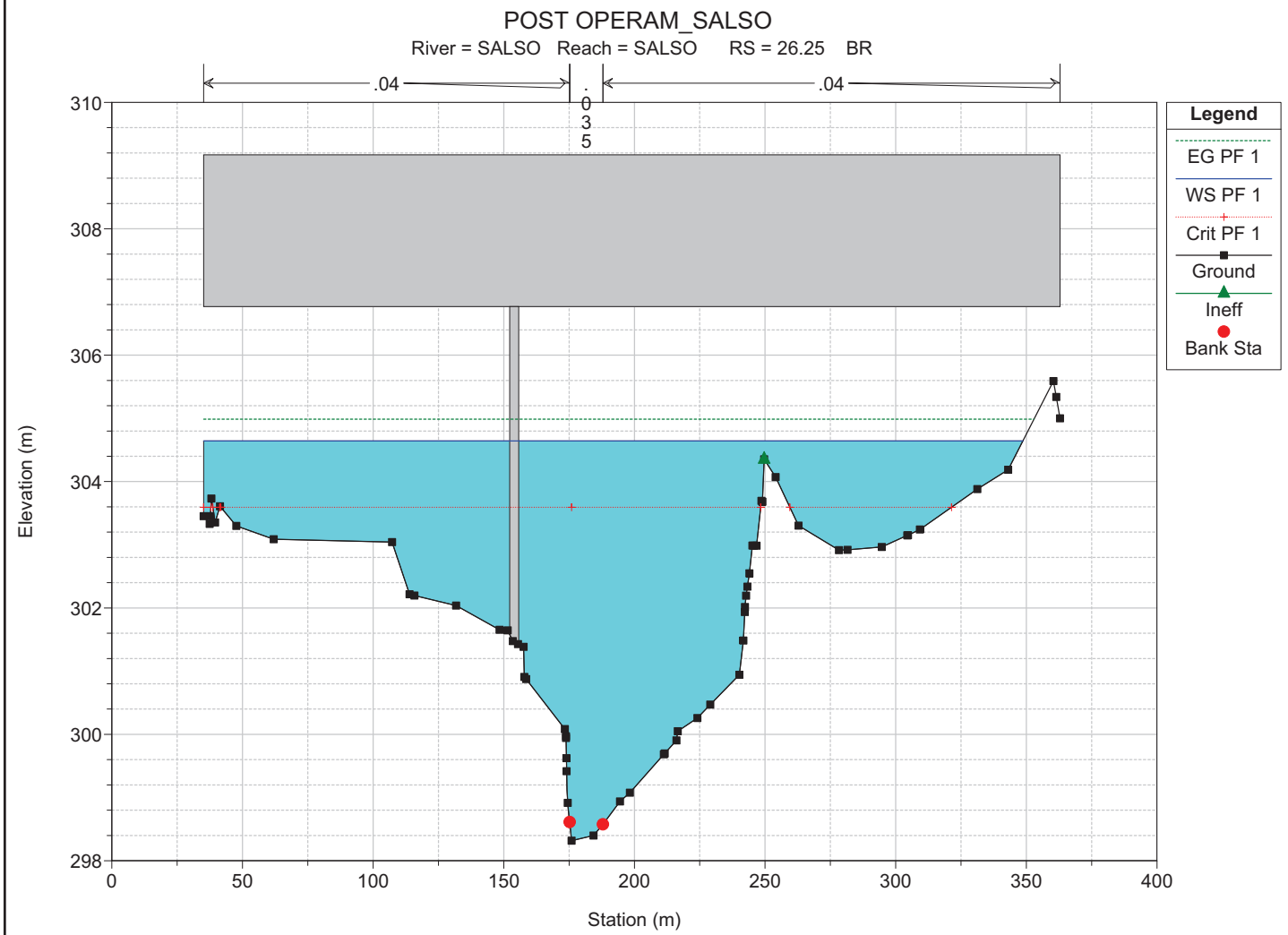
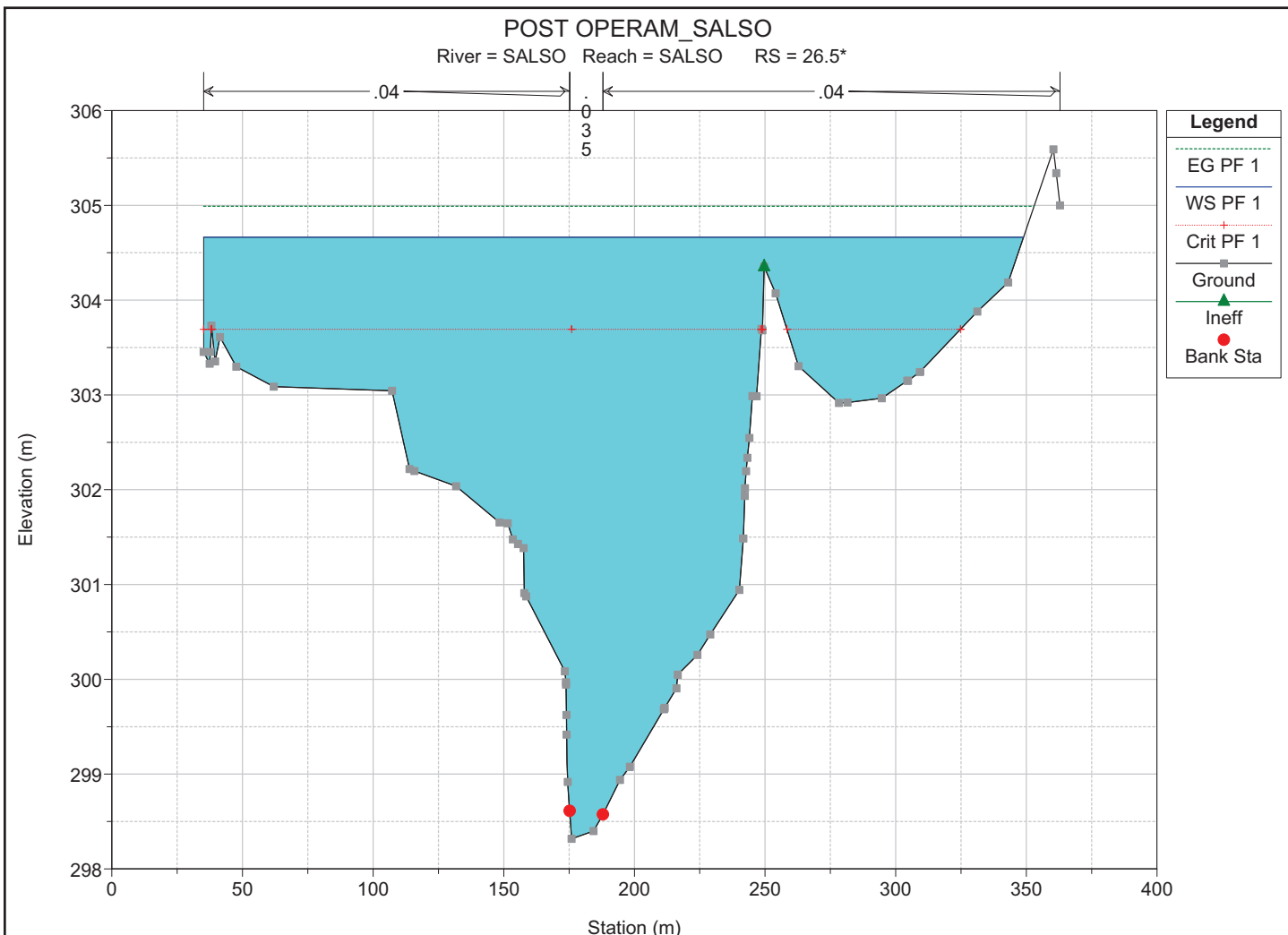
River = SALSO Reach = SALSO RS = 26.75 BR



POST OPERAM_SALSO

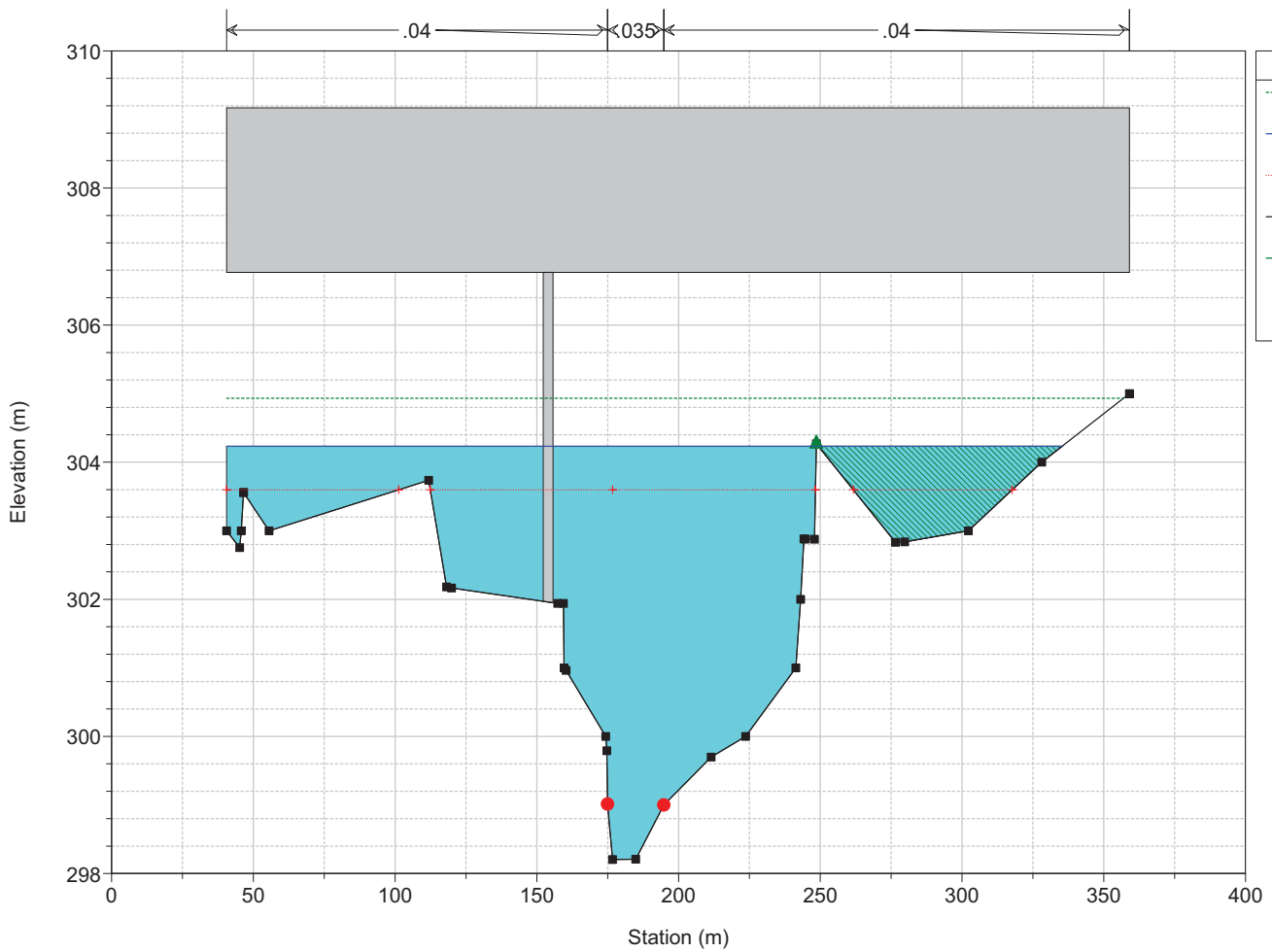
River = SALSO Reach = SALSO RS = 26.75 BR





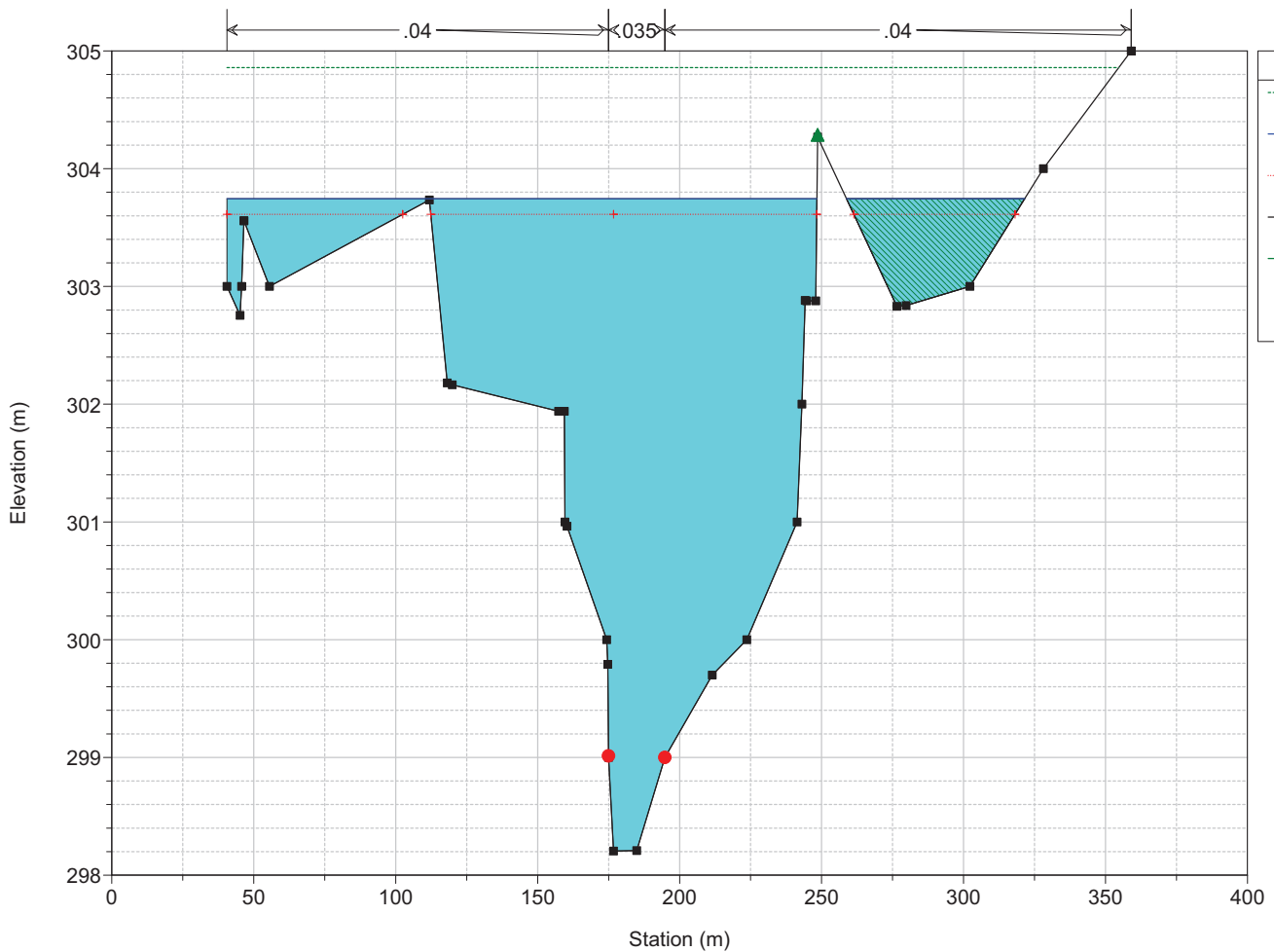
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 26.25 BR



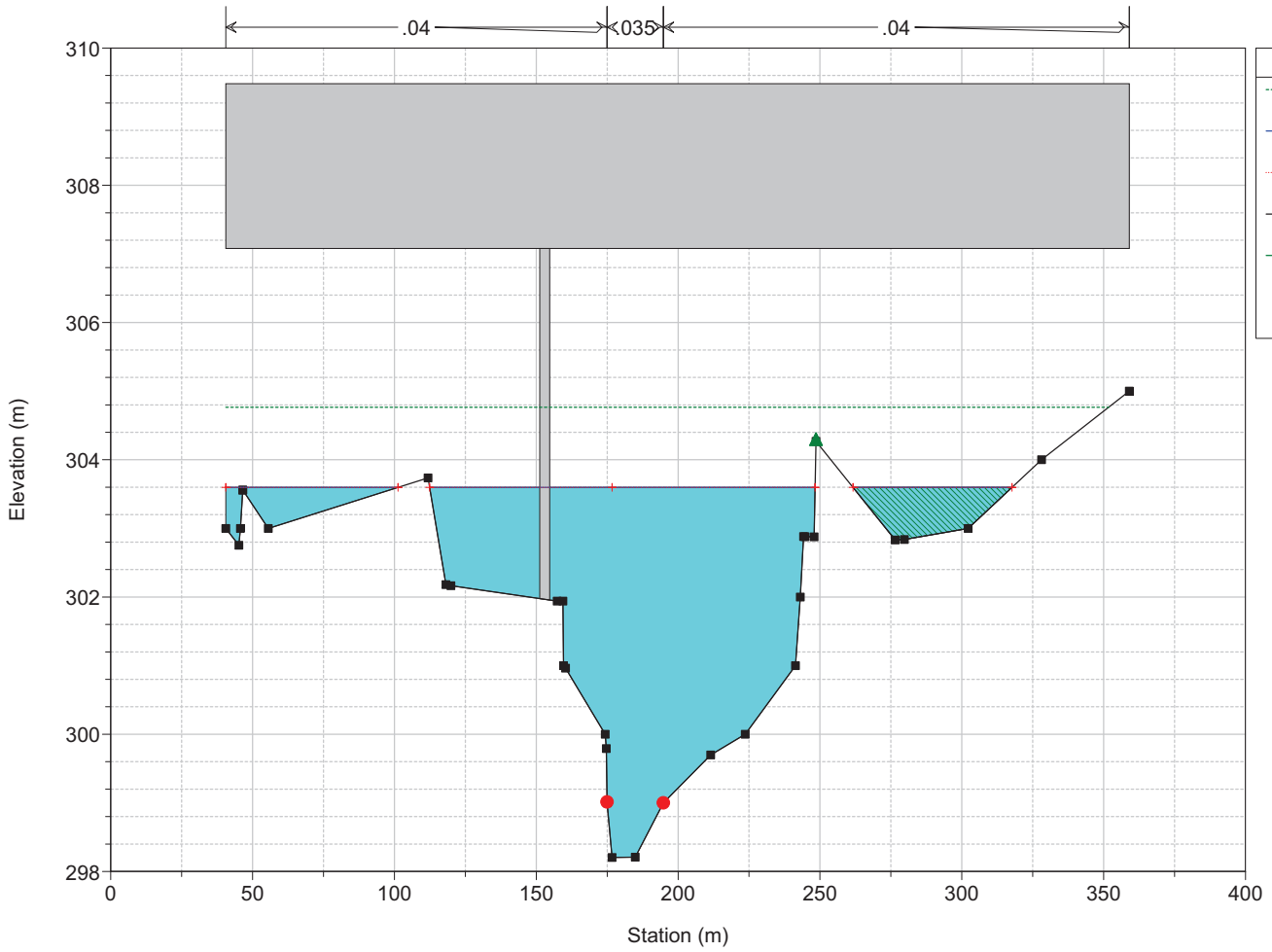
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 26



POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 25.5 BR

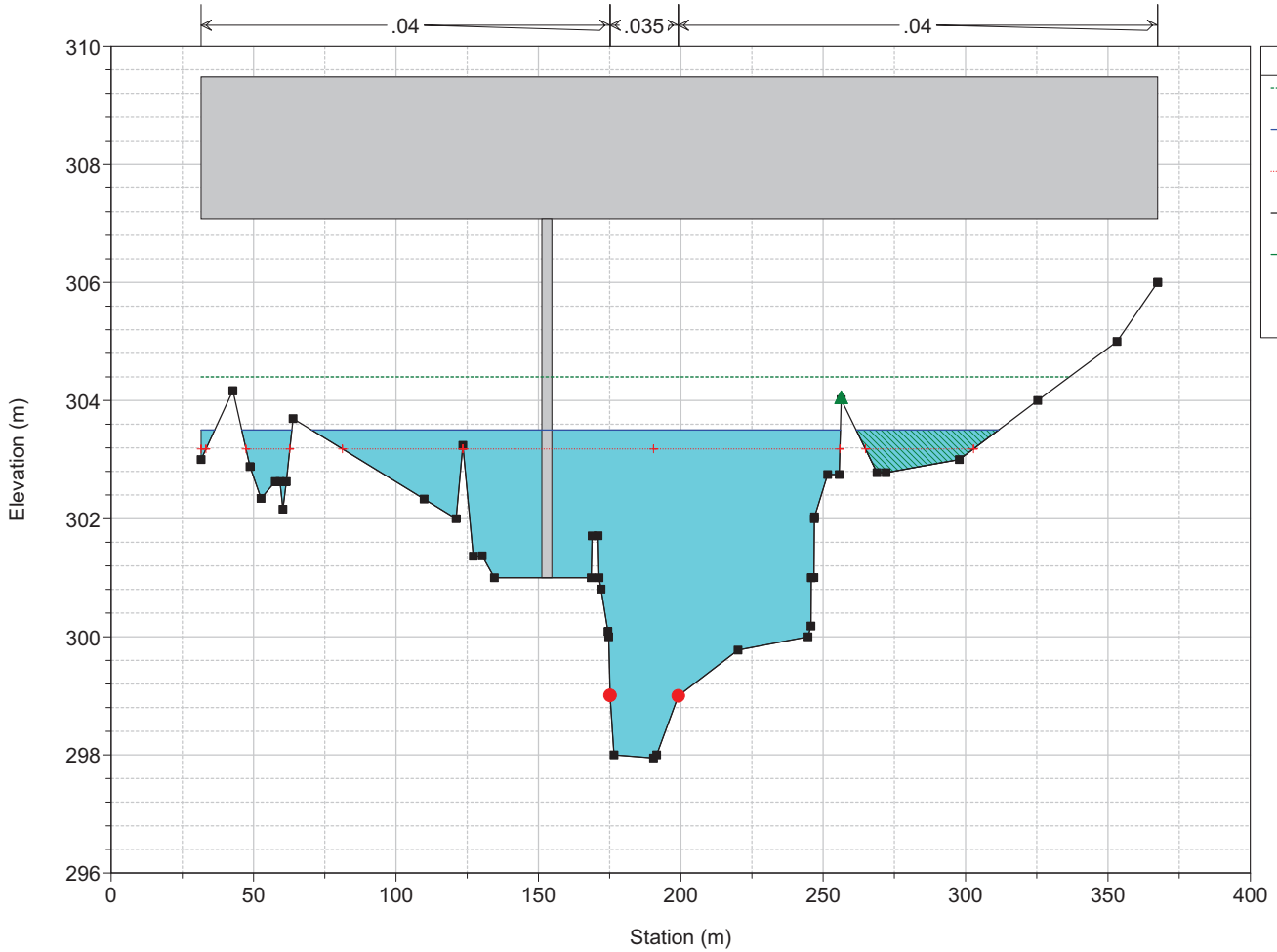


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Ineff
- Bank Sta

POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 25.5 BR

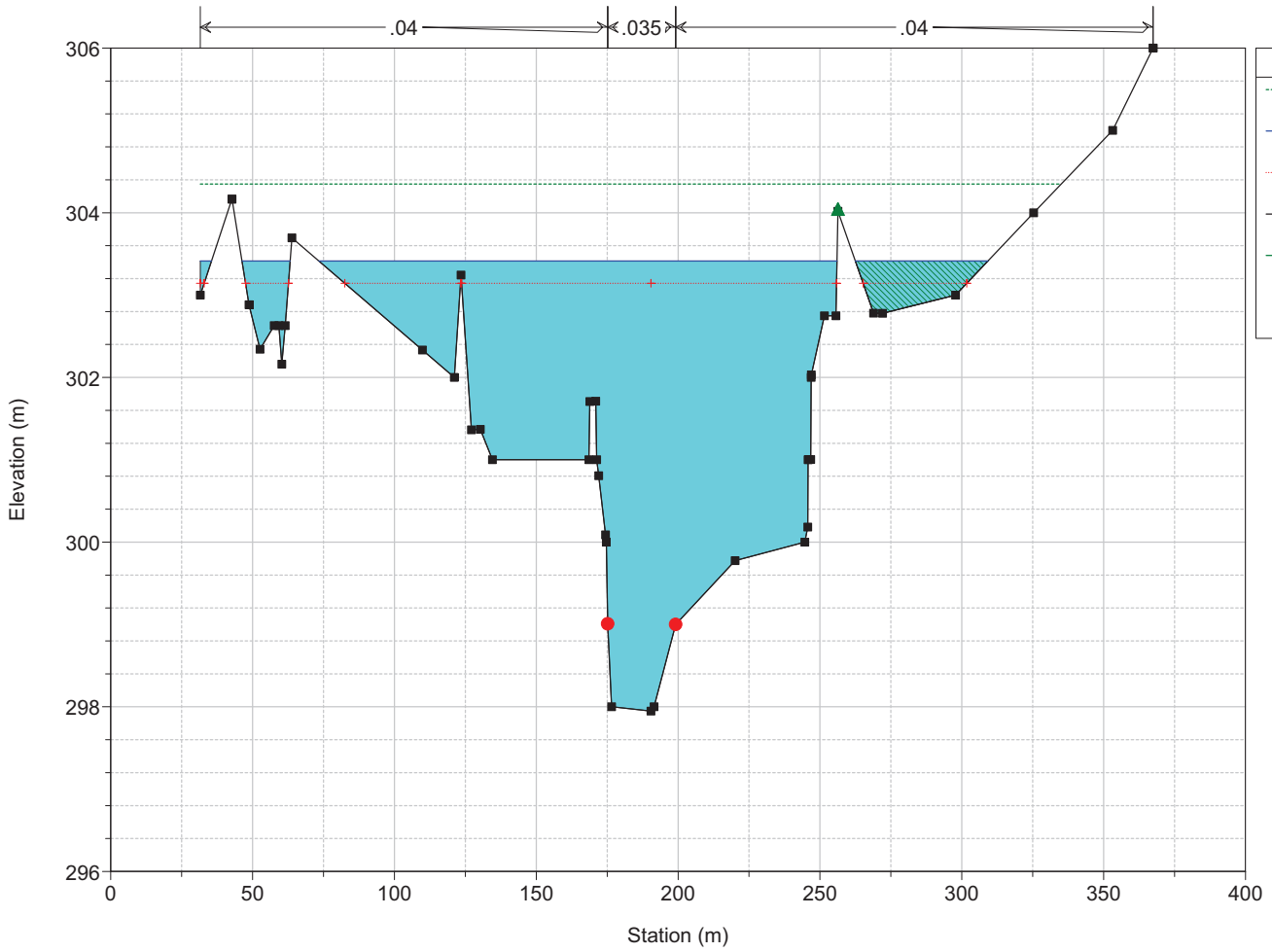


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Ineff
- Bank Sta

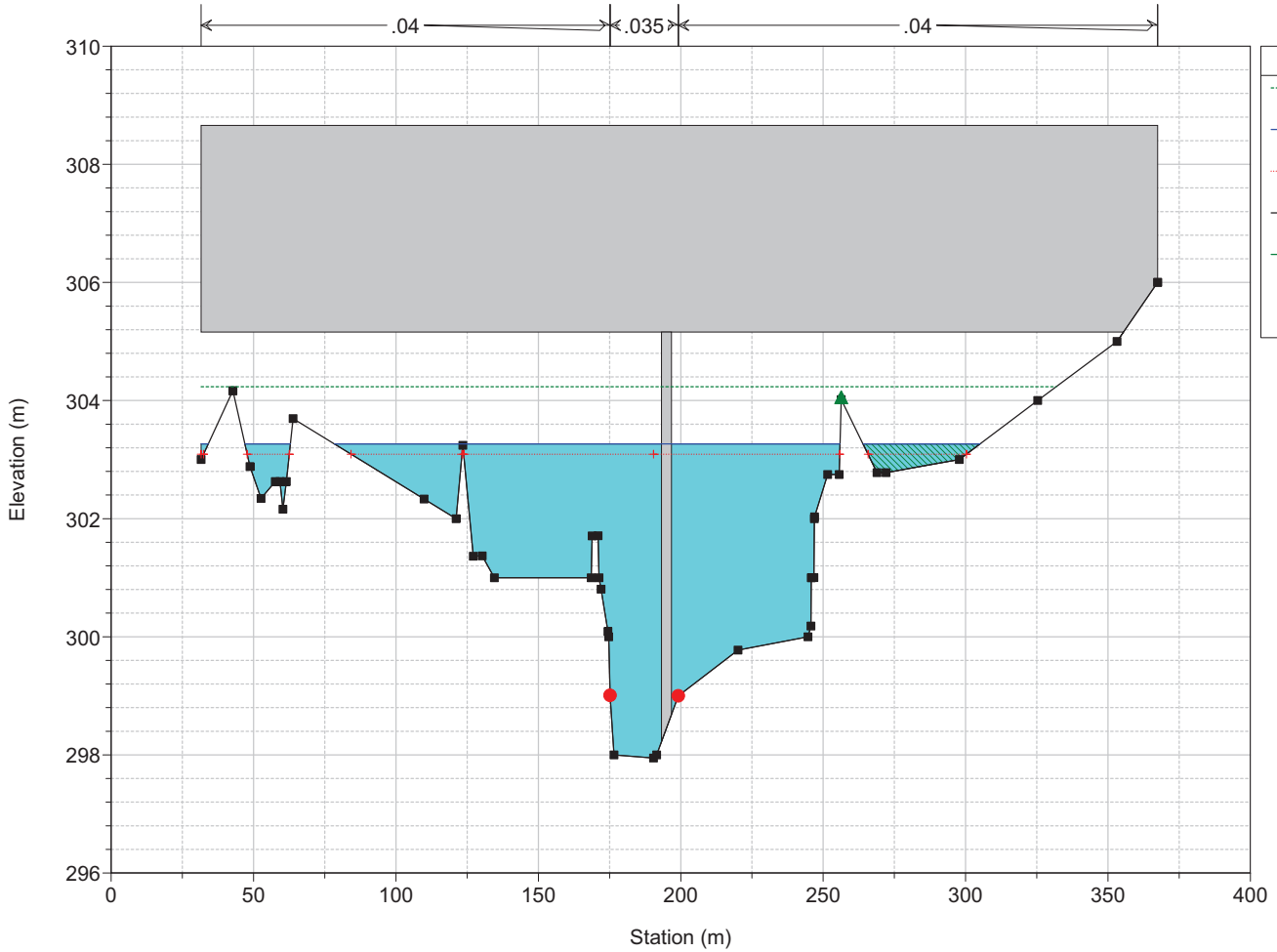
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 25



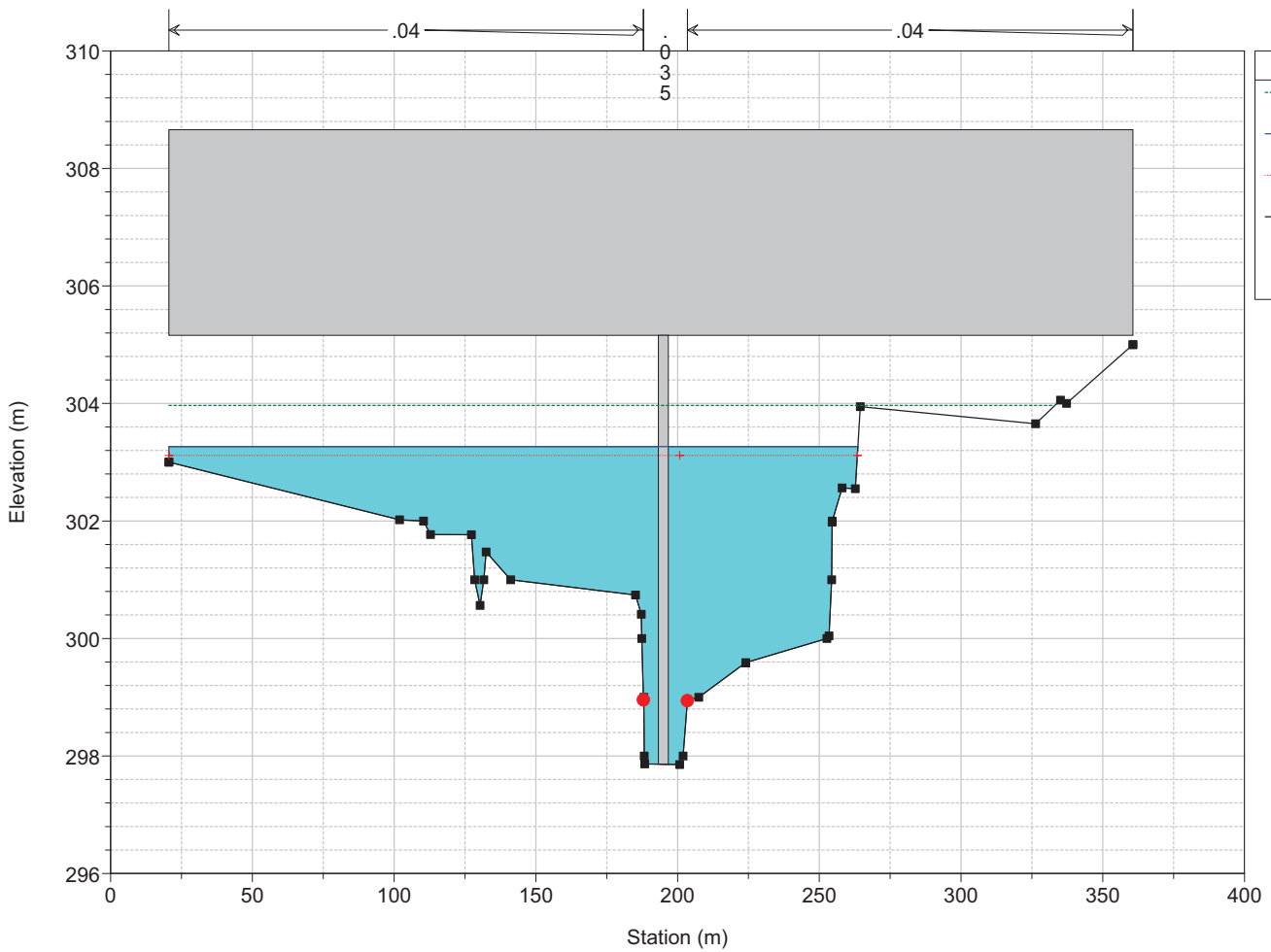
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 24.5 BR



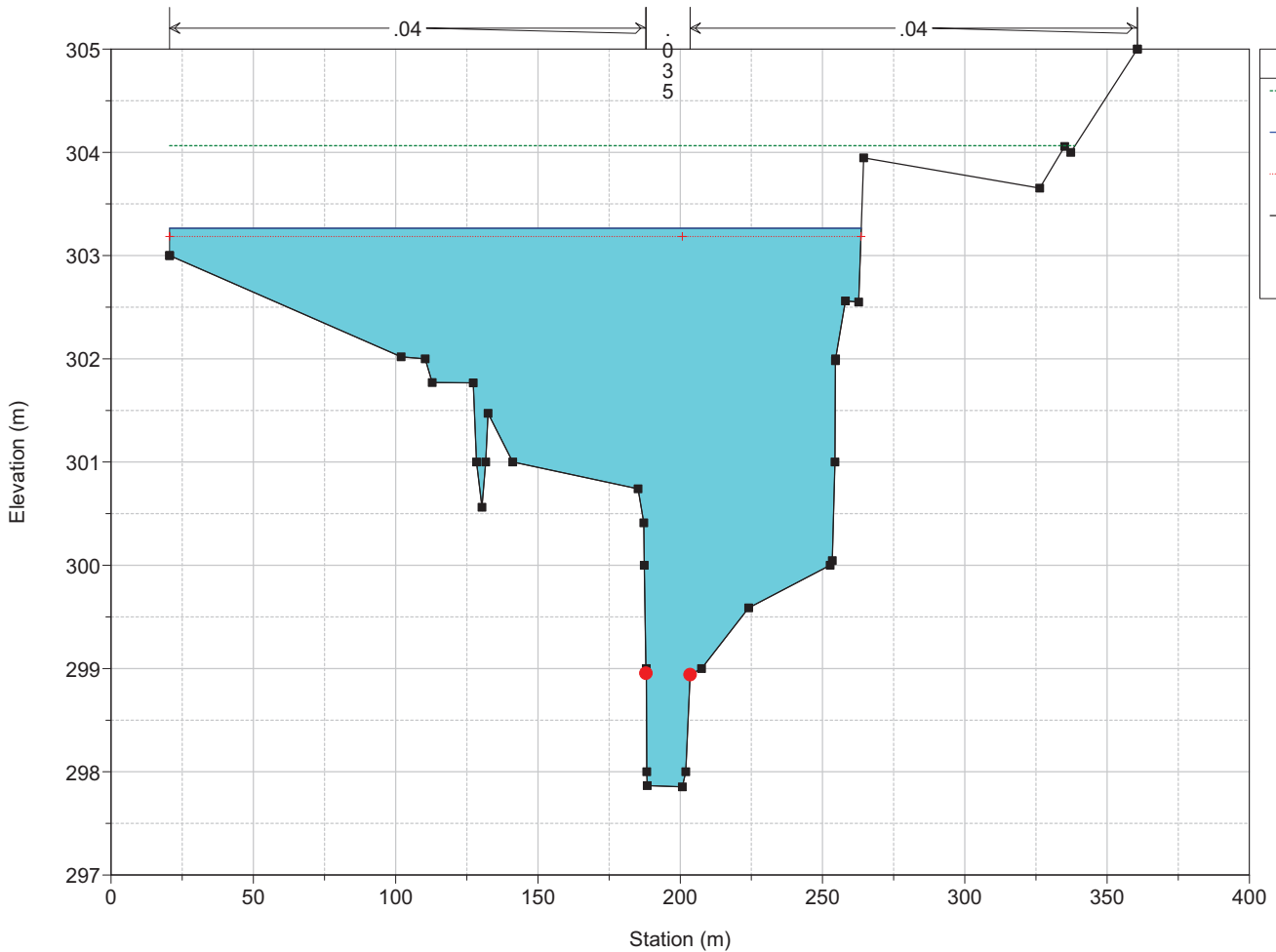
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 24.5 BR



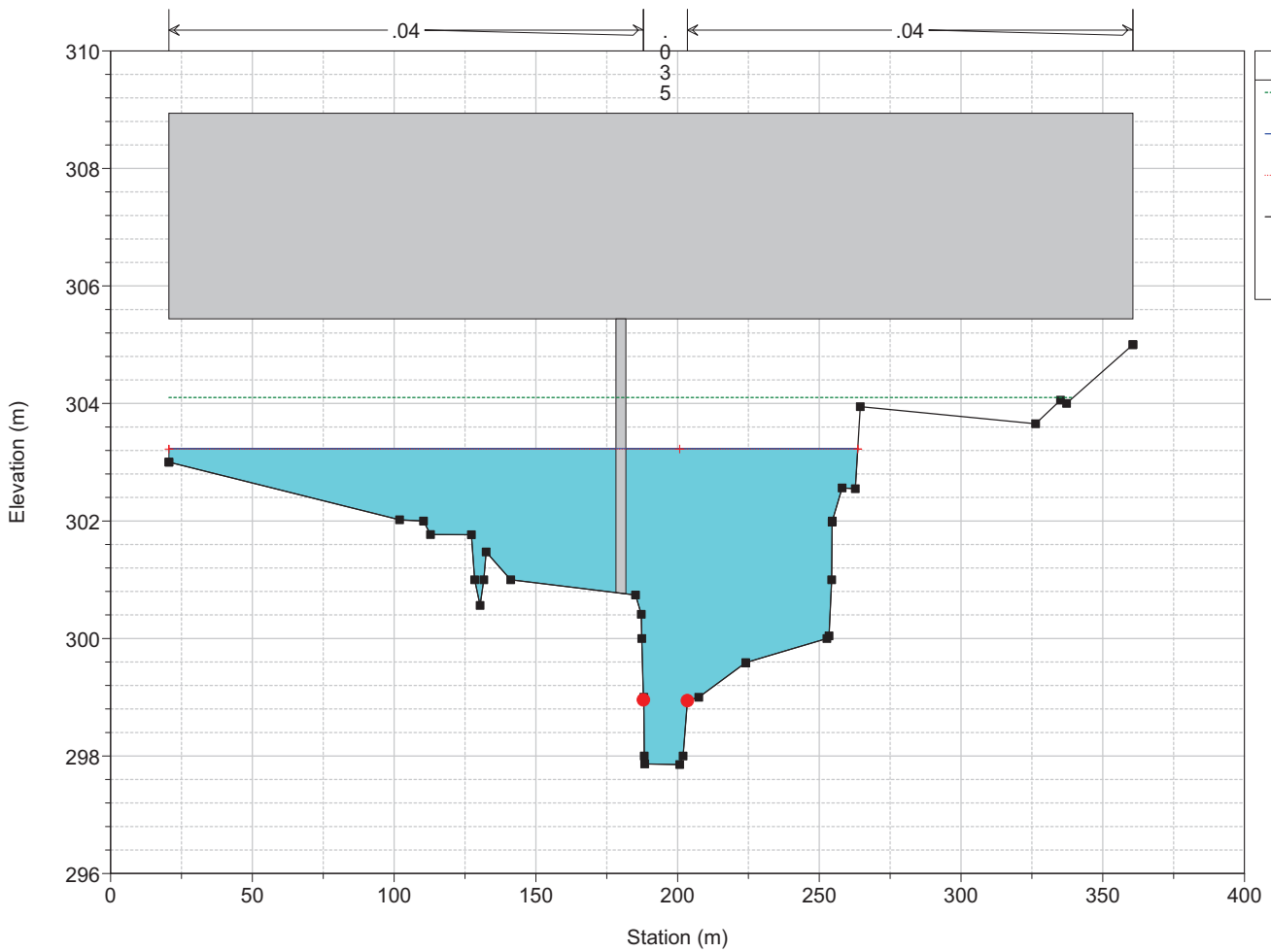
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 24



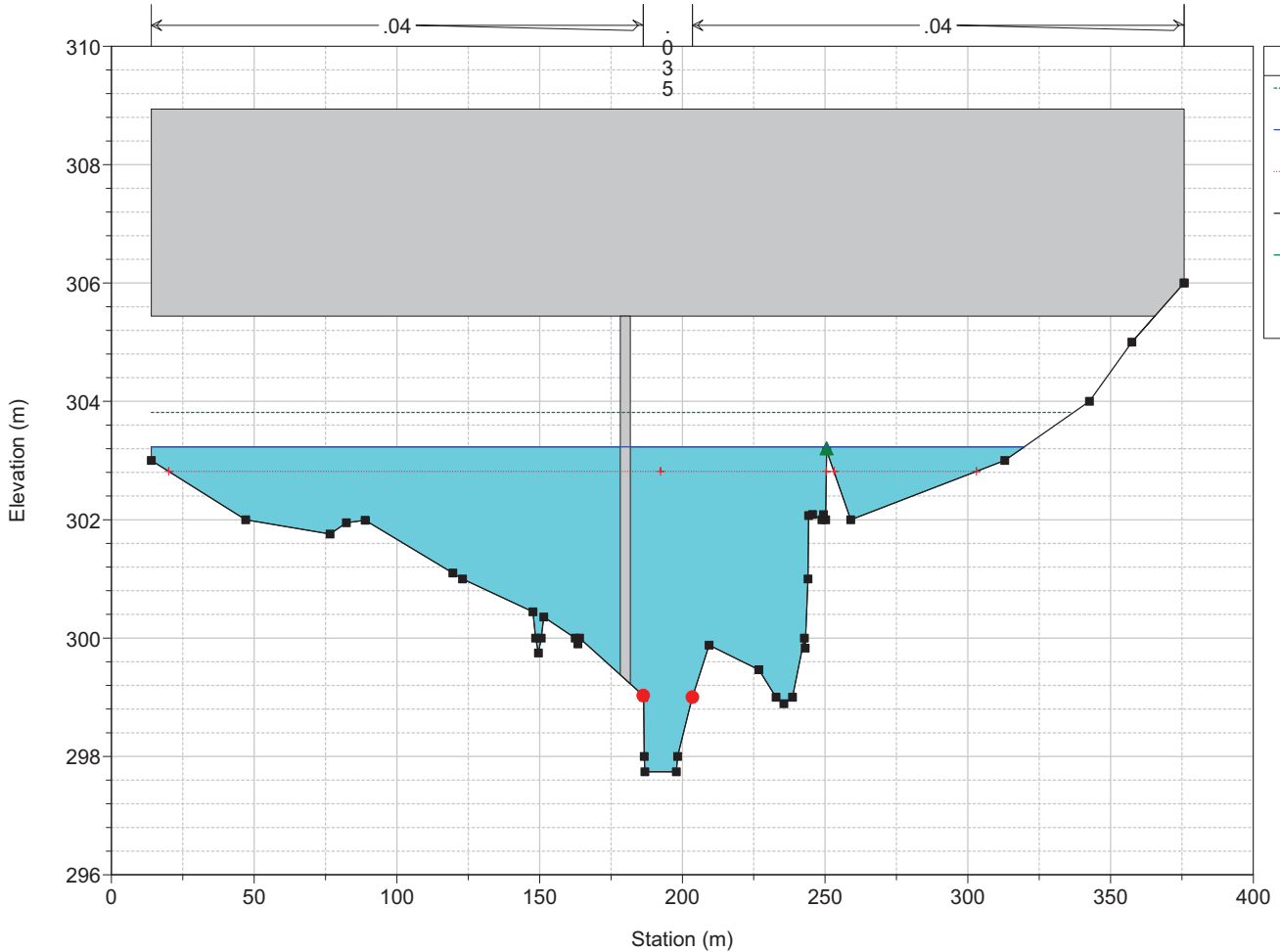
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 23.5 BR



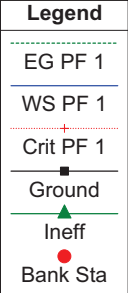
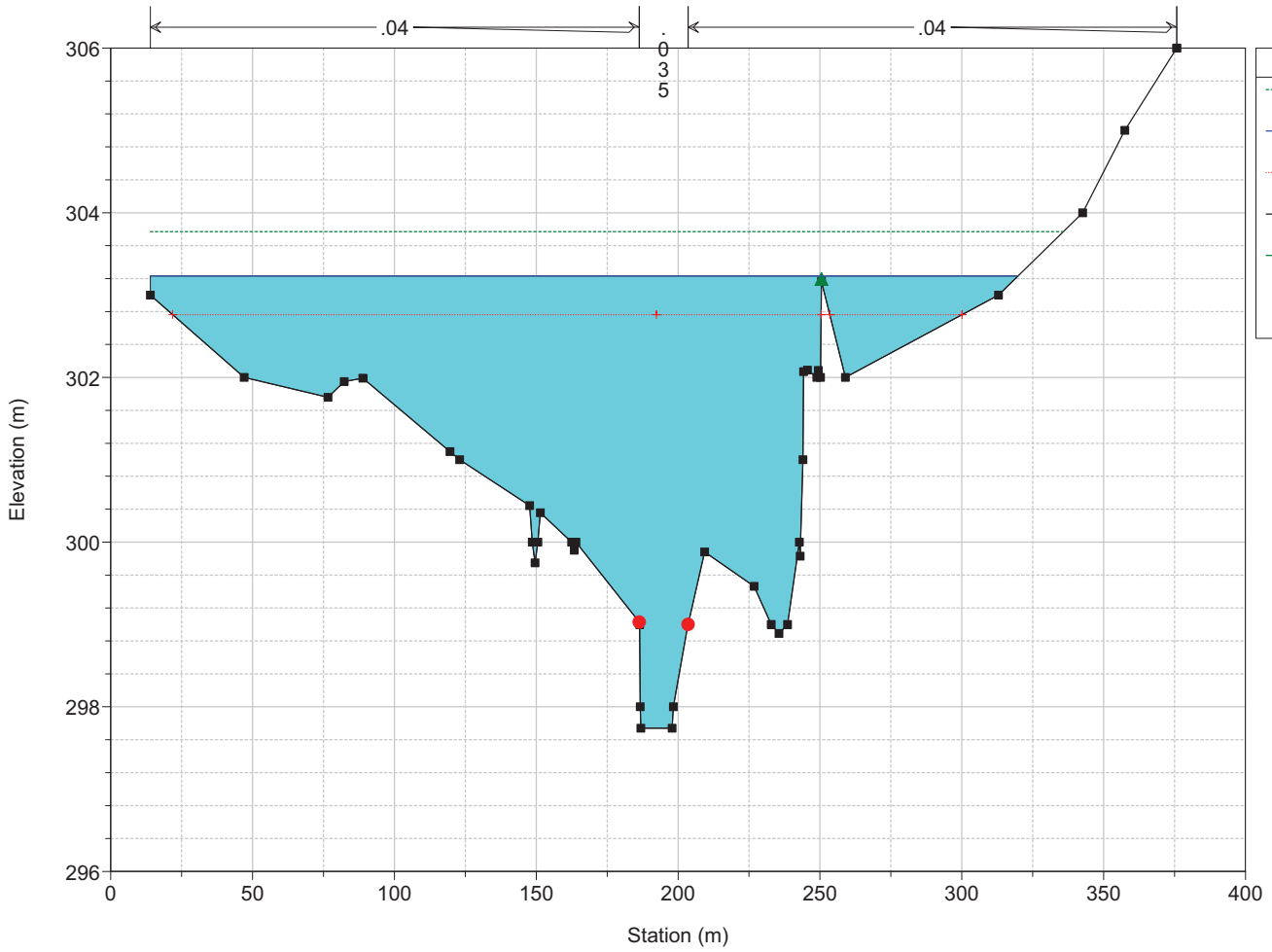
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 23.5 BR



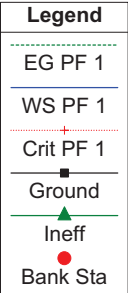
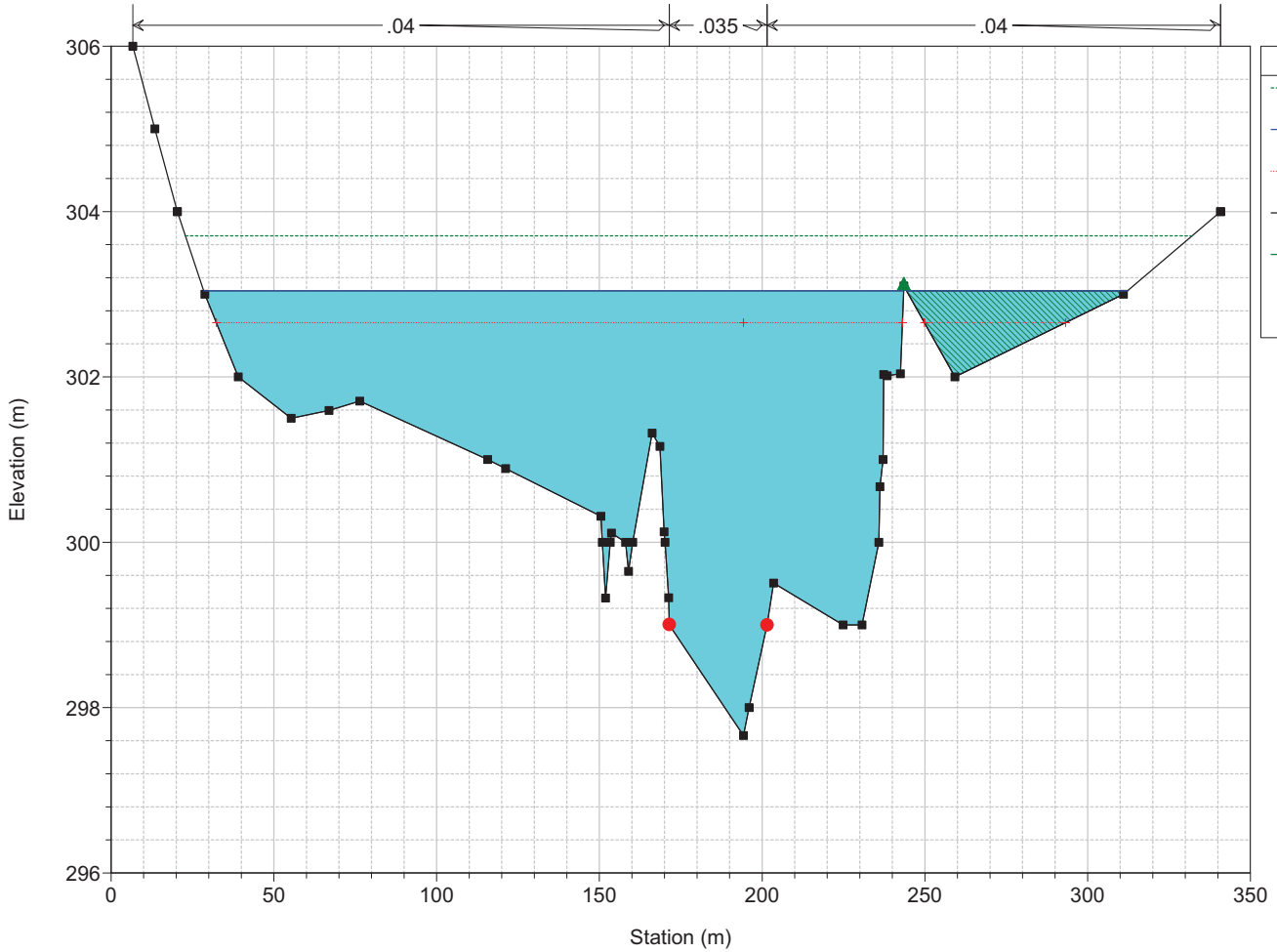
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 23



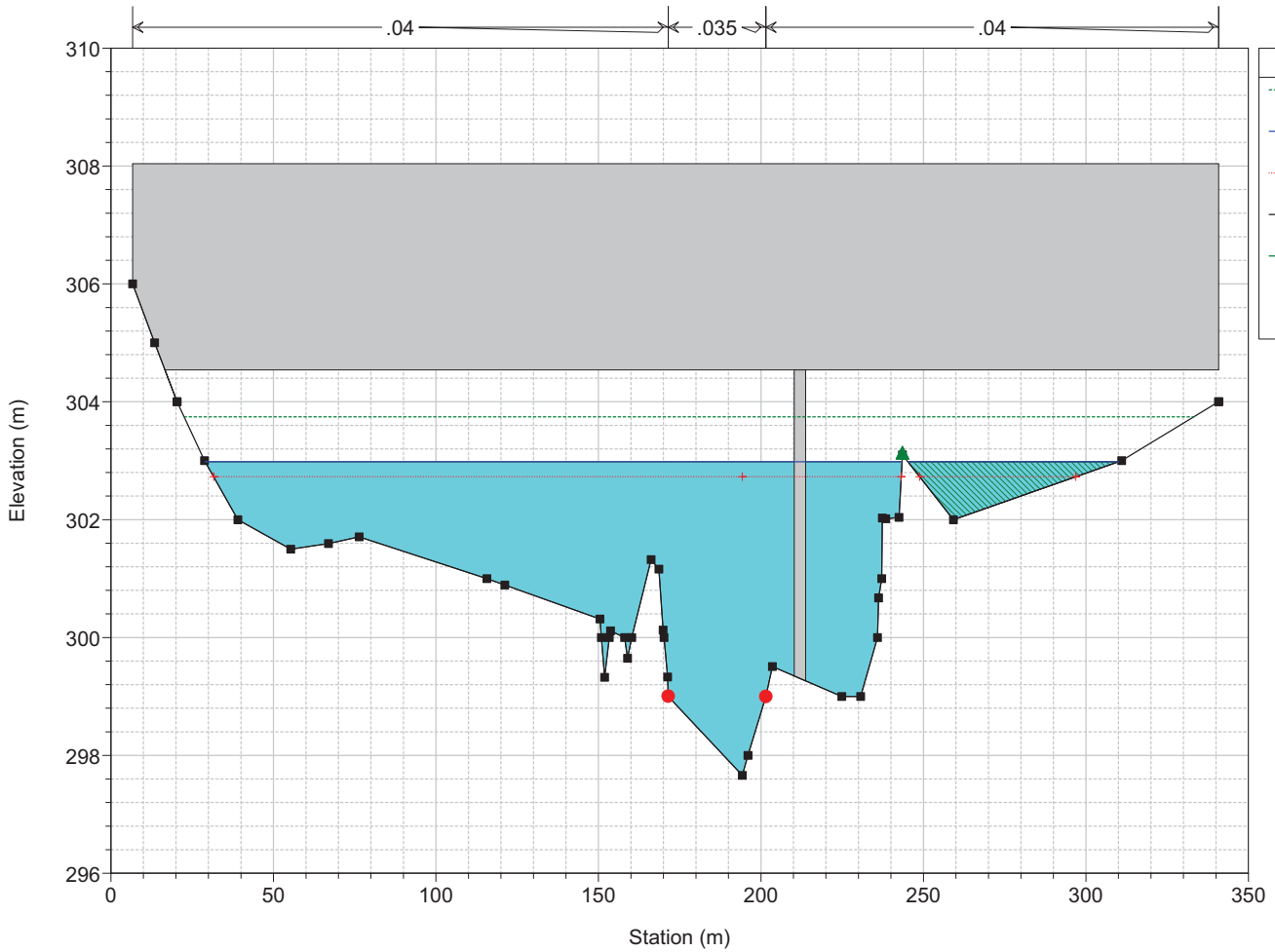
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 22



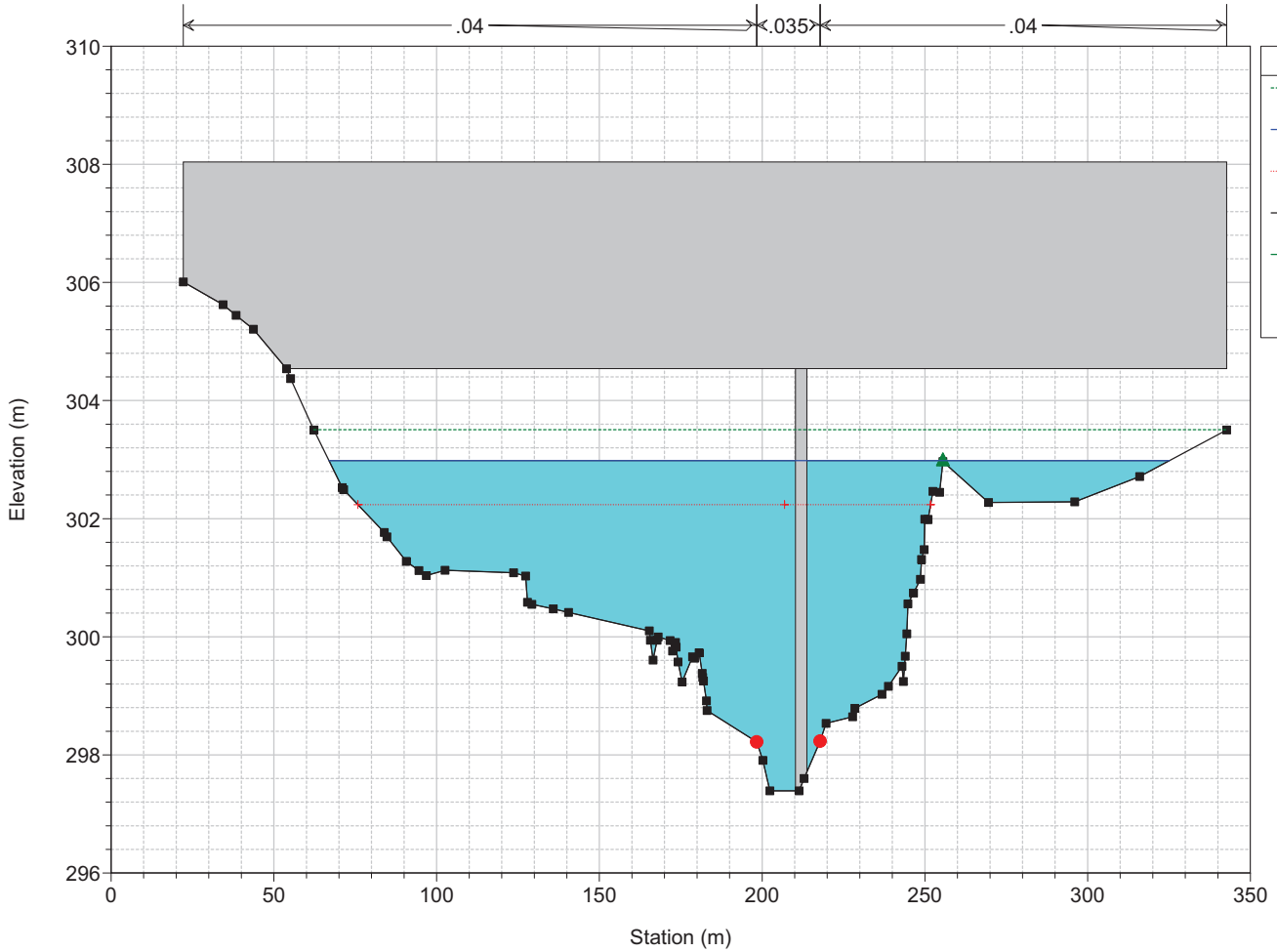
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 21.75 BR



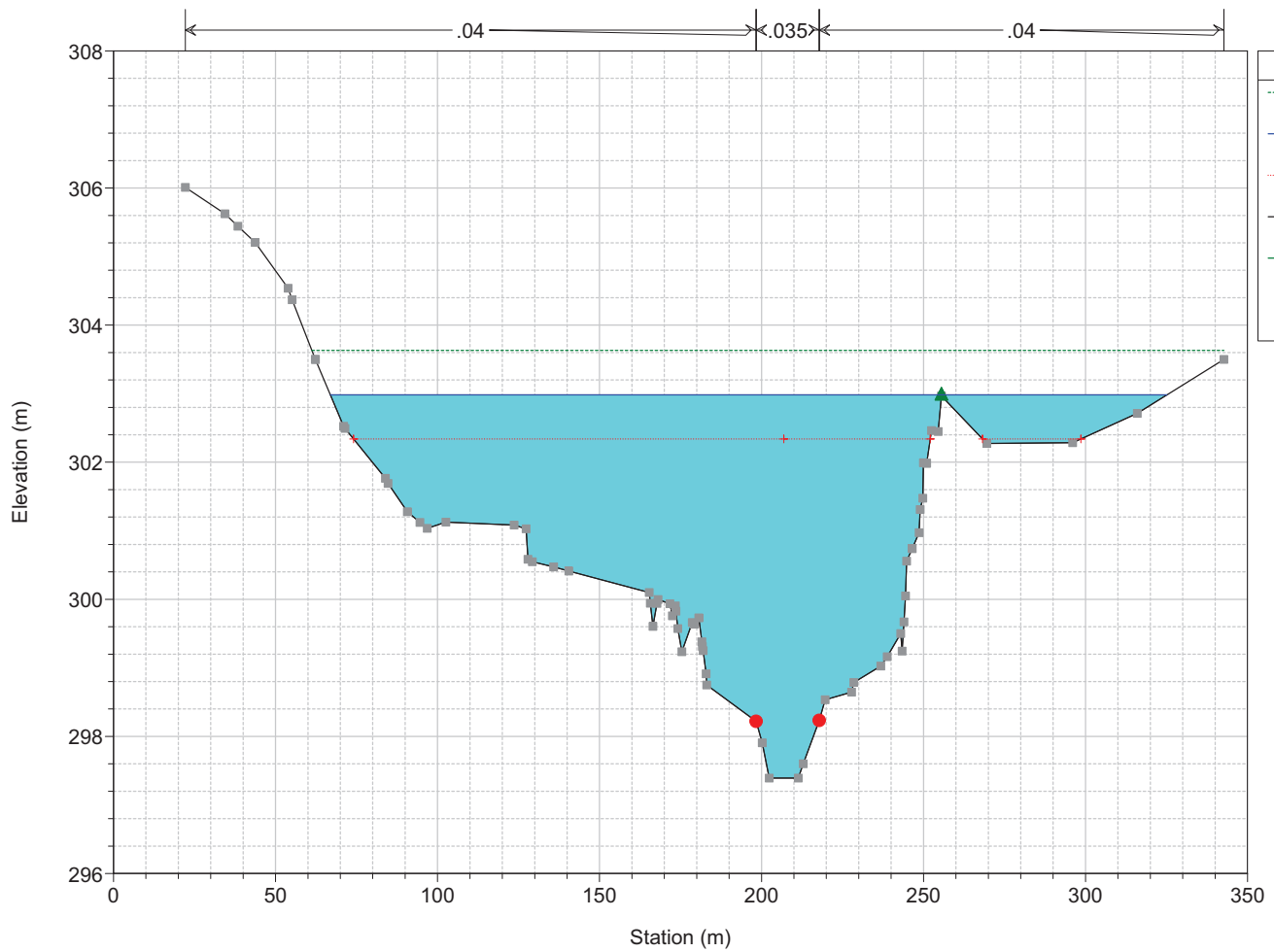
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 21.75 BR



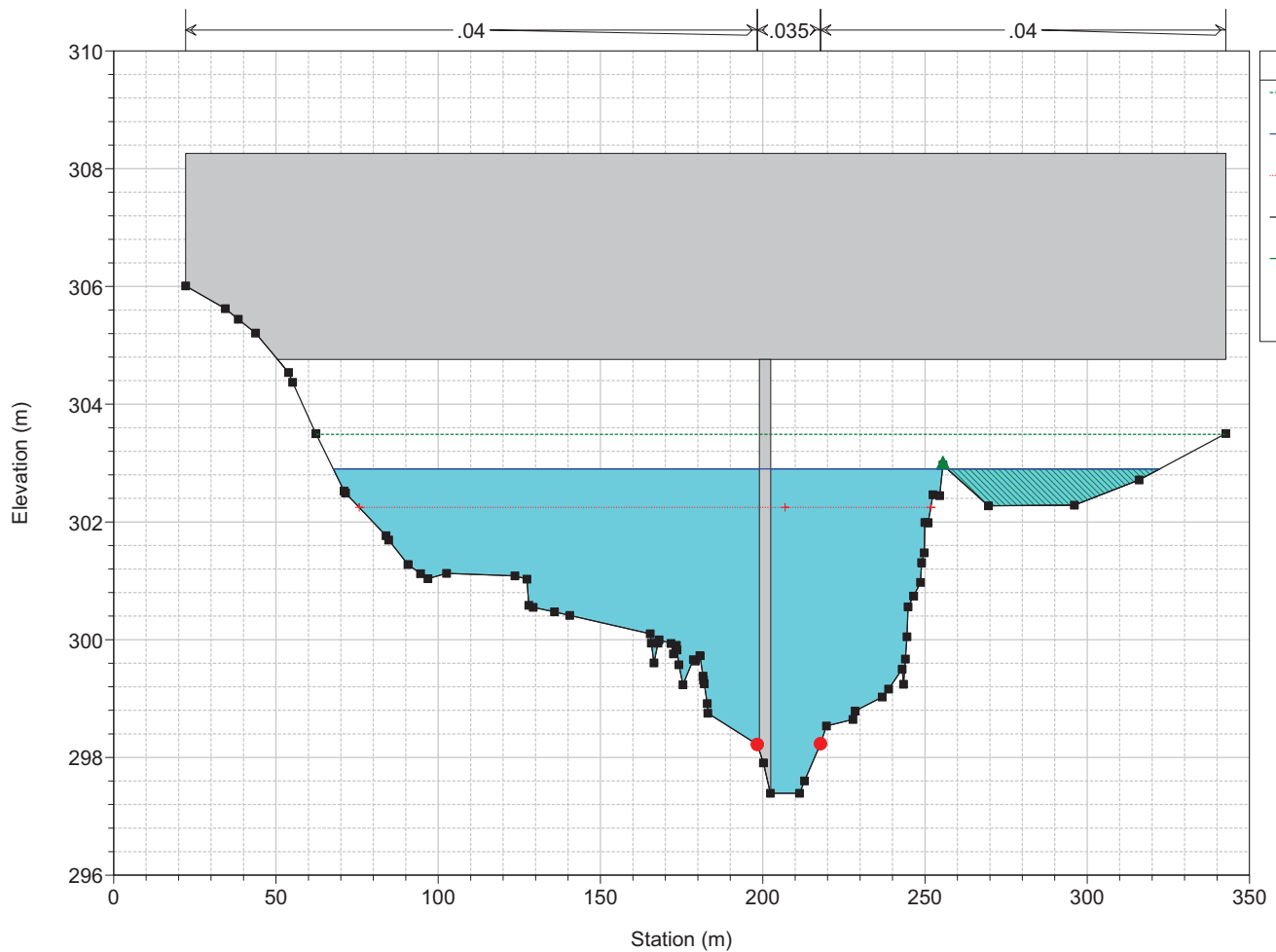
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 21.5*



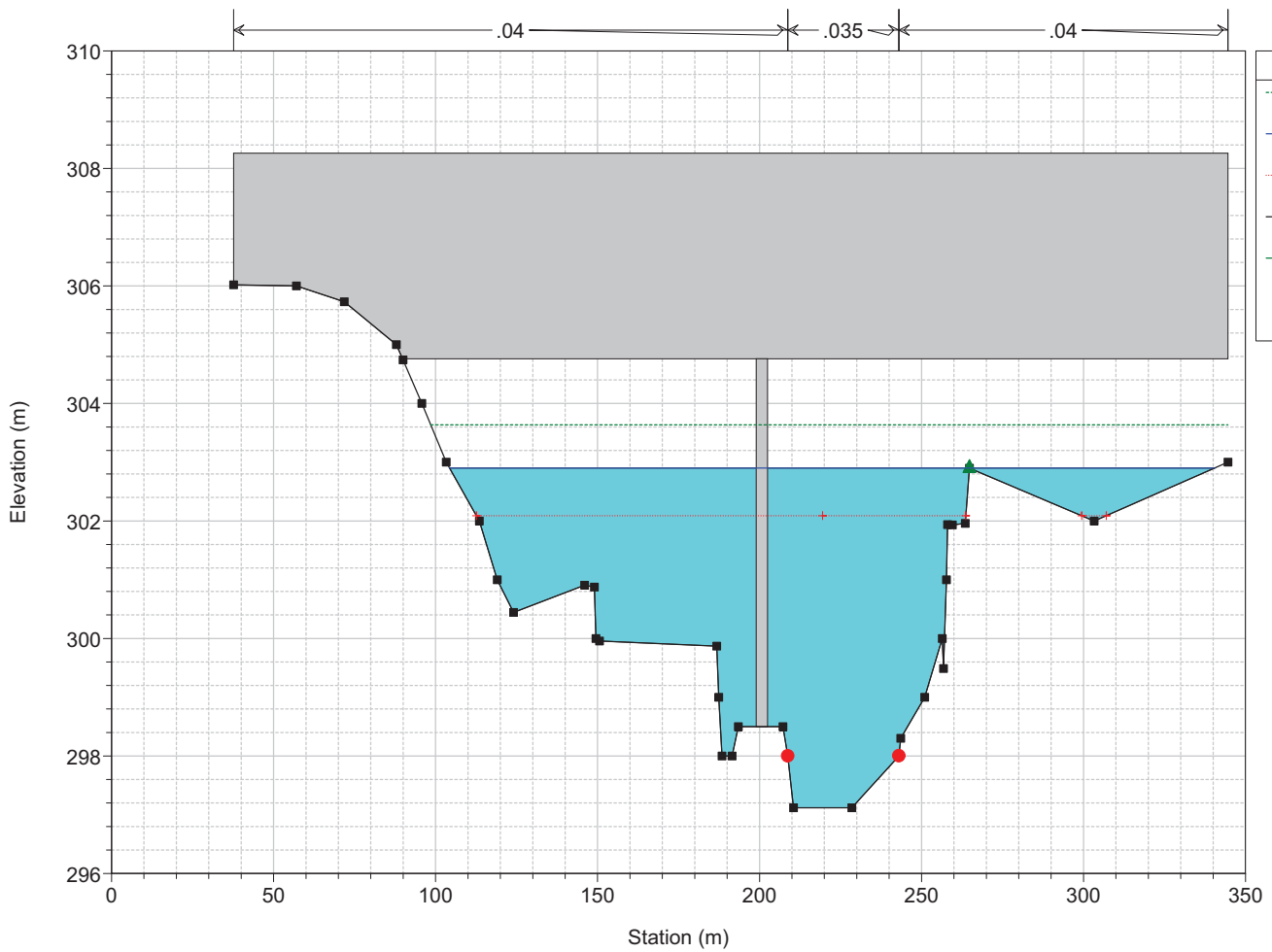
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 21.25 BR



POST OPERAM_SALSO

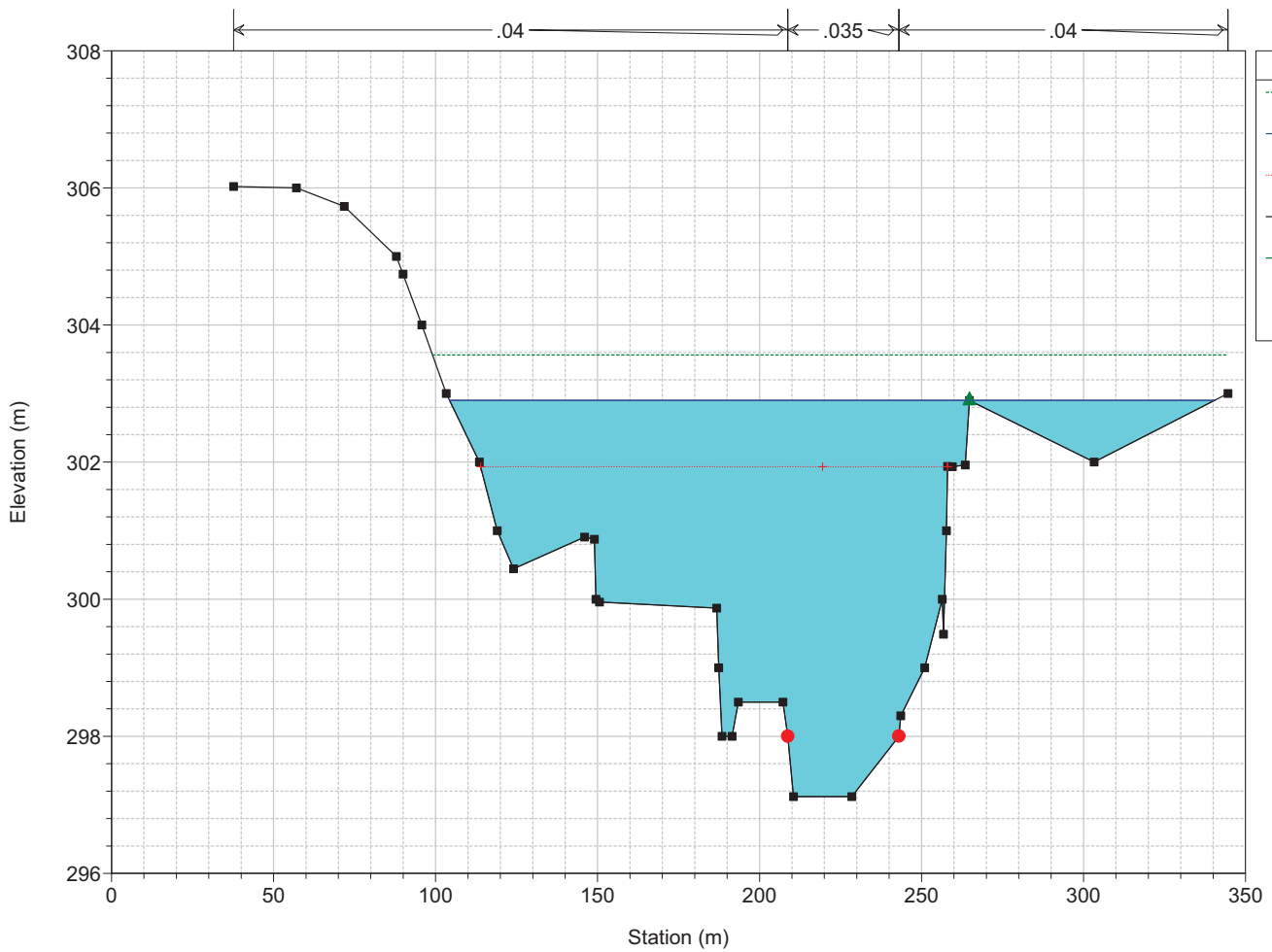
River = SALSO Reach = SALSO RS = 21.25 BR



- Legend**
- EG PF 1
 - WS PF 1
 - Crit PF 1
 - Ground
 - Ineff
 - Bank Sta

POST OPERAM_SALSO

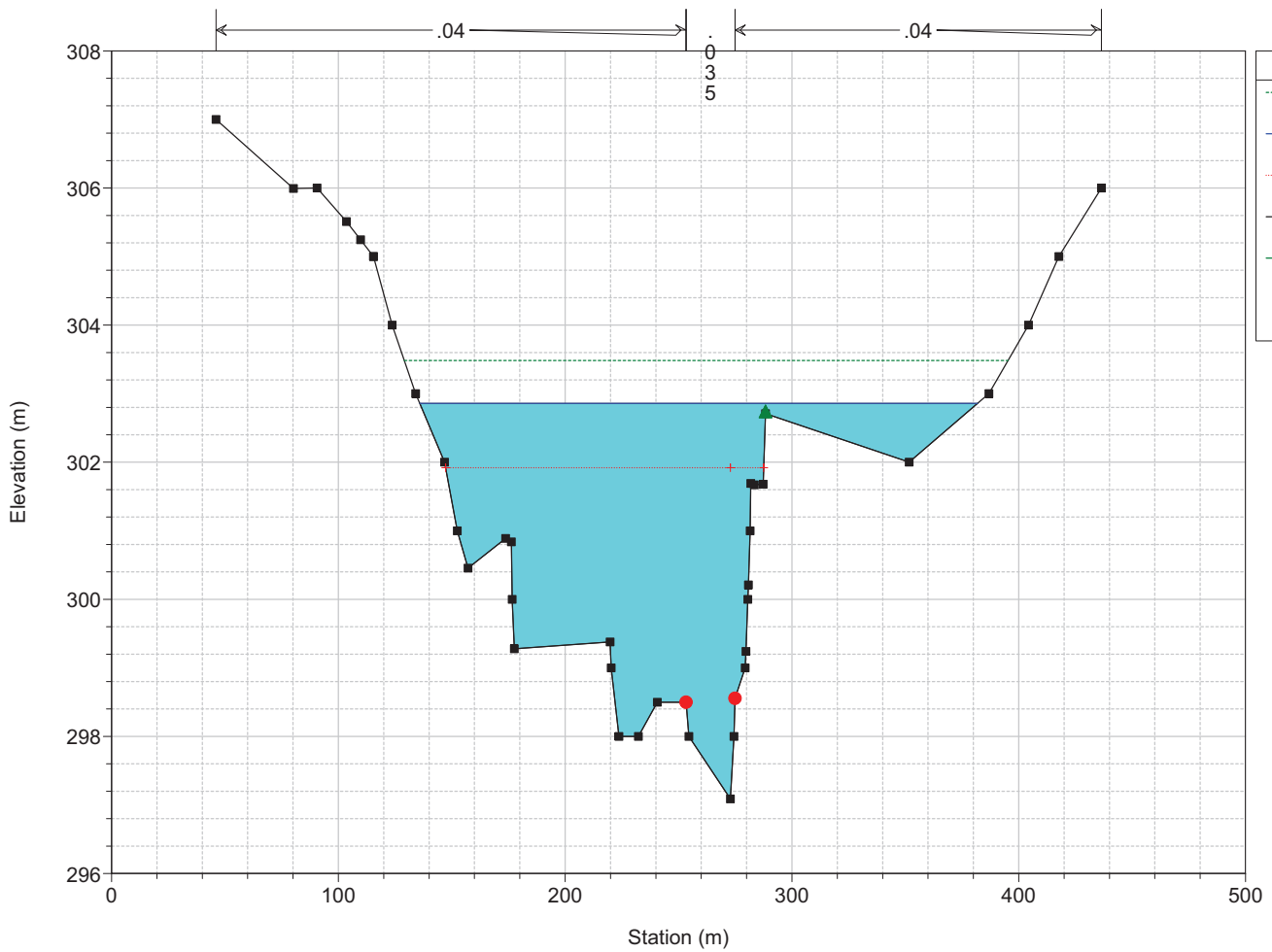
River = SALSO Reach = SALSO RS = 21



- Legend**
- EG PF 1
 - WS PF 1
 - Crit PF 1
 - Ground
 - Ineff
 - Bank Sta

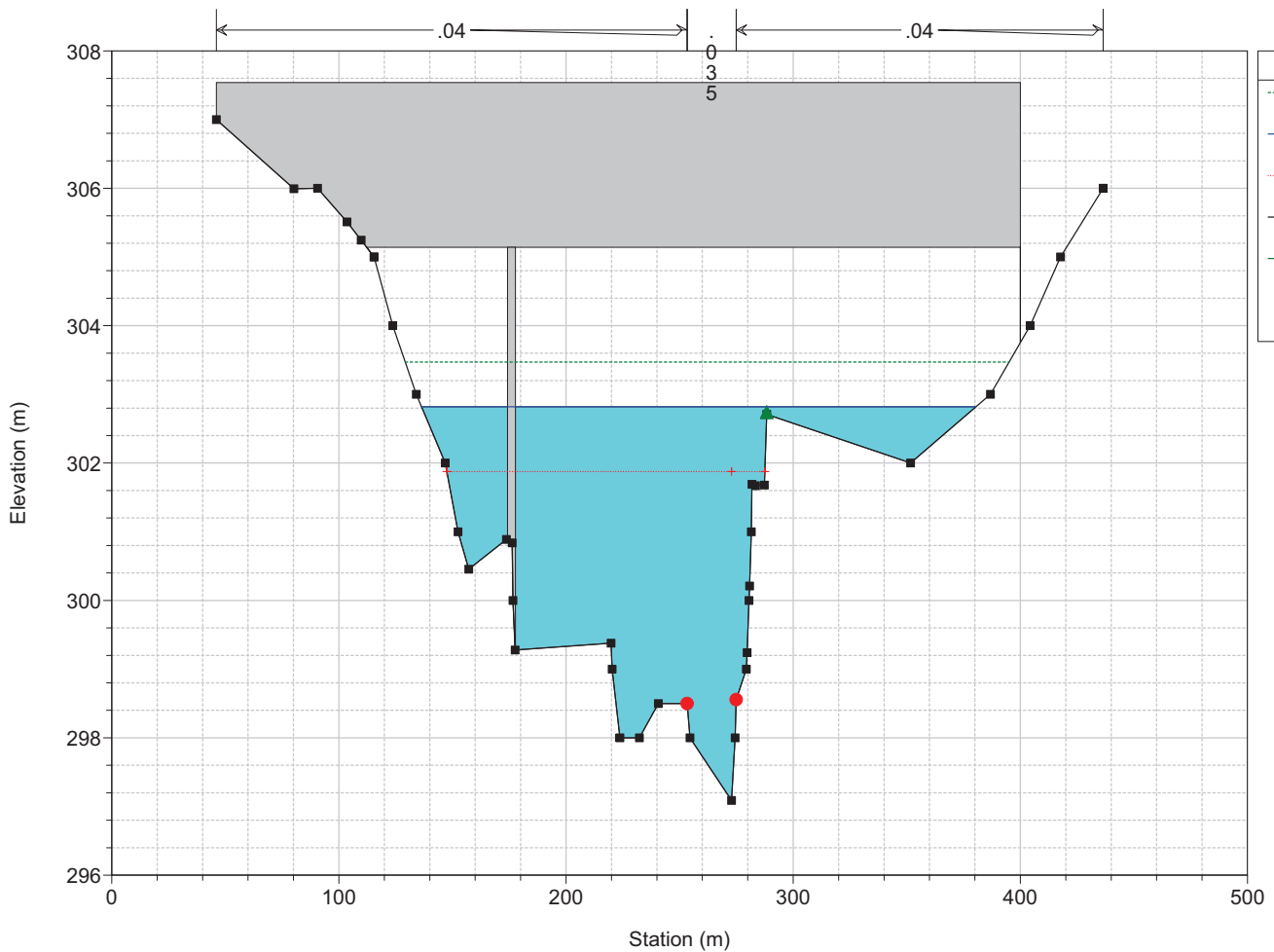
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 20



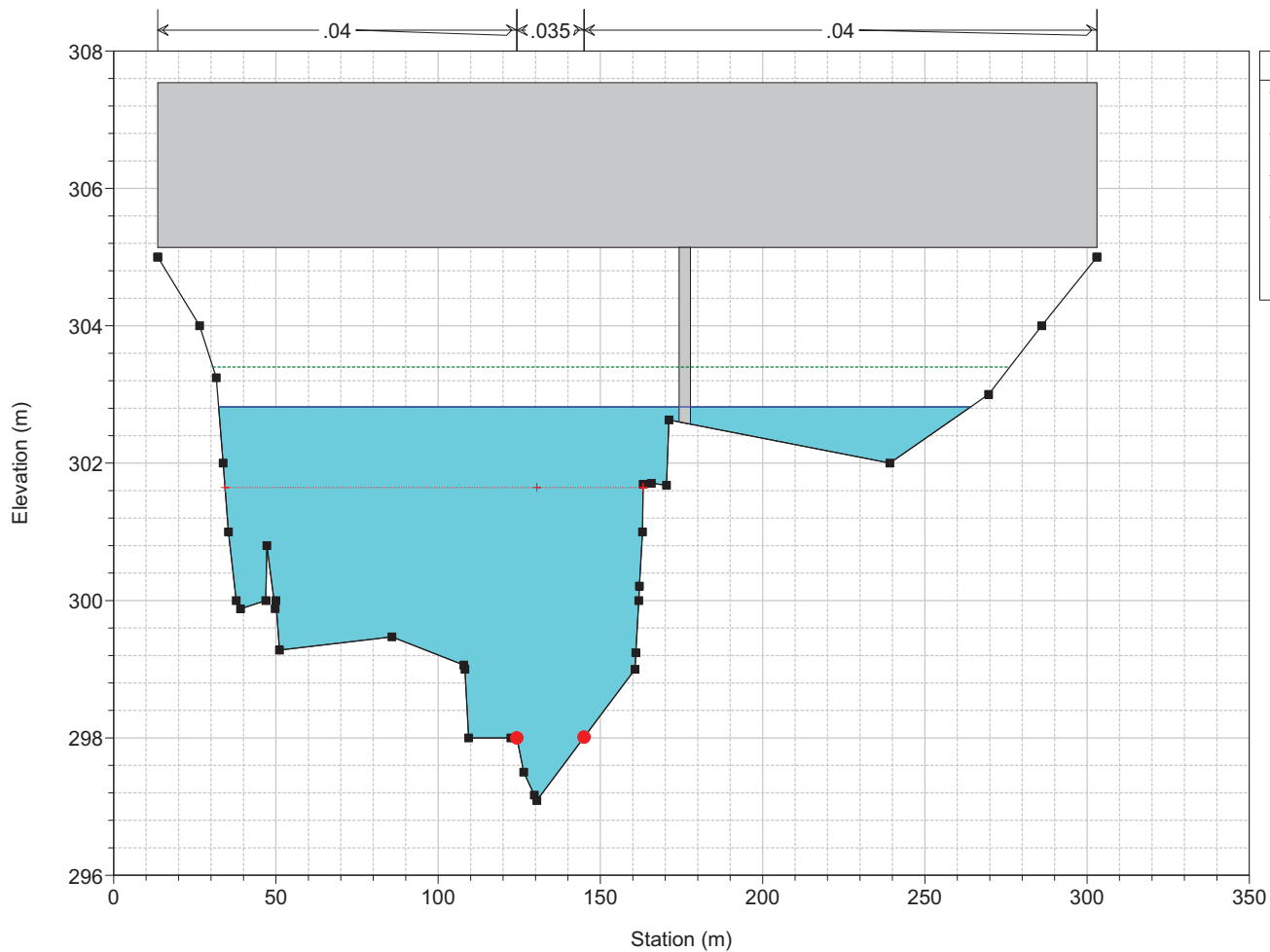
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 19.5 BR



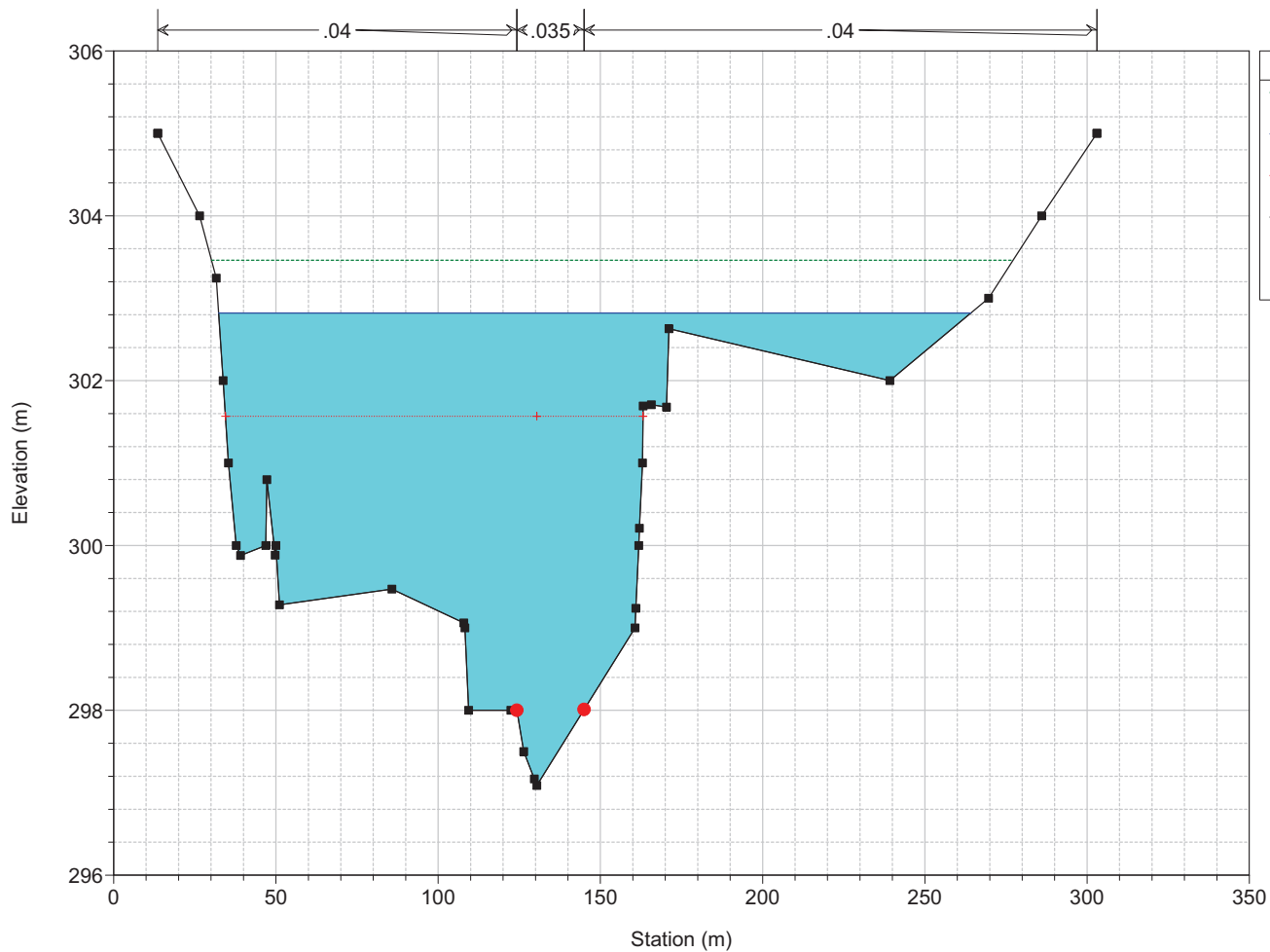
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 19.5 BR



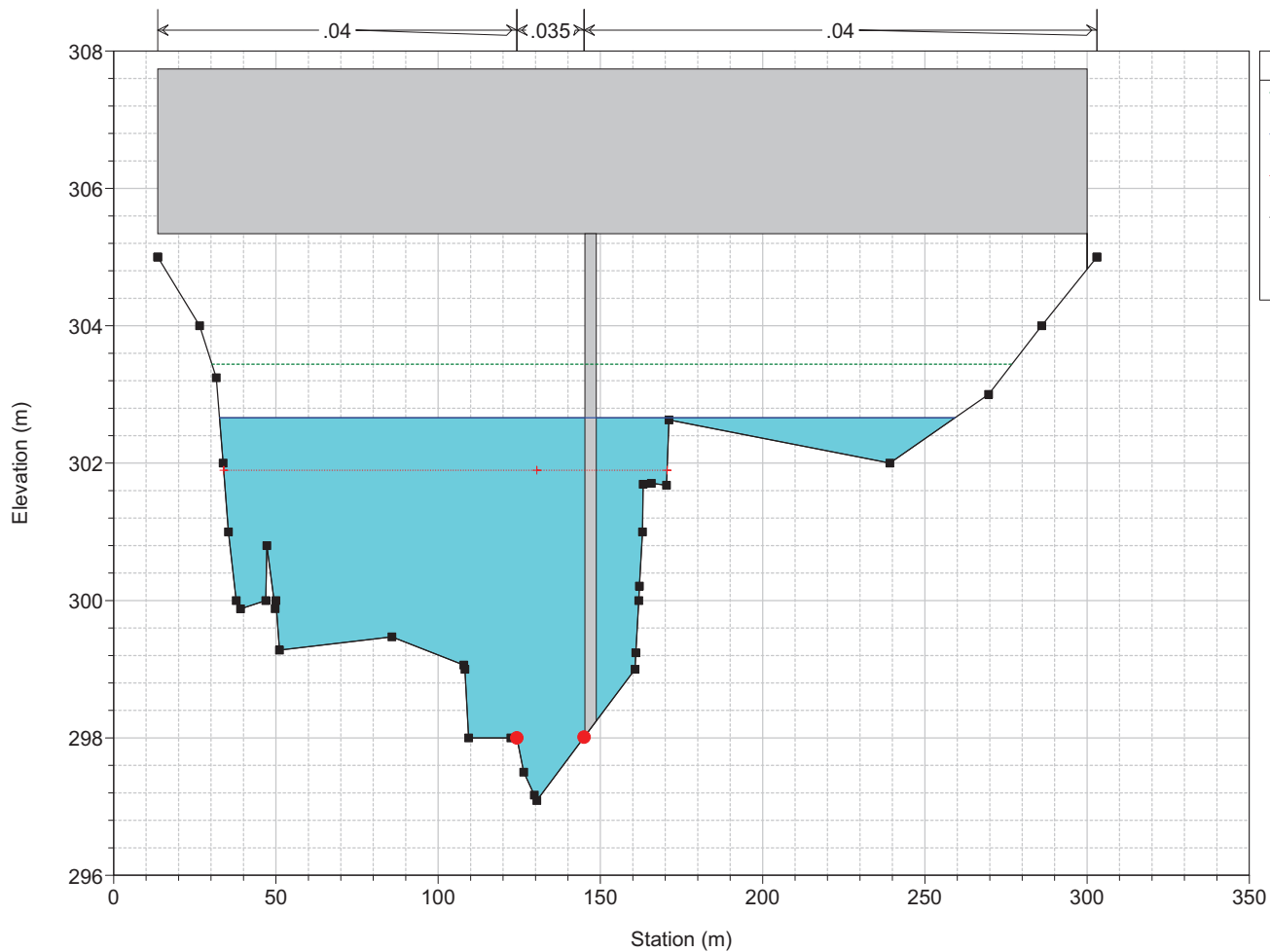
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 19



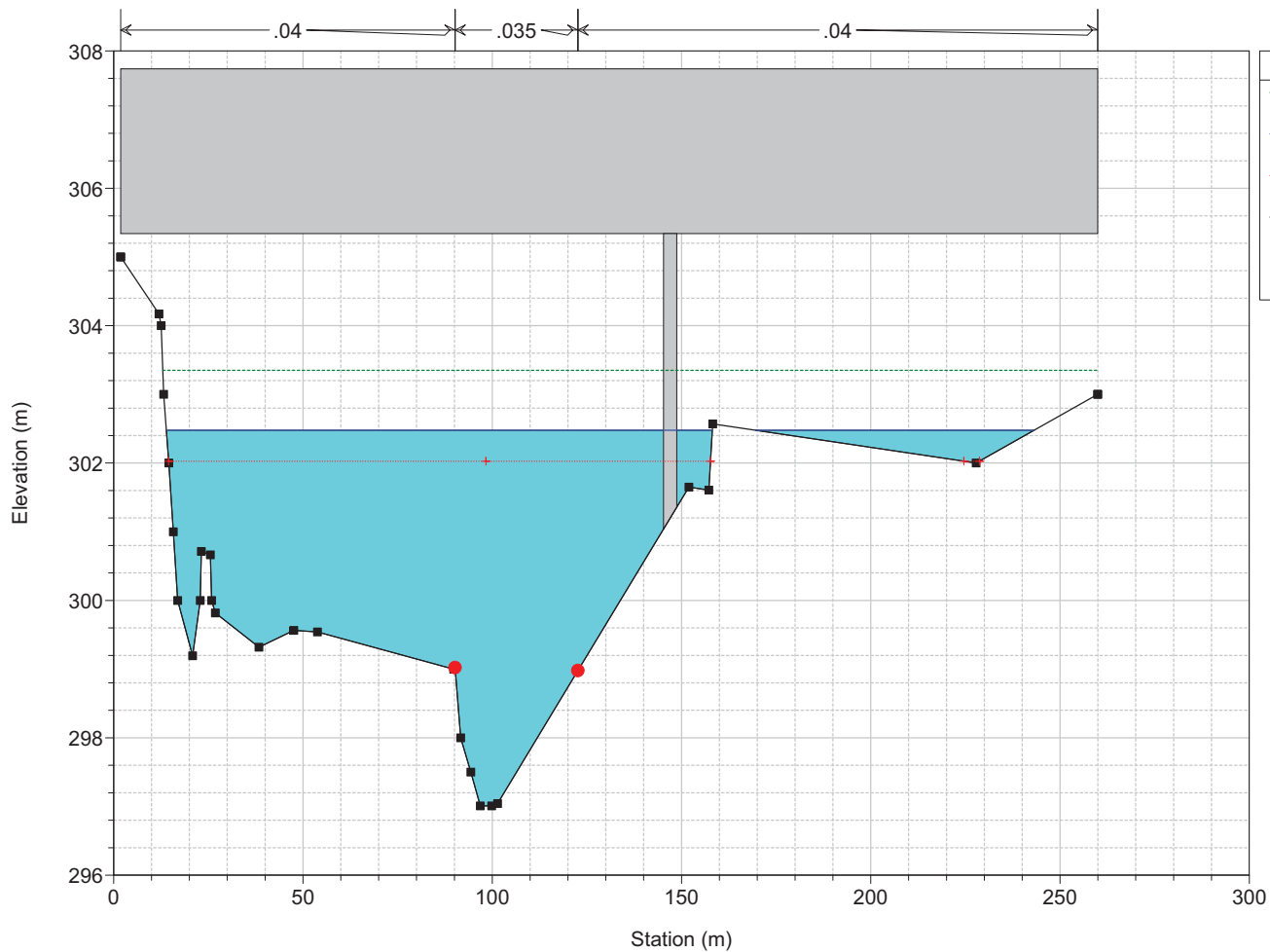
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 18.5 BR



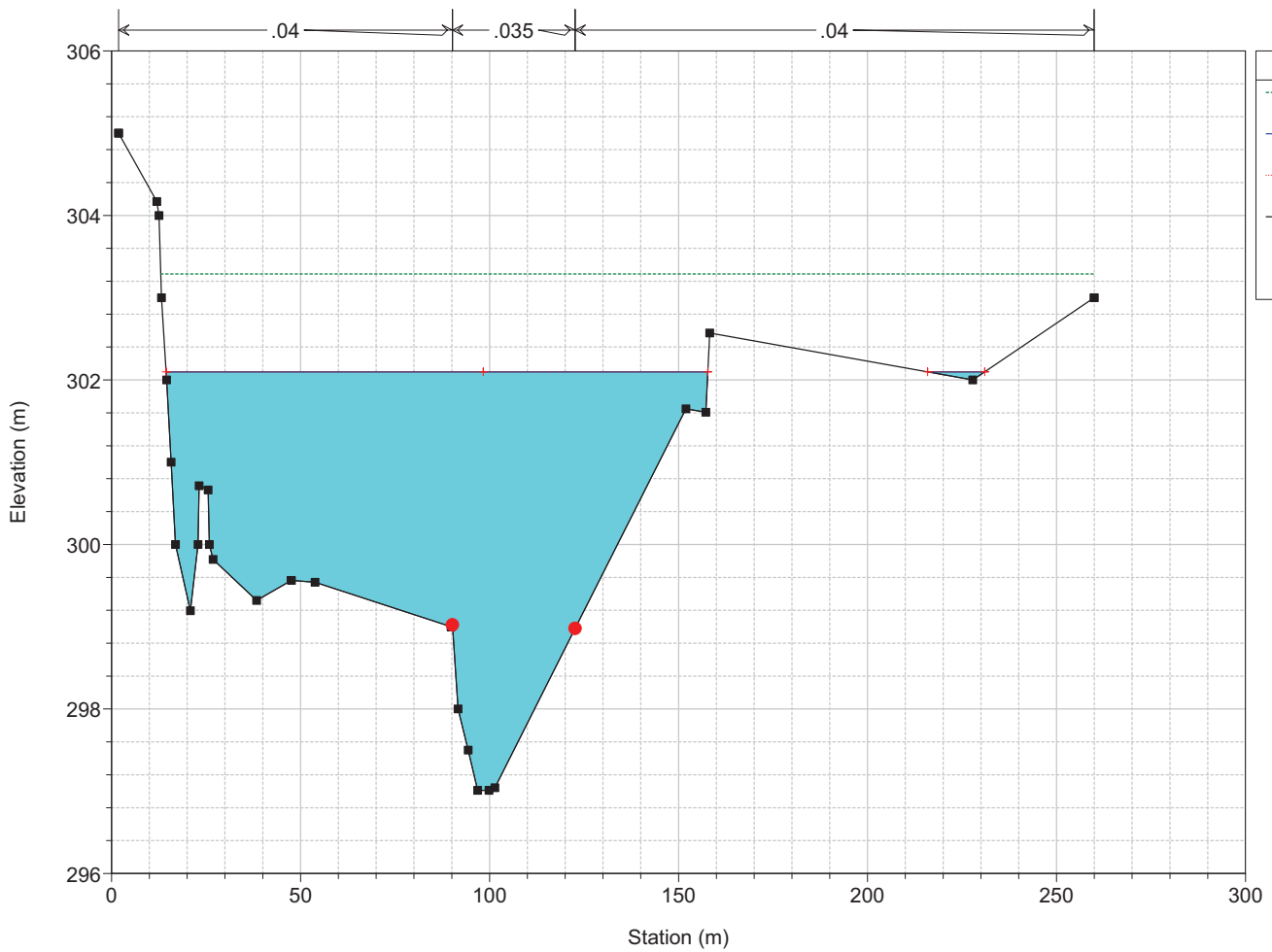
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 18.5 BR



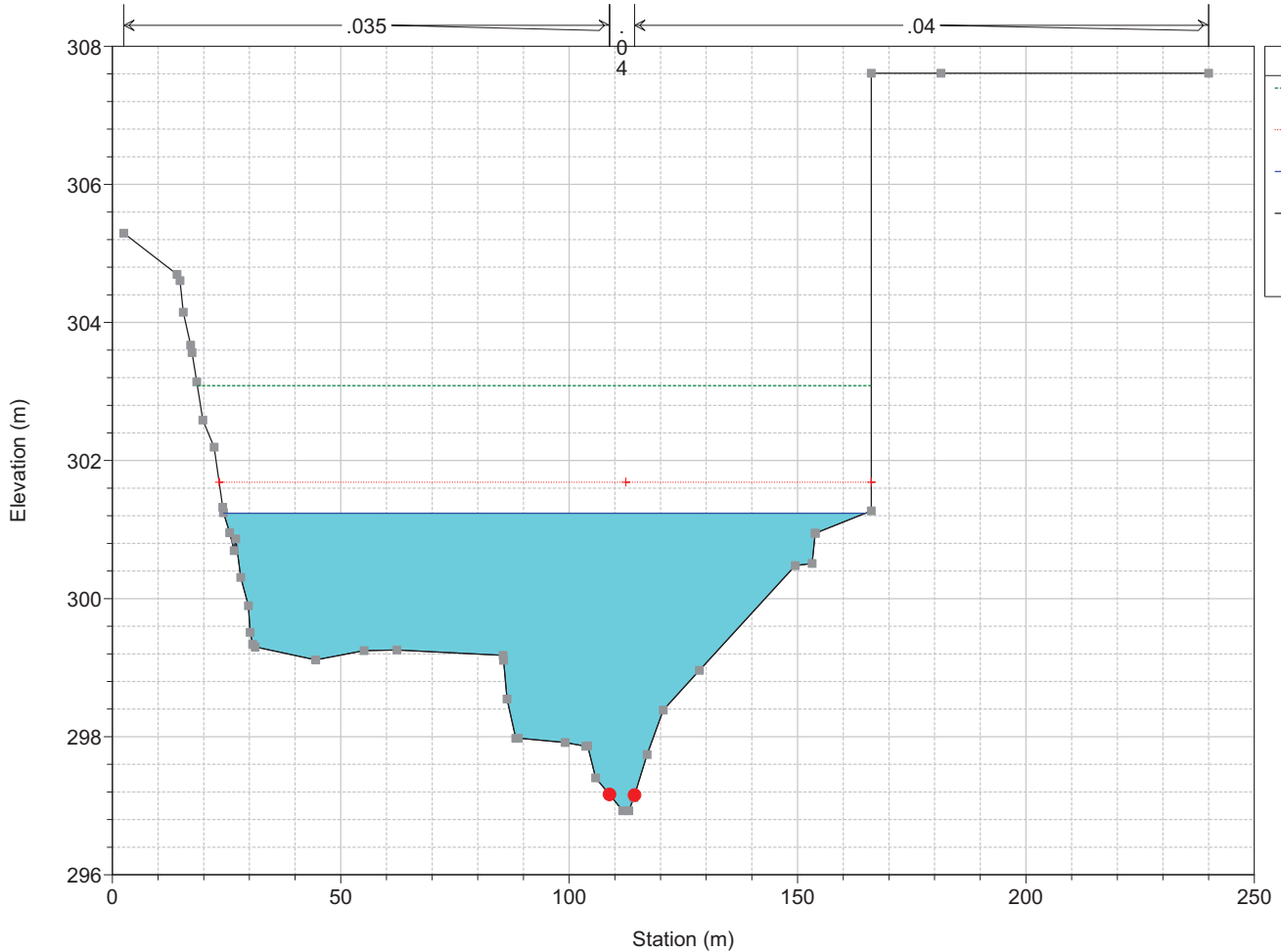
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 18



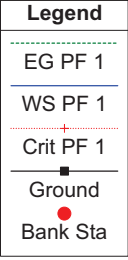
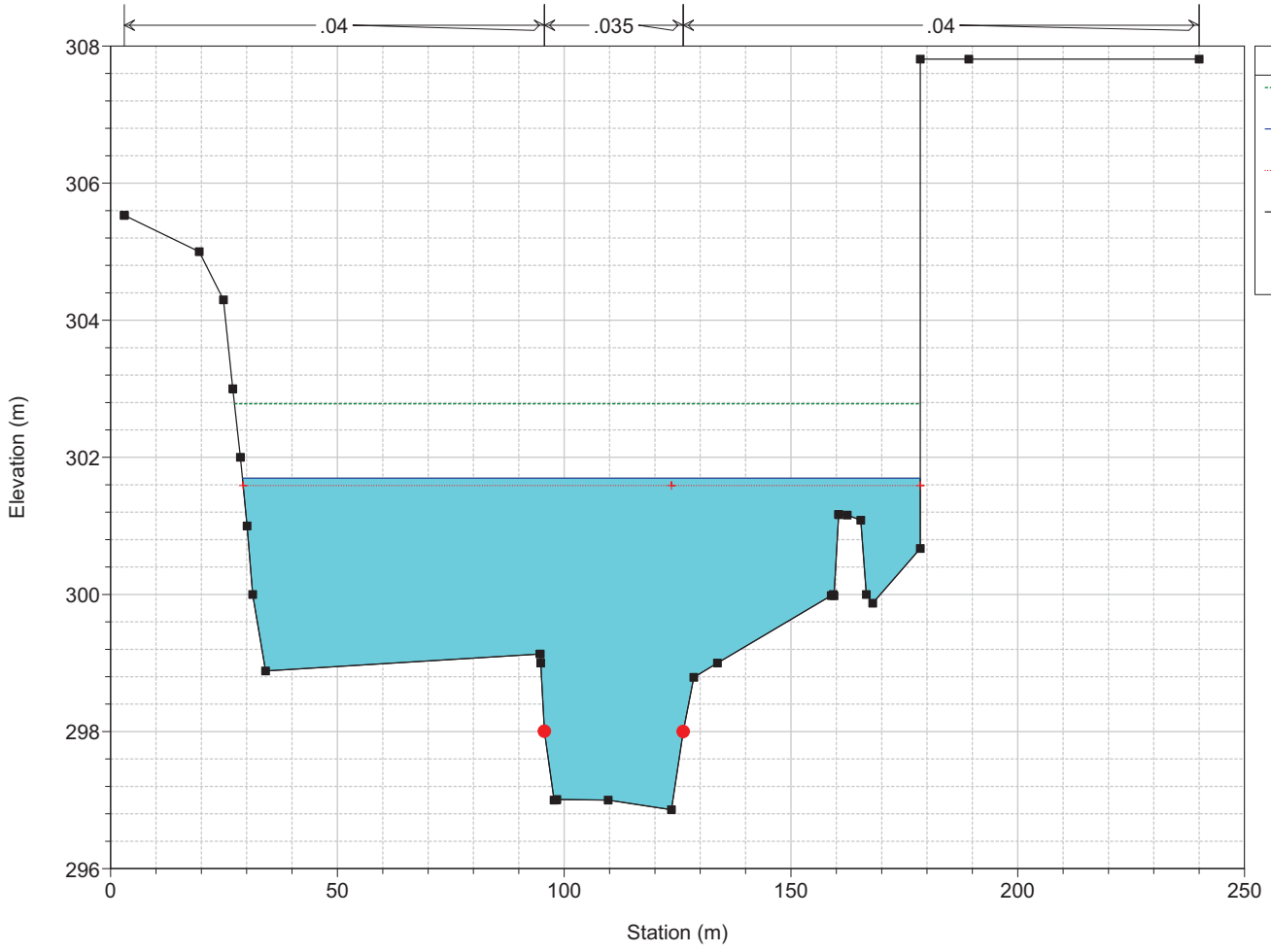
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 17.5*



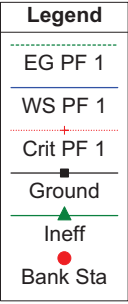
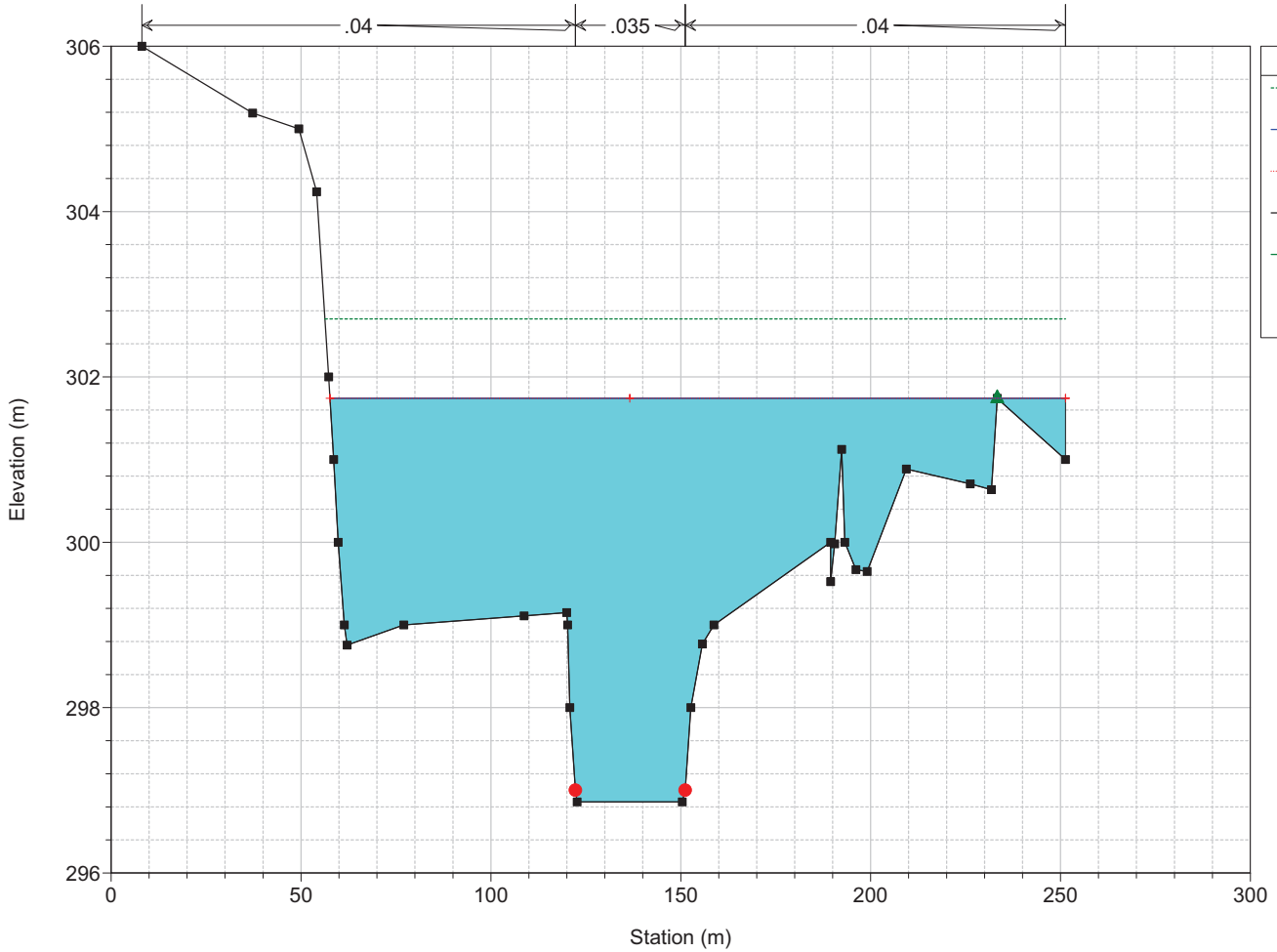
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 17



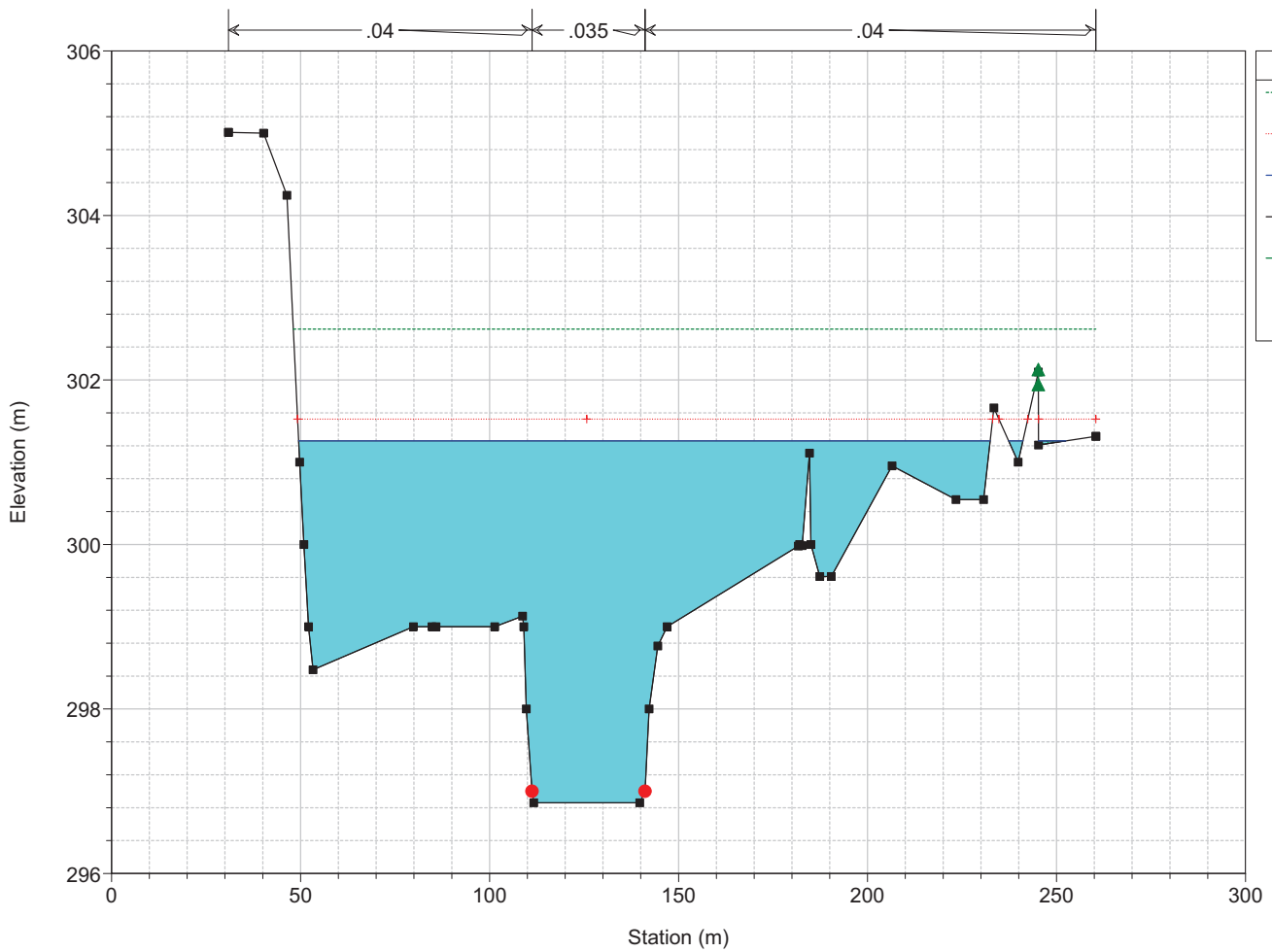
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 16



POST OPERAM_SALSO

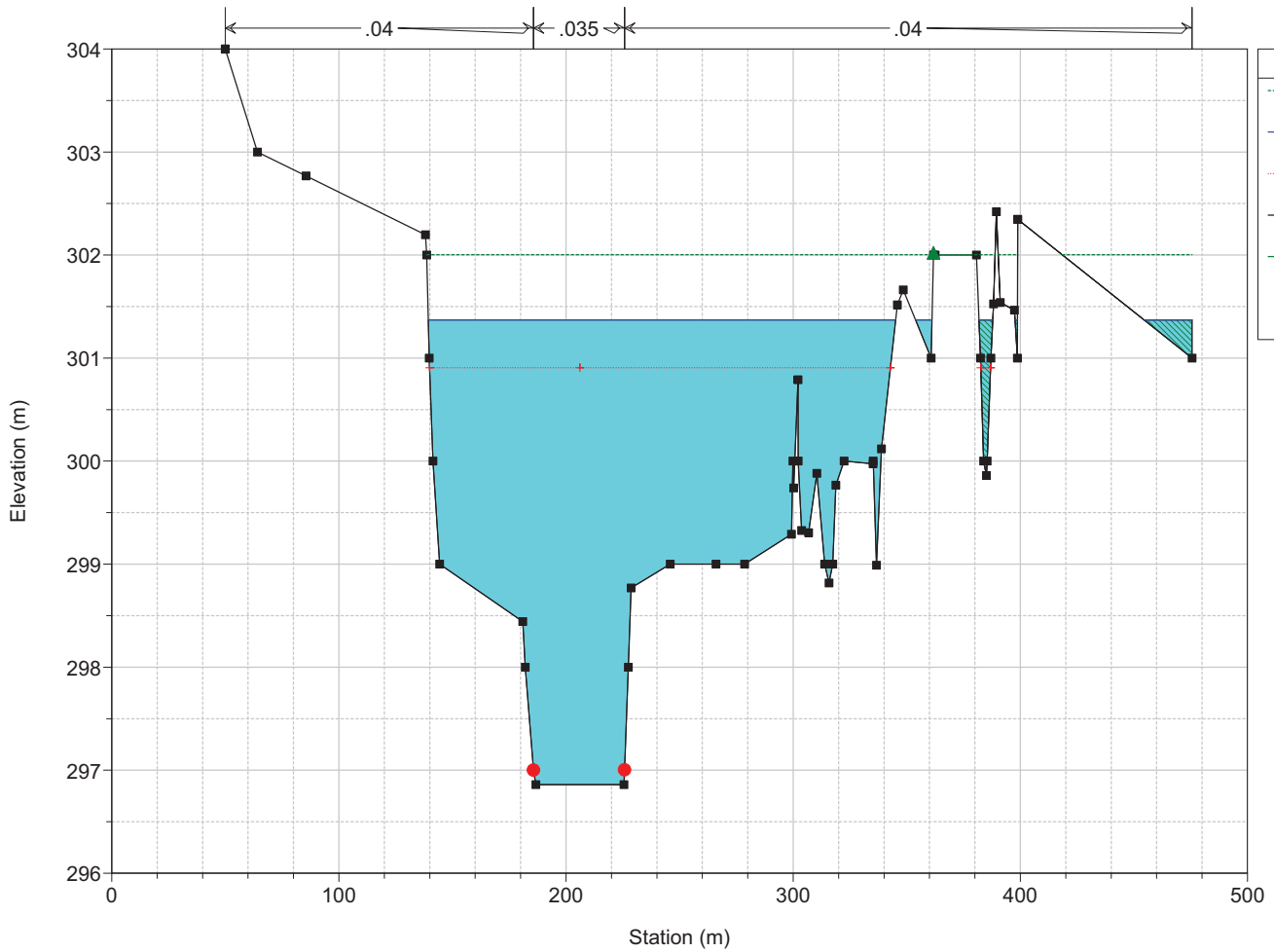
River = SALSO Reach = SALSO RS = 15



Legend	
EG PF 1	(Green dashed line with '+' markers)
Crit PF 1	(Red dotted line with '+' markers)
WS PF 1	(Blue solid line with '+' markers)
Ground	(Black solid line with square markers)
Ineff	(Green solid line with triangle markers)
Bank Sta	(Red solid circle)

POST OPERAM_SALSO

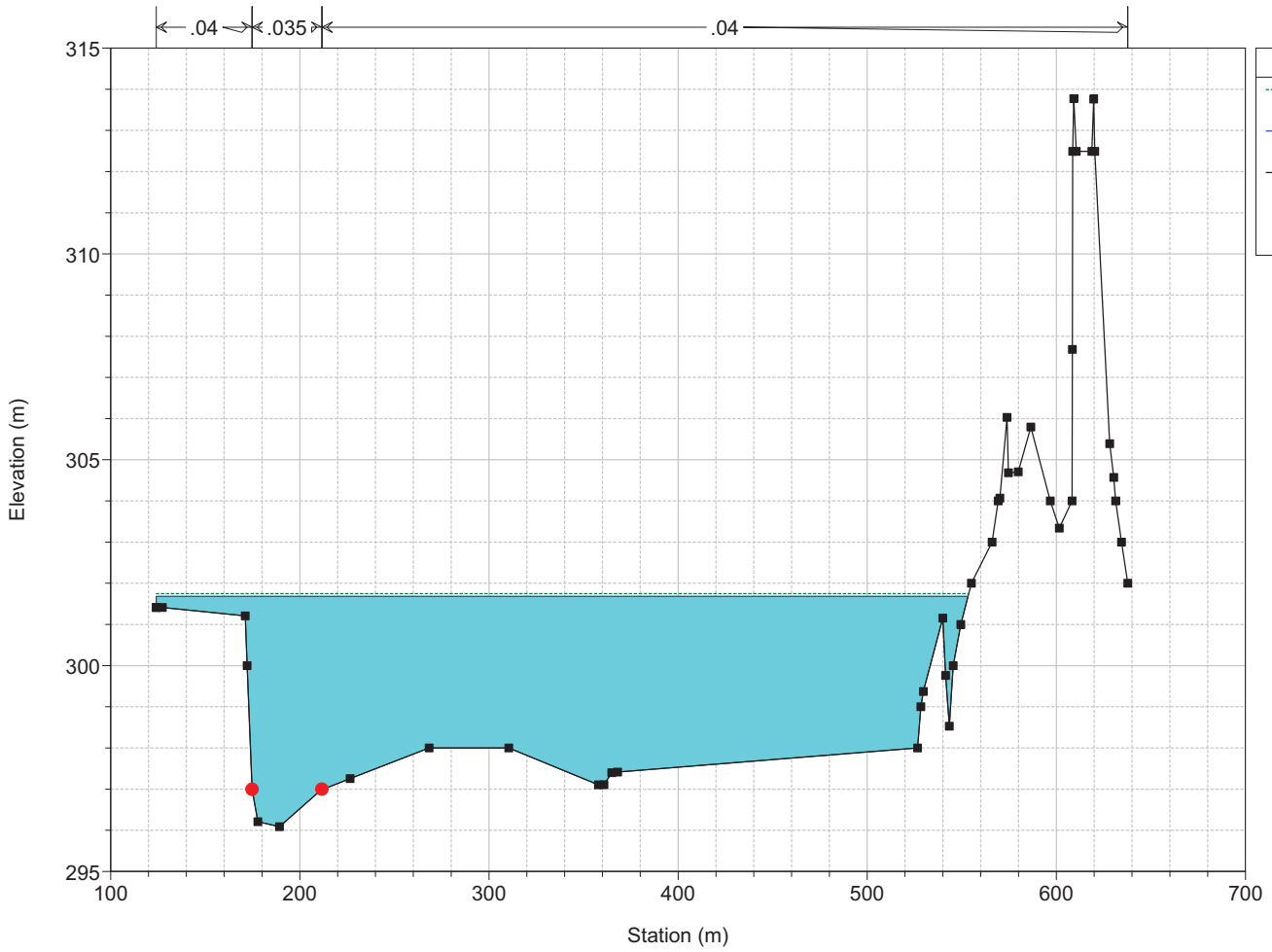
River = SALSO Reach = SALSO RS = 14



Legend	
EG PF 1	(Green dashed line with '+' markers)
WS PF 1	(Blue solid line with '+' markers)
Crit PF 1	(Red dotted line with '+' markers)
Ground	(Black solid line with square markers)
Ineff	(Green solid line with triangle markers)
Bank Sta	(Red solid circle)

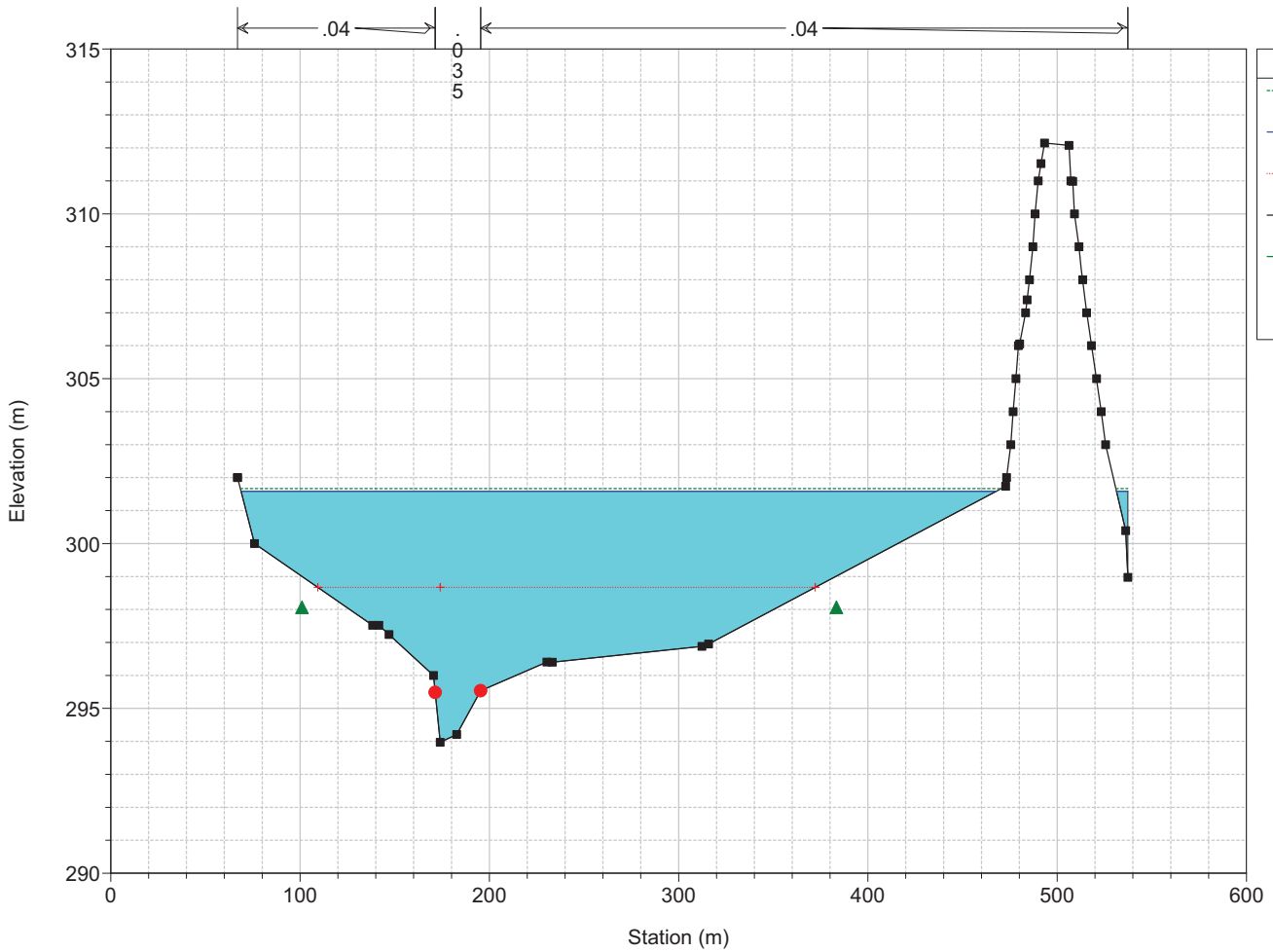
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 13



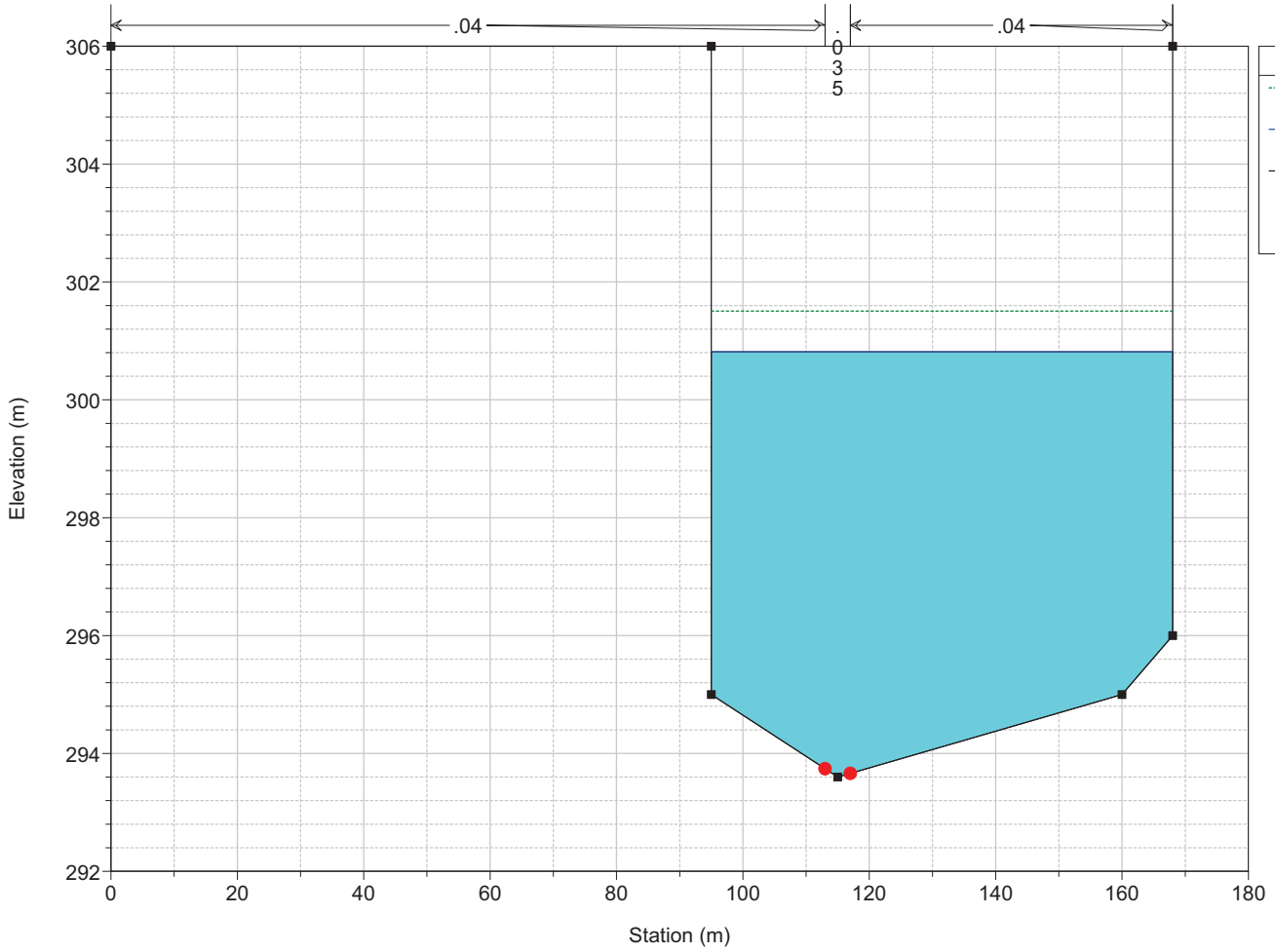
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 12



POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 11

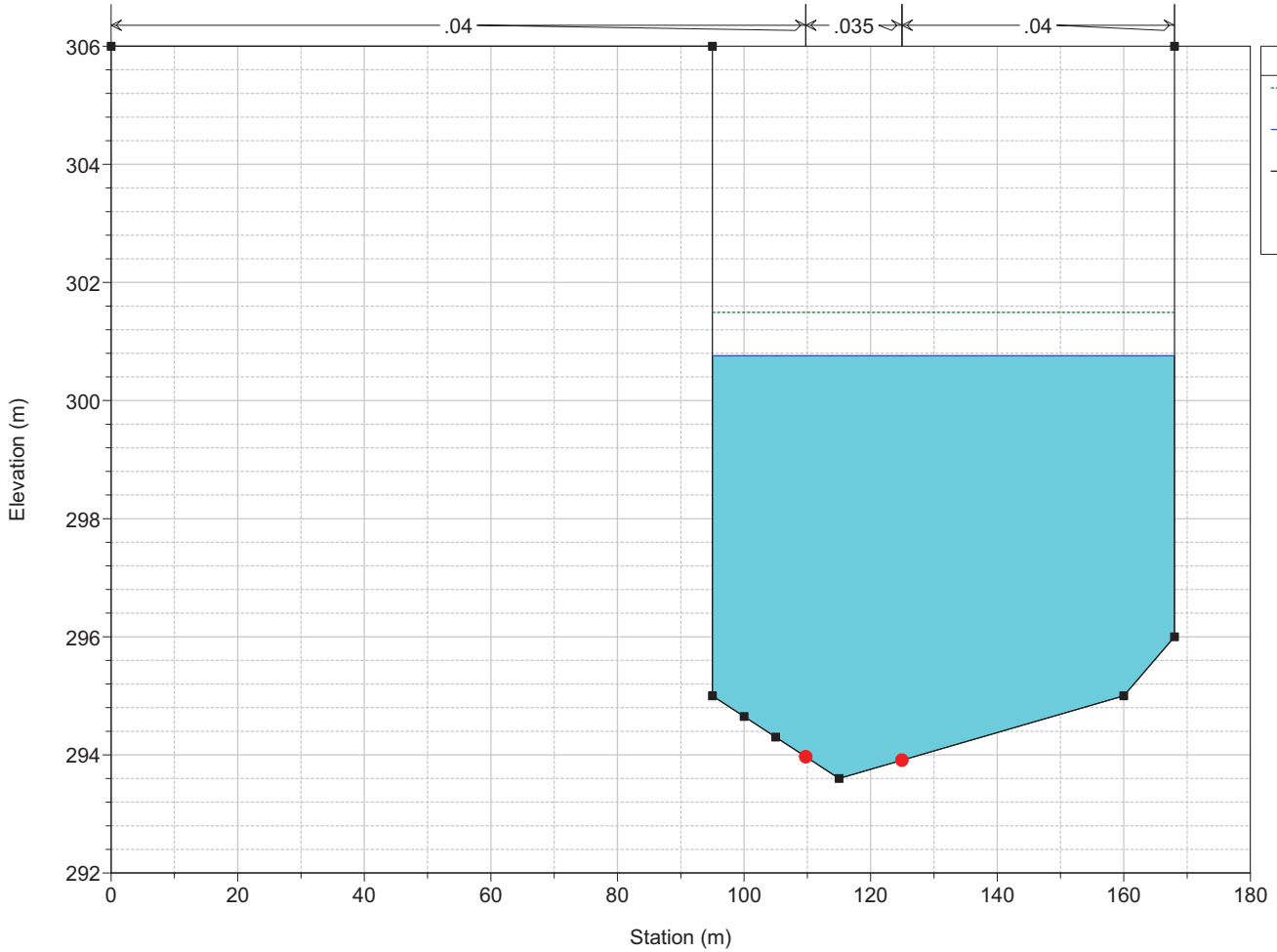


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 10

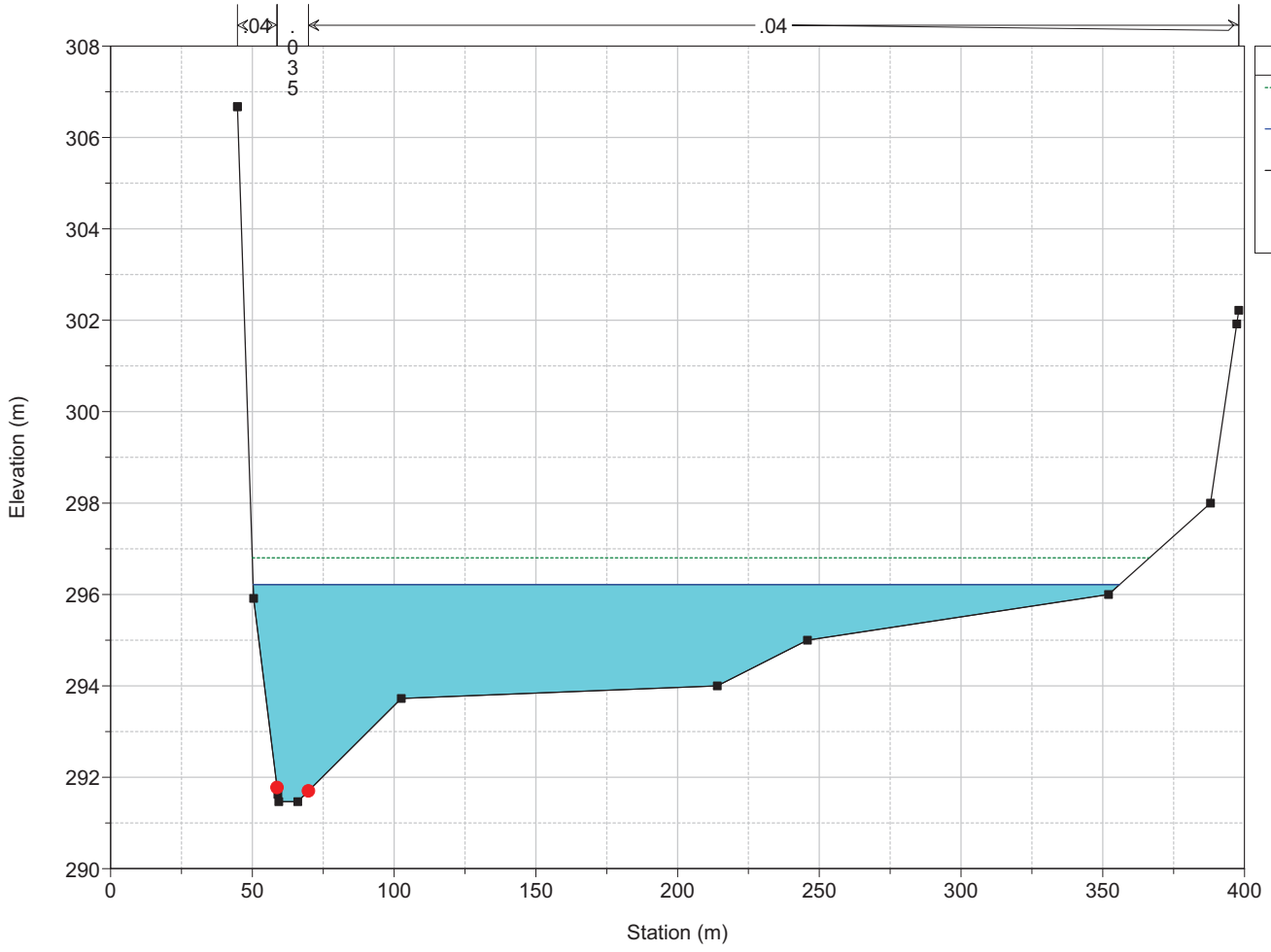


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

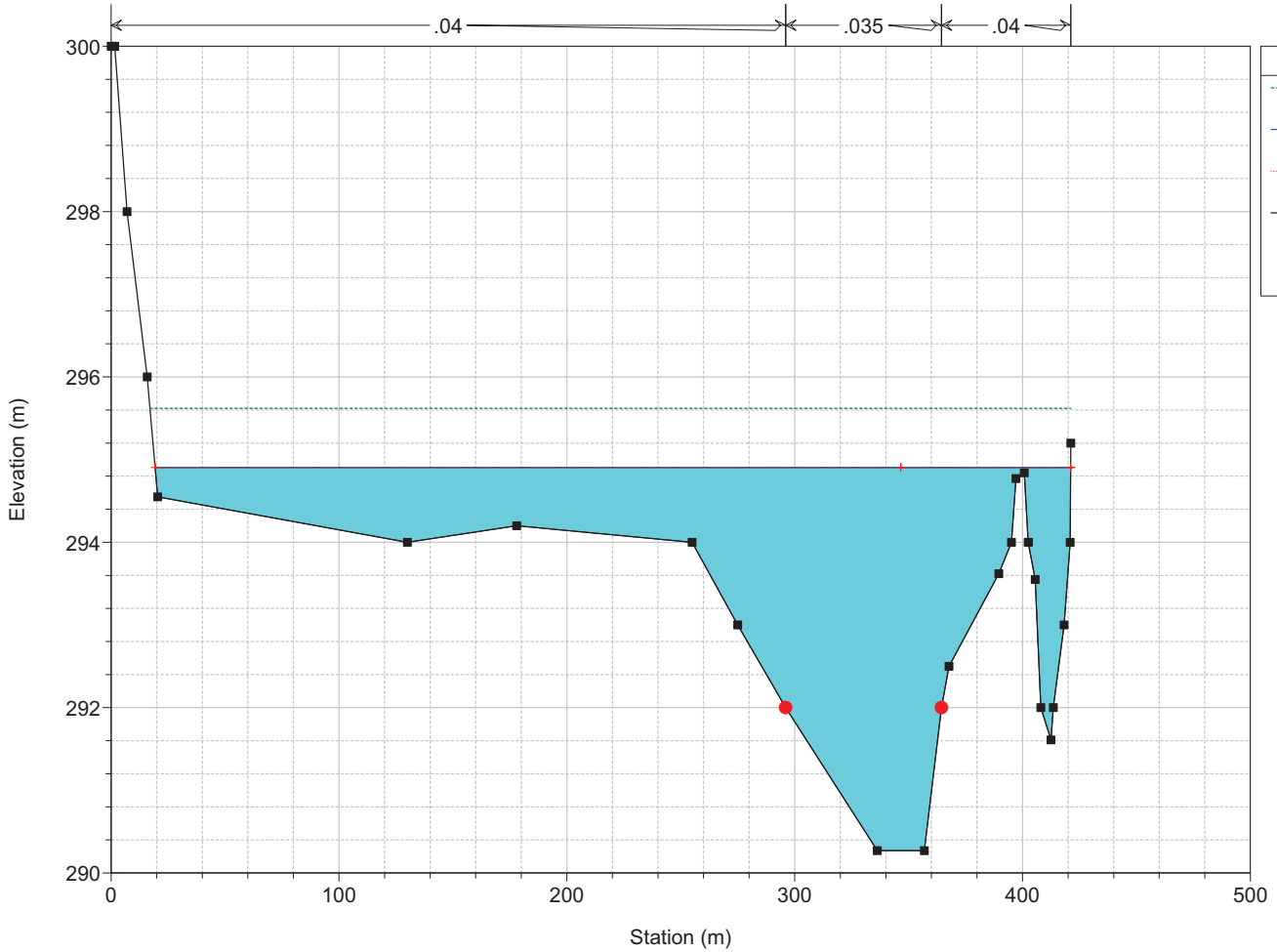
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 7



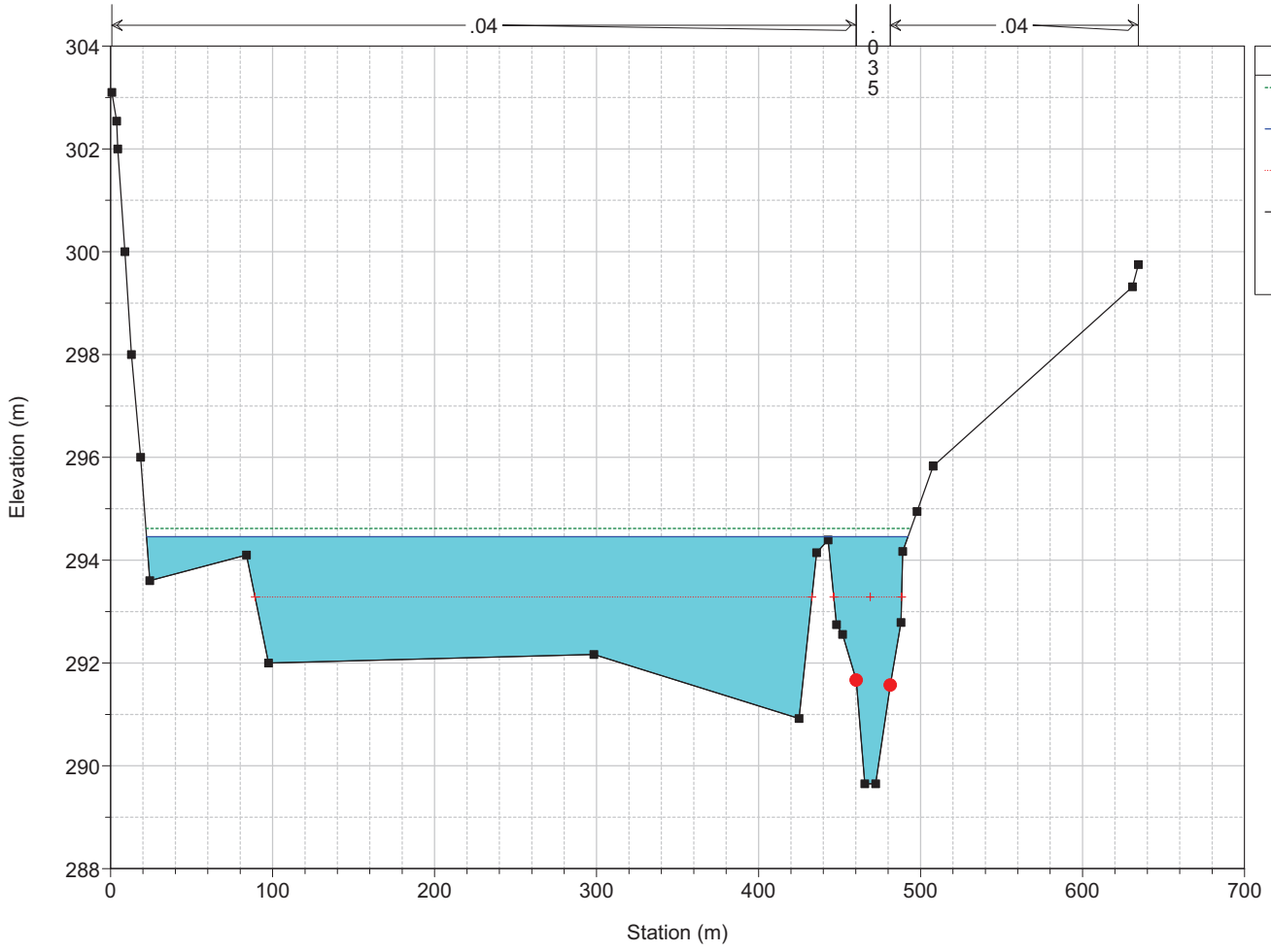
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 6



POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 5

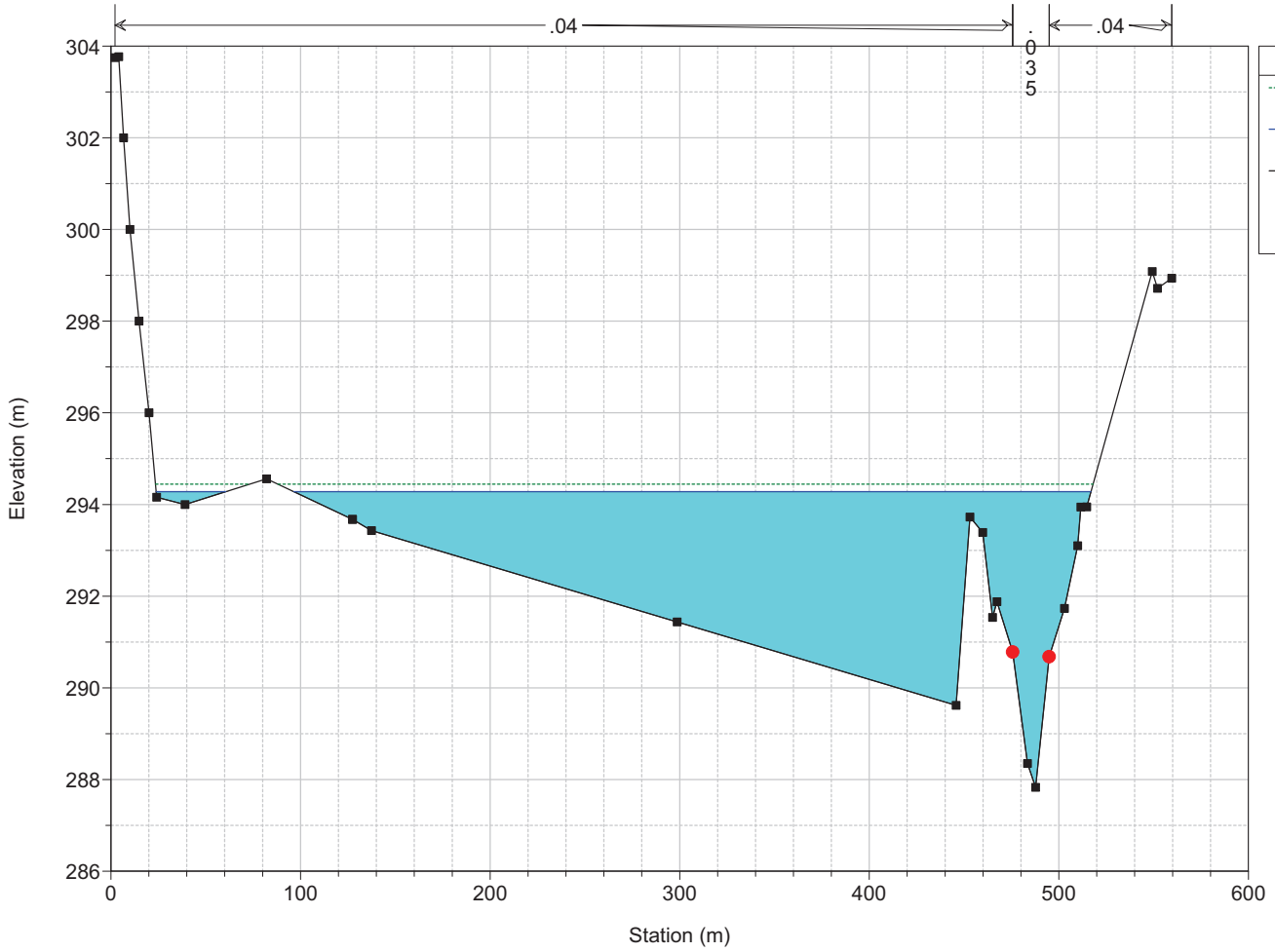


Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta

POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 4

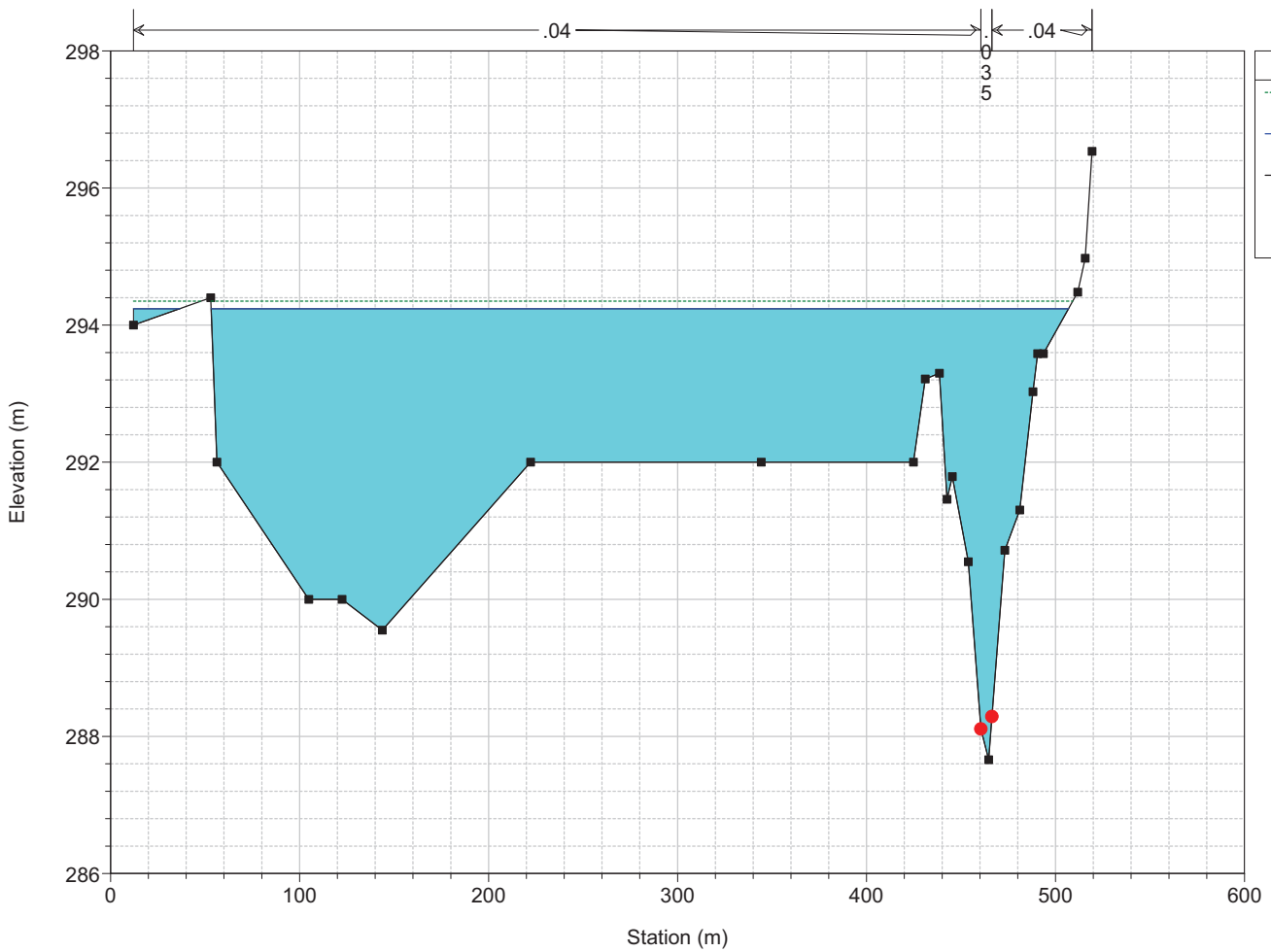


Legend

- EG PF 1
- WS PF 1
- Ground
- Bank Sta

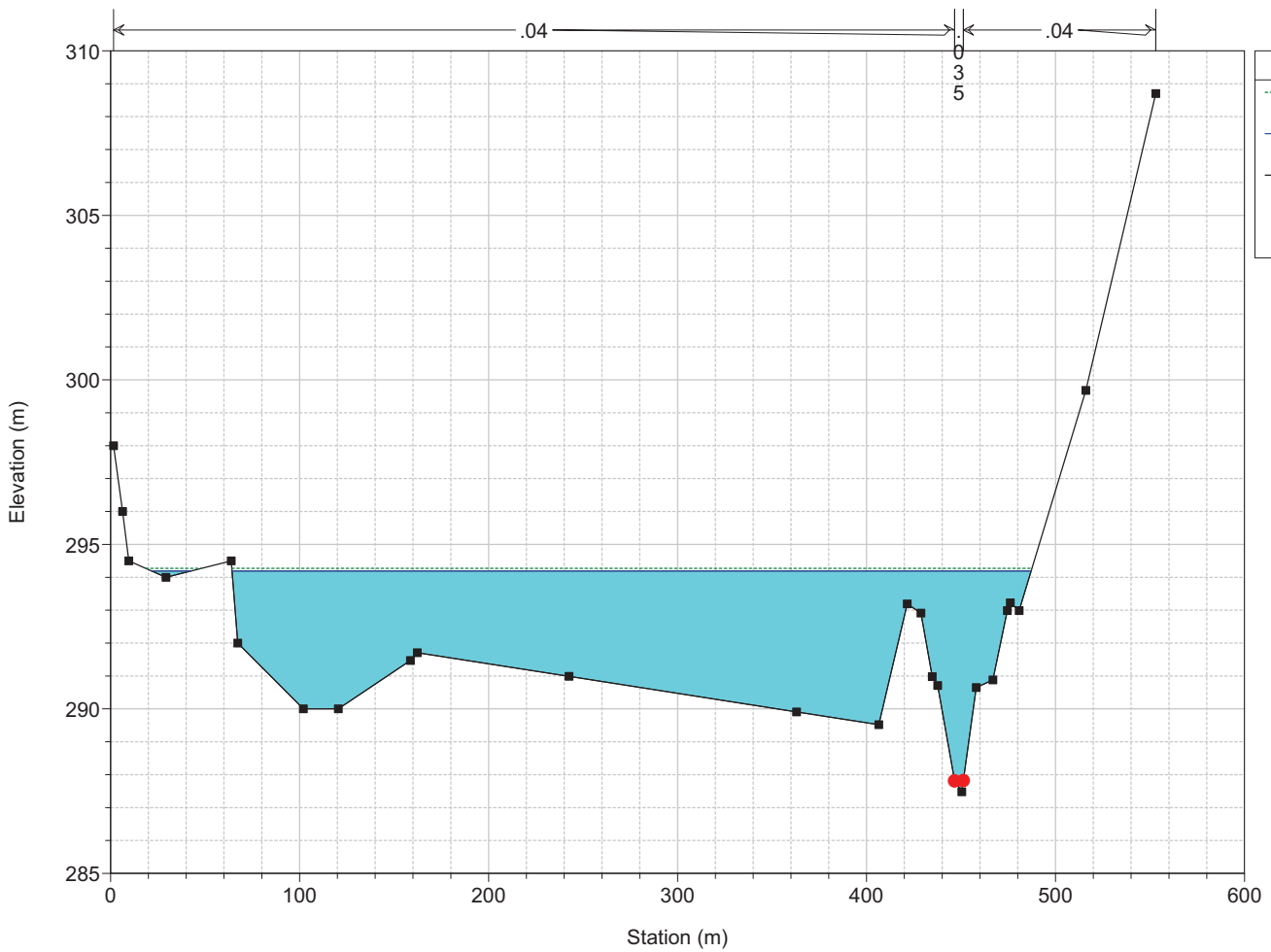
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 3



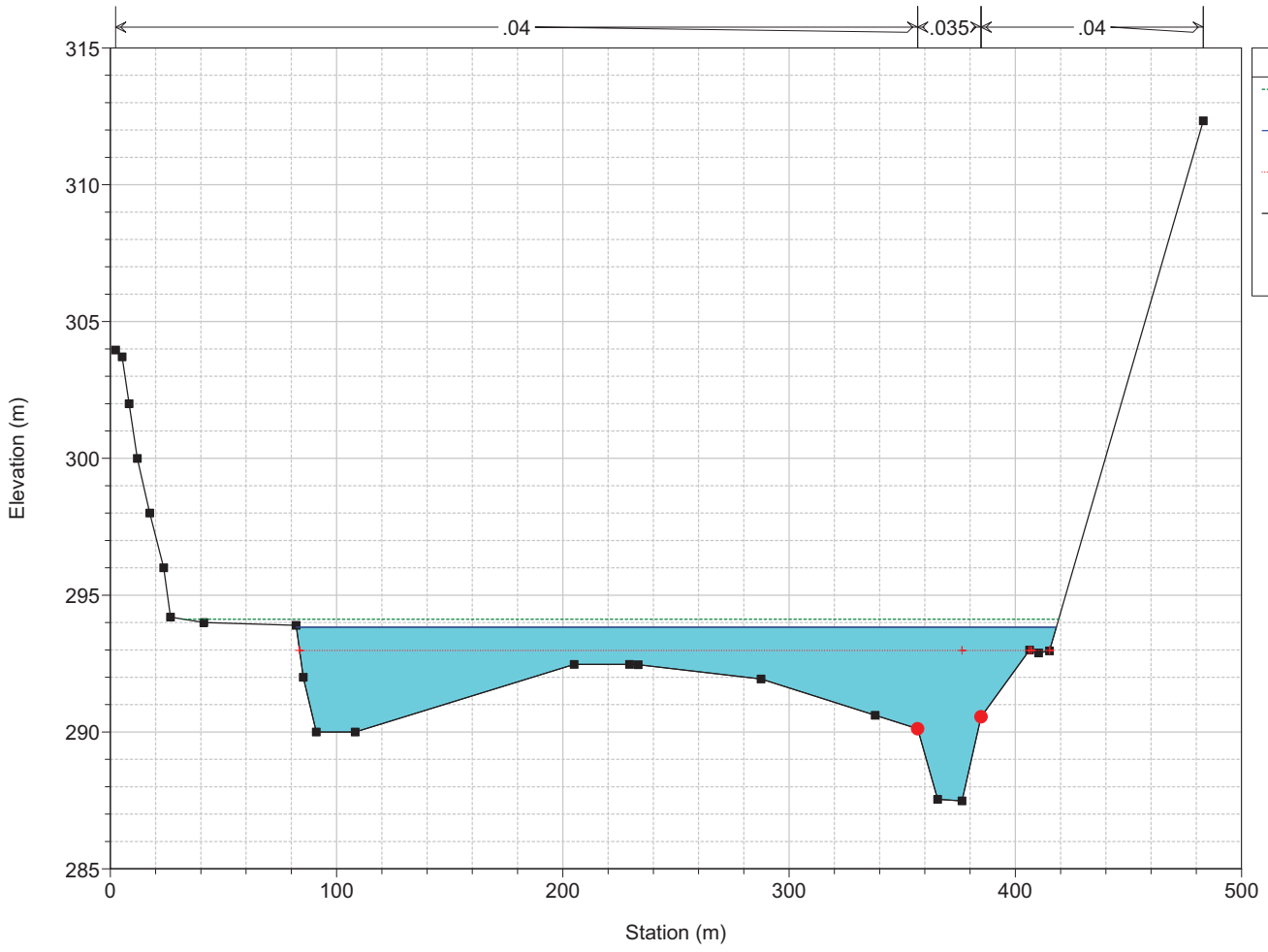
POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 2



POST OPERAM_SALSO

River = SALSO Reach = SALSO RS = 1 VALLE



Legend

- EG PF 1
- WS PF 1
- Crit PF 1
- Ground
- Bank Sta