



**Washington State
Department of Transportation**

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February 13, 2009

TO: Pete Jilek, Federal Highway Administration

THRU: Michael Sallis, SR 167 Environmental Manager, Urban Corridors Office (UCO)

FROM: Kenneth E. Juell, UCO Cultural Resources Specialist

SUBJECT: Section 106 Exemption for the SR 167 - 8th Street E Vicinity to 15th Street SW Vicinity Northbound HOT Lane (Stage 5) Project

Dear Mr. Jilek

As a result of background reviews and extensive field survey that included auger probe excavations to establish subsurface conditions, the proposed SR 167-8th Street E Vicinity to 15th Street SW Vicinity Northbound HOT Lane (Stage 5) project (hereafter 'the project') has been determined to be exempt from further Section 106 review per the *Amended Statewide Programmatic Agreement Implementing Section 106 of the National Historic Preservation Act (NHPA) in Washington State* (2007), signed by the Federal Highway Administration (FHWA), the Washington State Department of Transportation (WSDOT), the Advisory Council on Historic Preservation (ACHP), and the State Historic Preservation Officer (SHPO).

This project has minimal potential to affect historic properties (i.e., significant cultural resources) and meets the critical exemption requirement that construction-related activities will occur within the vertical and horizontal limits of previous ground disturbance. This determination is based on a principal findings that during the original SR 167 roadway construction a 2 to 6-foot + thick engineered fill layer was placed and compressed across the entire width of the highway right-of-way (ROW) and that the existing, generally highly elevated road grade then was constructed on the engineered base layer. The original or native ground surface thus is so deeply buried that all grade improvements (but one), including new grade fill, stormwater facilities, and safety appurtenances, will remain confined either to the elevated road-grade fill or the underlying engineered basal fill layer. Only a HOT lanes variable tolling sign bridge foundation will project below the fill layers into the native substrate, and the disturbance associated with this construction is relatively minor and confined to two pits.

In addition, no existing built historic properties are located within one-half mile of the project area, and no historic bridges will be affected. Based on current project specifications, no further review by WSDOT Cultural Resource Specialists (CRSs) is necessary prior to project construction. However, any changes to project description or proposed construction elements or facilities made after January 28, 2009 (the last date that project design was reviewed by CRSs) must be reported to a WSDOT CRS so that an updated review can be completed to ensure compliance with the *Statewide Programmatic Agreement* (see below).

SUMMARY OF DECISION

Regulatory Context

The project plans to obtain Federal Highway Aid Program funds and has been prepared for an eventual National Environmental Policy Act (NEPA) review. It thus is considered a potential federal undertaking with respect to Section 106 of the National Historic Preservation Act (NHPA). Initial WSDOT review of this project sought to determine if this project met one or more Exemptions from further Section 106 review by SHPO under the existing *Amended Statewide Programmatic Agreement of 2007* (see below).

Research and Analysis

WSDOT Urban Corridors Office (UCO) Archaeologist Ken Juell conducted a pedestrian survey and excavated a series of auger probes to establish existing surface and subsurface conditions in the project area. The auger probing was successful at establishing that a thick, engineered basal layer identified during SR 167-8th Street E Vicinity to S 277th Street Vicinity Southbound HOT Lane (Stage 4) project in the ROW margin west of the highway grade also covers the ROW margin east of the grade – the affected area of this project. The finding substantiates an assumption made during Stage 4 and queried during this review that a 2-foot to more than 6-foot thick (0.3 to 1.8 meter) fill layer was placed across the entire width of the SR 167 ROW to establish dry surface conditions prior to constructing the mainline road grade and the associated access ramps.

The pedestrian survey and auger probing verified that all areas where new grade fill will be added to widen the main line grade to the outside involve either placement of retained fill entirely on existing sides slopes of the SR 167 mainline, or placement of a new fill strip directly on the ground surface adjacent to the existing grade where the upper surface of an engineered basal layer is present. Thus all fill placement and all excavations associated with placement of new fill and shallow, structural wall foundations will remain on or within imported fill layers. The auger probes established that any excavation 24 inches or less that may occur at or adjacent to the base of the mainline grade, or at a comparable absolute elevation when excavating into the existing grade, will remain within the imported, engineered pre-grade fill layer. Thus it is concluded that all necessary excavation associated with the project construction, except for one sign bridge footing, will remain confined to the existing engineered fill zone. Stated conversely, no anticipated ground disturbance except for the sign bridge foundation will penetrate deeply enough to encounter the original or native ground surface, or the underlying native soils, that may contain archaeological resources.

The two pit excavations for the sign bridge will each originate on the highly elevated grade and extend downward through the road grade fill and the underlying basal fill layer into the native sediments. With two foundations estimated to be 3 feet in diameter and approximately 22 feet deep, and a 4-foot high road grade with a 2.5-foot thick underlying basal fill layer, the drilled shafts will disturb native sediments in two areas that are 3 feet in diameter and 15 to 16 feet deep. Given the proposed construction locations, opportunity to observe archaeological materials within drilled shaft spoils, if present, are considered to be limited and probably unproductive.

WSDOT Architectural Historian Connie Walker Gray conducted background research and a reconnaissance visual survey of the project area and the immediate environs. No historic properties are located in within the SR 167 ROW or in the areas adjacent to the highway. There are no historic buildings, structures, objects, or districts in the project area. Therefore, following inspection and assessment of historic significance, Ms. Walker Gray determined that no built historic properties are present in the project area or in the immediate vicinity.

Application of the 2007 Statewide Programmatic Agreement

Both the archaeological and architectural surveys have determined that this project has minimal potential to affect archaeological or standing built historic properties. This project meets several of the Exemption requirements listed in Appendix B: Highway and Bridge Activities Presumed to Have Minimal Potential to Cause Effect in the *Amended Statewide Programmatic Agreement Implementing Section 106 of the National Historic Preservation Act (NHPA) in Washington State*, including:

- B-2. Work within interchanges or within medians of divided highways, within the demonstrated vertical and horizontal limits of previous construction or disturbance;
- B-5. New installation, or replacement or repair of cameras, lighting, signs, signals, and other traffic control devices, guardrails, barriers, and informational signage/kiosks, provided the associated ground disturbance is within the demonstrated vertical and horizontal limits of previous construction or disturbance;
- B-7. Slope flattening by placement of fill material on the side slopes of intersection crossroads and accesses to meet safety criteria, and other slope flattening done within the demonstrated vertical and horizontal limits of previous construction or disturbance;
- B-10. Roadway widening within the demonstrated vertical and horizontal limits of previous construction or disturbance;
- B-12. Trenching or other excavation to install, replace, or repair electrical, water, sewer lines, fiber optics, telephone cable, or other utilities in areas demonstrated to have been previously disturbed by construction, fill, or prior trenching activities.

All Category B Exemptions depend on demonstrating that all ground disturbances associated with anticipated construction remain confined to the vertical and horizontal limits of previously disturbed substrates or imported fill (Statewide PA 2007: Pages B-2 and B-3). Such demonstration was made by confirming through field observation and excavations that:

- the mainline and access ramps typically are elevated 3 to 20 feet above the ground surface that lies adjacent the those roadways;
- the existing ground surface adjacent to the mainline grade or access ramps, but within the highway ROW, is the upper surface of deep engineered fill layer that covers the original, native ground surface;
- all proposed project elements are confined to the ROW limits, and either will be built on and into the side slope of elevated roadway grade or ramp fill (retained fill and walls, and compost-amended vegetative filter strips, or on or within the existing, engineered fill layer that covers the ROW margin east of the roadway grade.

Also, the following additional project requirements for Exemption are met (from Amended Statewide PA 2007: Page B-2); the project:

- is not adjacent to or within a historic property or historic district;
- does not affect a bridge that is listed in or eligible for listing in the National Register of Historic Places;
- does not involve soil disturbance within one-quarter mile of a known or recorded archaeological site; and,
- does not involve modification of a bridge or structure that is 40 or more years old.

The intersection bridges all are less than 40 years old, having been built in the early 1970s, with generic architectural character, and thus may not be considered eligible to the NRHP. Associated roadway widening to accommodate the extra space for a HOT Lane will not require bridge widening. Instead, paved shoulders will taper inward on both ends of each bridge.

PROJECT DESCRIPTION

WSDOT plans to widen the State Route (SR) 167 roadway to construct a new northbound high-occupancy toll (HOT) lane from the vicinity of 8th Street E in Pacific (MP 10.2) in Pierce County, Washington to the vicinity of 15th Street SW in Auburn (MP 14.26), King County, Washington (Figure 1). This project adds a northbound HOT lane onto the recently completed 15th Street SW to 15th Street NW HOV Lanes (Stage 3) project. It also extends the HOT Lane system southward to 8th Street E in both directions, along with the HOT Lane Stage 4 project that extends the southbound HOT lane from 15th Street NW to 8th Street E.

Project Location

The project is on SR 167, south of SR 18, between the 8th Street E interchange vicinity at Milepost (MP) 10.20 to the 15th Street SW interchange vicinity at MP 14.26. It traverses the city limits of Sumner, Pacific, Algona, and Auburn in King and Pierce counties (Figure 1).

The project is located on the U.S. Geological Survey (USGS) 7.5 minute quadrangle Poverty Bay, Washington (1973, 1994); Auburn, Washington (1994); and Puyallup, Washington (1998) (Figure 2).

The project traverses Section 2 of Township 20 North, Range 4 East, and Sections 36, 26, and 23 of Township 21 North, Range 4 East, Willamette Meridian.

Roadway Improvements

All proposed project roadway widening will occur within WSDOT ROW (Table 1). The mainline surface will be widened to accommodate the new HOT lane, except where it crosses the existing bridges over 3rd Avenue SW, Ellingson Road, and 1st Avenue N. At the overpass bridges, shoulders on both sides of the mainline will be reduced toward the barrier, so that no bridge modification is necessary. In the southern-most project area, from 8th Street E to just south of 3rd Avenue SW, there is sufficient space to widen the roadway toward the median. From just south of 3rd Avenue SW to a point approximately 1,800 feet north of 1st Avenue N (between local surface streets 6th Avenue N and 5th Avenue SE) where the median returns, roadway widening will be to the outside. Widening then resumes toward the median (only) until reaching the northern end of this project at 15th Street SW. Where widening will occur in the median, imported fill will be placed and compacted directly on sod-cleared, original-grade construction fill. Because the grade

is elevated between 6 and 20 feet above the engineered basal fill layer, there will be no effects on cultural resources.

Where roadway widening will occur to the outside of the grade, the driving and paved shoulder surface generally will be widened by steepening the existing side slope and only rarely by widening the base of the elevated grade. This design is being done in order to avoid impacts to wetlands. New fill will be placed either as mechanically stabilized earth (MSE) walls or behind cantilevered gravity walls that originate at the middle- to lower-middle side slope of the elevated road grade. MSE walls consist of a vertical facing element combined with horizontal soil reinforcement to retain backfilled and compacted soil. Gravity walls use strips, bars, or mats of steel or polymeric reinforcement to stabilize the soil and create a reinforced soil block behind the face. The reinforced soil block then acts as a unit and resists the lateral soil loads through the dead weight of the reinforced mass. MSE walls may be constructed as fill walls, with fill and reinforcement placed in alternating layers to create a reinforced mass, or reinforcement may be drilled into an existing substrate using grouted anchor technology to create a reinforced sediment mass (soil nail walls) (Figure 3). The latter design will not be used for this project. MSE wall locations are shown in Appendix A.

Improvements are planned at the access ramps at Ellingson Road. The northbound off-ramp will be realigned toward the SR 167 mainline midway down the ramp to improve safety. The northbound on-ramp will be widened toward the mainline and realigned to accommodate a new HOV-only access lane.

Ramp meters will be installed at the northbound on-ramps at the 8th Street E and Ellingson Road interchanges.

Stormwater Detention and Treatment Facilities

Proposed stormwater facilities include two detention ponds with collection and distribution systems and seven (7) compost-amended vegetative filter strips (CAVFS) (see Figure 4, Table 2 and Appendix A). New ponds will be constructed at intersection islands (both in NE corner), at 8th Street E and at Ellingson Road (Appendix A). Each pond will have new enclosed drainage systems that involve diverting water off the mainline and northbound on-ramps with the use of curbs at pavement margins, with storm drains leading water to short lengths of pipe to channel runoff into the ponds. Gravity-fed outflow pipes will discharge treated water into wetlands or ditches near the eastern margin to the ROW. Due to an existing local high water table, these ponds cannot be created by excavating a basin into the substrate. Instead they must be created by first building a peripheral berm enclosure with imported fill, then performing some excavation to level the artificial basin to the lowest relative elevation within the enclosure. To be clear, the basal elevations of the ponds will be the existing lowest elevation at each interchange island. The inflow and outflow pipes will be placed within shallow trenches excavated only into the existing engineered grade fill and basal fill layer within confines of the highway ROW.

Seven (7) CAVFSs will be constructed along the mainline or ramp pavement margins and road grade embankment to treat runoff from sheet flow (Table 2 and Appendix A). CAVFSs are built parallel to travel lanes, and by design the length is equivalent to the linear distance of roadway, depth is consistently 1 foot, and width is determined based on infiltration rates of the fill material placed and width of pavement draining to the CAVFS. On this project, CAVFSs will vary

between 6 and 18 feet wide. In all cases, excavation associated with their construction will remain confined to the upper 18 inches to 2 feet of the elevated grade side slopes. A CAVFS profile is shown in Figure 4.

BACKGROUND RESEARCH AND RECORDS SEARCH

Department of Archaeology and Historic Preservation (DAHP) archaeological and ethnographic site file and GIS layers, and the architectural property database, were searched prior to field reconnaissance. There are no known prehistoric- or historic-period archeological resources, and no standing historic properties, objects, or districts within one mile of the project area.

Two cultural resources surveys were completed recently in the project vicinity, both associated with SR 167. The SR 167 Stage 3 project area is positioned immediately north of this project on the northbound (eastern) side, between 15th Avenue SW and 15th Avenue NW. This project was determined to be exempt from further Section 106 review in 2005.

The second assessment is of the SR 167-8th Street E Vicinity to S 277th Street Vicinity Southbound HOT Lane (Stage 4) project, the southern portion of which established existing subsurface conditions on the opposite side of the ROW traversed by this project (Jones & Stokes 2008). That survey excavated 75 16-inch diameter (40 centimeter) shovel probes between the 8th Street E and 1,500 feet north of 1st Avenue N, where the median returns toward the north. The fieldwork identified two important subsurface conditions. First, the ROW margin west of the elevated road grade was covered with an engineered fill (clean medium to fine sands and well-rounded cobbles); depth varied between 0.3 and 4.25 feet (4-50 inches, or 10-125 centimeters), and generally exceeded 16 inches (40 centimeters). Second, the engineered fill layer rests either directly on organically rich, black loam or black peat, with alternating peat and muck layers below, or on a dark grayish brown loam with alternating peats and muck layers below. The former sequence is interpreted as fill placed directly on the original ground surface, without sod or significant vegetation removal, with an underlying, intact sedimentary profile. The latter is interpreted as fill placed over native sediments following some stripping of the surface and near-surface substrate. Two conclusions may be drawn: there is an intact or relatively little disturbed native substrate present in the western ROW margin opposite this project area that could contain archaeological materials in their original location; and the native substrate is covered by a thick fill layer that serves as an effective barrier from any shallow disturbance associated with highway construction.

That project's (Stage 4) proposed improvements are limited mostly to the elevated roadway grade, and otherwise where off the grade on the western margin to a subsurface disturbance of less than approximately 18 inches. If it were established that the engineered basal fill layer was present in the eastern margin of the highway ROW as well, and that it was consistently deeper than the proposed depth of ground disturbance for this project, any intact archaeological resource actually present in the ROW could be avoided.

Thus the two principal objectives of this project's (Stage 5) archaeological reconnaissance were to establish the presence or absence of an engineered fill layer in the eastern ROW margin adjacent to the mainline grade (and likely below it), and to establish that is consistently deeper than the proposed depths of construction.

WSDOT SURVEY RESULTS

Historic Resource Survey

WSDOT Architectural Historian Connie Walker Gray conducted background research on the WSDOT GIS, which, through a data sharing agreement with the Department of Archaeology and Historic Preservation (DAHP), includes an up-to-date inventory of historic resources listed in the NRHP. Ms. Walker Gray also reviewed the DAHP Historic Property Inventory Database to determine if any historic resources adjacent to the SR 167 ROW had been evaluated for NRHP eligibility. These records searches established that no previously recorded historic buildings, structures, districts, or objects are located within one-half mile of the project area. Ms. Walker Gray also conducted a windshield and pedestrian survey on September 10, 2008, of the neighborhoods bordering the eastern edge of the highway ROW. This evaluation resulted in the determination that there are no historic properties within the project area or in the immediate vicinity. Further, even if present, this undertaking would have no potential to affect historic properties outside of the SR 167 right of way.

Archaeological Resource Survey

WSDOT Archaeologist Ken Juell conducted a pedestrian survey and subsurface investigation of the project area on several non-consecutive days in late September, October, and early November, 2008. The pedestrian survey involved walking the entire project area to verify that the MSE wall or gravity retaining walls/retained fill façade locations were located mid- to lower-middle slope on the roadway or ramp embankments, to select locations for auger probes to establish the depth of the engineered basal fill layer adjacent to the grade, and to ensure that construction excavations would remain within grade fill or the underlying engineered basal fill layer. The pedestrian survey also was used to establish that the two proposed pond locations were previously disturbed by highway and stormwater detention improvements.

Auger probes (APs) were used to establish the presence or absence of the pre-grade, basal engineered fill layer in the ROW margin east of the mainline, and its depth where present. APs were also used to investigate substrates at the proposed pond locations. A 4-inch (10 centimeter) diameter bucket auger was used to extract sediment, which was dumped onto the ground to record stratigraphic descriptions (color, texture, compaction, percentage of stone clasts). Upper and lower depths of stratigraphic layers were determined by measuring base of excavation after each lift and measuring stratigraphic shifts on the bucket exterior. Sediments were returned to holes after recording their contents. APs that only could be excavated to a depth less than 16 inches, due to rock refusals, were abandoned, with another one excavated in close proximity. Sediments underlying the clean, engineered fill were examined for artifacts using fingers and trowel.

A total of 55 4-inch (10 centimeter) diameter APs were excavated in the project area adjacent to the highway grade's base of slope, between 1,500 feet south of the 8th Street E and 1,500 feet north of 1st Avenue N (where the median returns to the north). AP locations were selected to provide a series of samples adjacent to proposed MSE walls and CAVFSs, and were spaced at intervals varying between 90 and 165 feet (25 to 40 meters) (see Appendix A). AP results are provided in Table 3. The basal engineered fill was found in all APs, and varied in depth between

18 and 52 inches (45 to 130 centimeters). Importantly, the fill layer always was deeper than 18 inches.

Following fieldwork, project engineers entered AP locations (station numbers and offset distance from the mainline centerline) into the design software to generate profiles to establish depth of MSE wall construction relative to the bottom elevation of the basal engineered fill layer. Results are provided in Appendix B. The profiles illustrate the existing ground surface of the highway shoulder, the side slope of the roadway prism and ground surface adjacent to the grade, the proposed position of the MSE wall base on the grade's side slope, and the position of the AP. The MSE wall will be reinforced with a 3- to 5-foot deep foundation. The profiles indicate that in all locations sampled by the APs, the base of excavation of the proposed wall foundation is higher in elevation than the bottom of the basal engineered fill layer. Therefore, provided all MSE wall construction occurs as planned, native substrates everywhere will be avoided. Thus so would any archaeological resource present in the project area.

Fourteen (14) APs were used to investigate proposed detention pond locations (Table 3 and Appendix A). APs 6 to AP 9 examined a pond location in the southeast island of the 8th Street E interchange, which was later abandoned. APs 10 to 14 exposed extremely hard engineered fill that contained a sufficiently high enough percentage of river gravels and cobbles (5 to 50mm+) to prohibit excavation greater than 16 inches (40 centimeters). But with a base of excavation of 62 feet above mean sea level (amsl) in elevation, which is equivalent to the ground surface at the AP 10 location, these APs do establish that all excavation for the pond will remain confined to imported fill. Lastly, AP 41 to AP 45 explored substrate conditions at the proposed pond at the Ellingson Road interchange. As at 8th Street E interchange, extremely hard engineered fill with cobbles was exposed to a depth of 16 inches (40 centimeters). Because the base of this pond will be at lowest elevation of the existing ground surface, the APs established that excavation will remain entirely within the basal engineered fill layer.

The archaeological field survey results indicate that all construction needed to build the proposed improvements, except for the two proposed sign bridge foundations located on the grade top at Station No. 359+00, will remain confined to the ROW-broad engineered basal fill and the roadway grade fill layers. As mentioned above, the sign bridge foundations will disturb two areas approximately 15 to 16 feet deep and 3 feet in diameter. Thus this project has only minimal potential to disturb a significant archaeological resource.

SUMMARY

Based on available information, results of the recently completed SR 167 Stage 4 cultural resources survey (Jones & Stokes 2008), and the results of this review and survey, this project has been determined to be exempt from Section 106 review and any additional cultural resources investigation. No further investigations are necessary or recommended prior to construction, unless there are design changes of project elements after January 28, 2009. FHWA, the Department of Archaeology and Historic Preservation (DAHP) and identified concerned tribes (The Muckleshoot Indian Tribe and the Puyallup Tribe) will be advised of this determination at the next quarterly Amended Statewide Programmatic Agreement meeting, and this project will be listed on the WSDOT website under Section 106-Exempted projects. This memorandum is the only written record of this determination.

Please let me know if you have questions, comments, or concerns.

Sincerely,



Kenneth E. Juell
WSDOT UCO Cultural Resources Specialist (Archaeologist)

cc. Michael Sallis, WSDOT UCO w/o attachments
Jonathon Harris, WSDOT UCO w/ attachments
Donald Seeberger, WSDOT UCO w/o attachments
Scott Williams, WSDOT HQ w/o attachments
Matthew Sterner, DAHP w/ attachments
Laura Murphy, Muckleshoot Indian Tribe, w/ attachments
Brandon Raynon, Puyallup Indian Tribe, w/ attachments

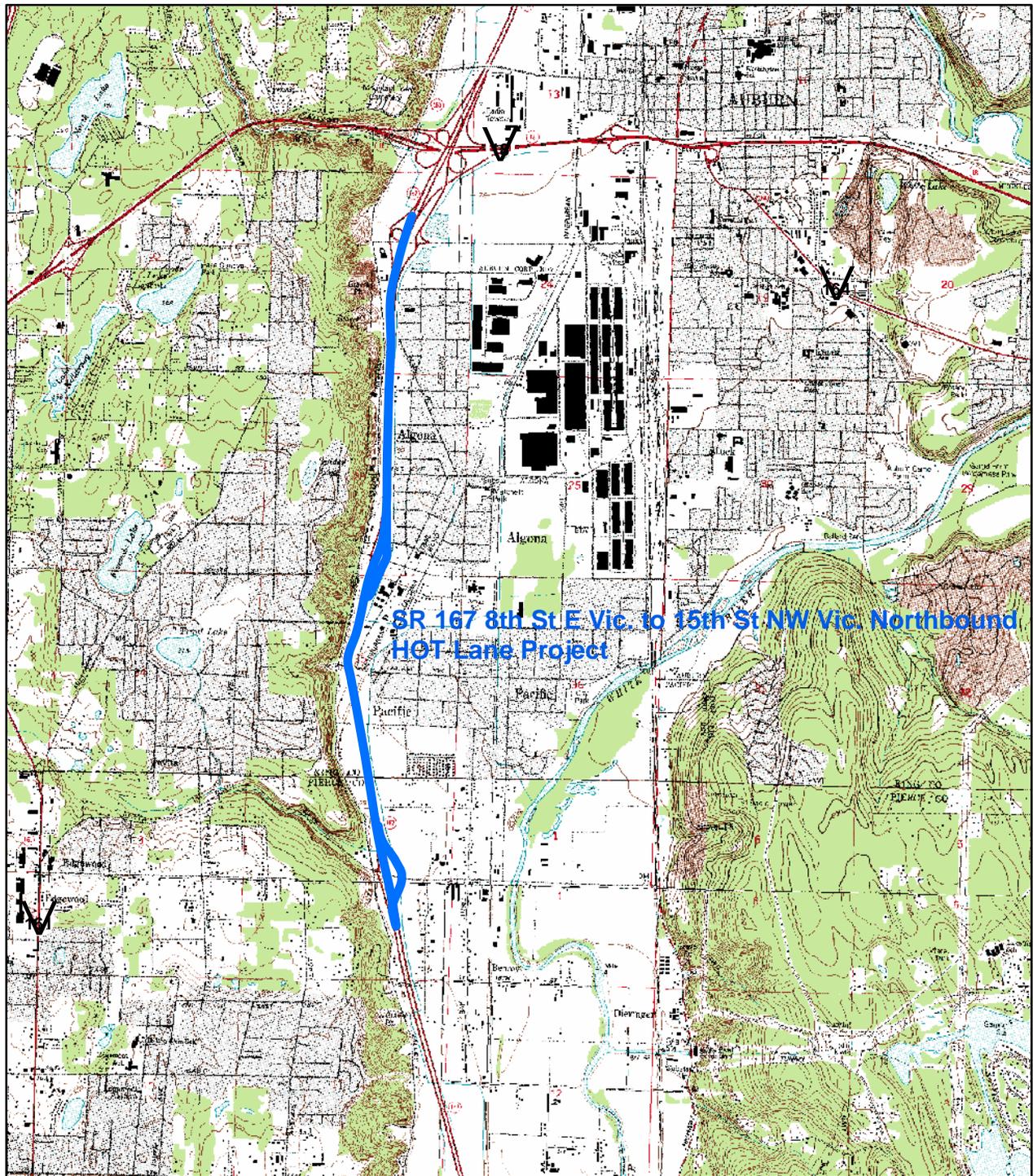
REFERENCES

Jones & Stokes, Inc.
2008 *Cultural Resources Assessment of the SR 167-8th Street E Vicinity to S 277th Street Vicinity Southbound HOT Lane (Stage 4) Project*. Technical Report produced for Perteet Inc. and the Washington State Department of transportation, Urban Corridors Office, Seattle.

Statewide PA
2007 *Amended Statewide Programmatic Agreement Implementing Section 106 of the National Historic Preservation Act (NHPA) in Washington State*

Figure 1. Project Location Map

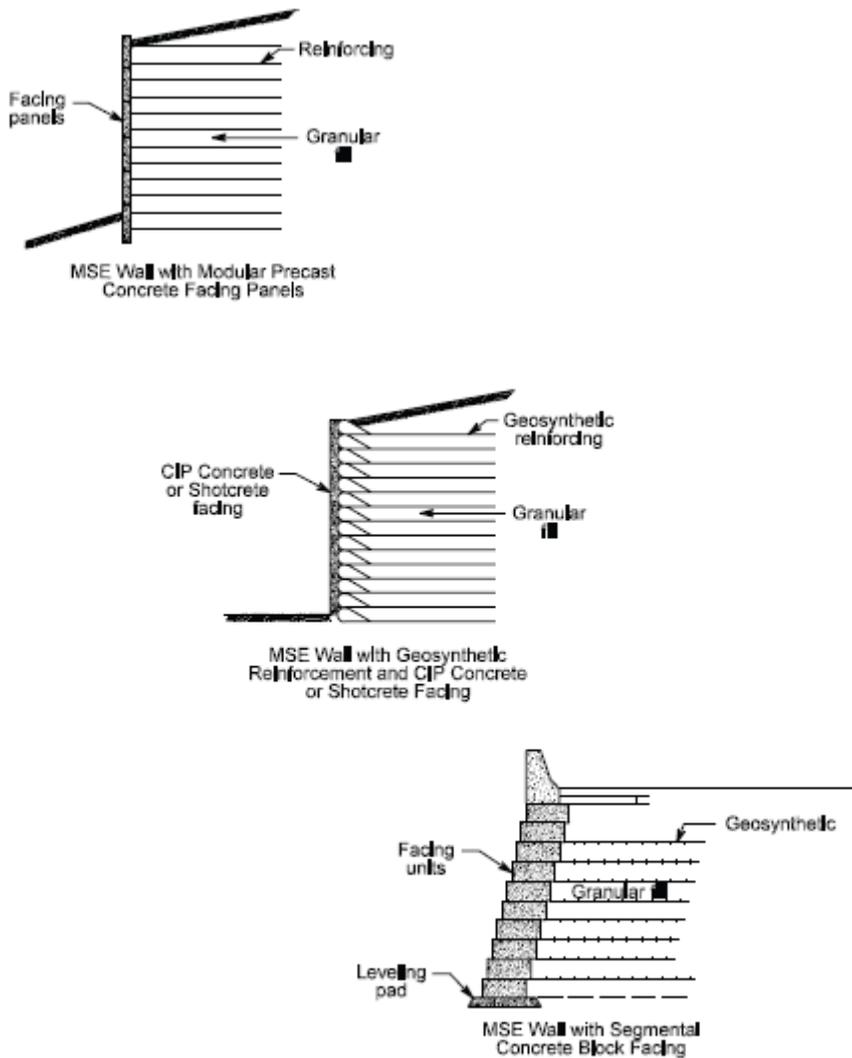




0 2,400 4,800 9,600 Feet

Figure 2. Project Location Map (USGS 7.5 min. quads. Poverty Bay, WA (1994); Auburn, WA (1994); and Puyallup, WA (1993))

Figure 3. MSE wall construction typical profiles



Typical Mechanically Stabilized Earth Gravity Walls
Figure 1130-1a

Figure 4. Typical CAVFS profile.

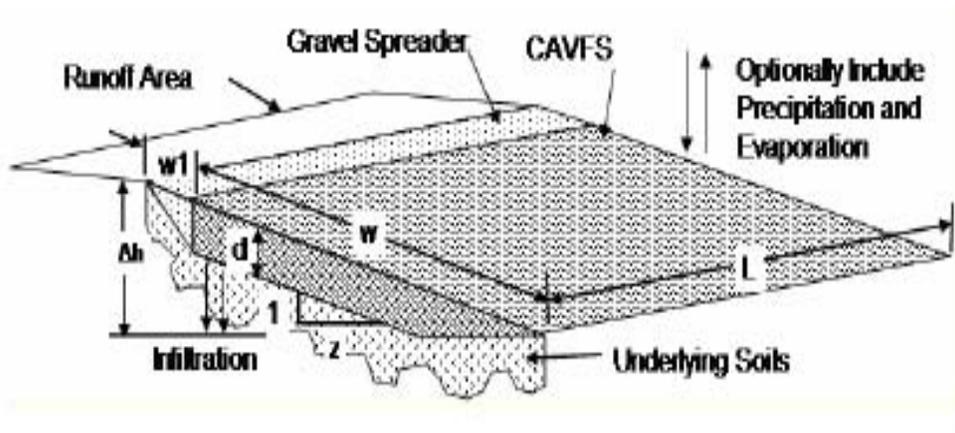


Table 1. Planned roadway widening sections within project area.

Road Widening	Station No. Begin (S)	Station No. End (N)	Distance (feet)	Notes
Inside Taper	335+02	344+82	980	Taper added toward median for HOT lane, from approximately 720 ft north of 8th Street E to approximately 1,700 ft north of 8th Street E
Inside only	344+82	360+13	1,531	Widening entirely to the inside, toward the median, to add the new 12 ft HOT lane, 10 ft shoulder, and full 2 ft buffer between the HOT and General Purpose (GP) lanes
Inside and Outside	360+13	475+00	11,487	Widening to inside and outside from approximately 3,230 ft north of 8th Street E to approximately 2,030 ft south of 15th Street SW, to accommodate the 2 ft median barrier, 10 ft inside shoulder, 12 ft HOT lane, 2 ft buffer between HOT and GP lanes, two - 12 ft GP lanes, and a 10 ft outside shoulder
Inside Only	475+00	494+04	1,904	Widening only toward the median continues from to approximately 2,030 ft south of 15th Street SW to approximately 125 ft south of 15th Street SW, where upon widening ends

Table 2. Stormwater treatment compost-amended vegetative filter strip (CAVFS) locations.

CAVFS ID No.	NB Location	Position (E side)	Station No.	Station No.	Length (ft)	Width (ft)	Depth (ft)
			Begin (S)	End (N)			
1	S of 8th St E mainline	lower slope	312+00	316+70	470		1
2	8th St E Interchange SE mainline	Edge of existing pavement	320+50	326+50	600		1
3	N of 8th St E mainline	Edge of existing pavement	338+50	360+00	2,150		1
4	3rd Ave SW to Ellingson Rd mainline	Edge of new pavement	383+60	389+10	550		1
5	Ellingson Rd Interchange SE mainline	Edge of new pavement	399+80	402+20	240		1
6	N of Ellingson Rd mainline	Edge of new pavement	421+00	430+80	980		1
7	S of 15th St SW mainline	Edge of new pavement	449+60	452+00	250		1

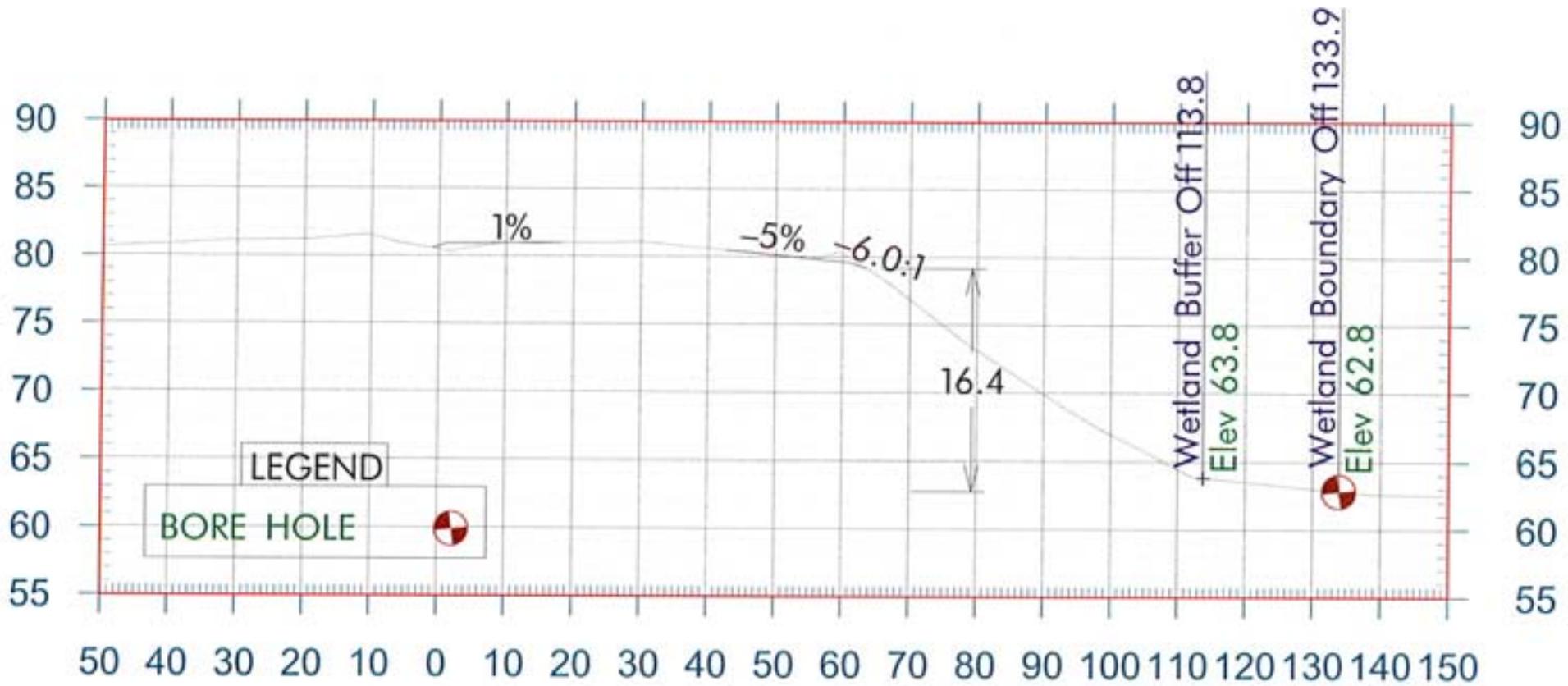
Table 3. Stage 5 auger probe results, showing project location and depth of the engineered basal fill layer adjacent to road grade..

AP No.	Station No.	Depth of Basal Fill (centimeters)	Depth of Basal Fill (inches)	Depth of Basal Fill (feet)
AP1	312+00	60	24	2.00
AP2	312+95	50	20	1.67
AP3	314+55	60	24	2.00
AP4	315+30	70	28	2.33
AP5	316+35	60	24	2.00
AP6	324+00	40+	16+	1.33+
AP7	324+00	40+	16+	1.33+
AP8	325+25	40+	16+	1.33+
AP9	325+40	40+	16+	1.33+
AP10	327+20	40+	16+	1.33+
AP11	327+90	40+	16+	1.33+
AP12	329+35	40+	16+	1.33+
AP13	330+90	40+	16+	1.33+
AP14	332+70	40+	16+	1.33+
AP15	359+90	80	32	2.67
AP16	361+30	110	44	3.67
T-52	362+35	130	52	4.33
T-51	363+65	90	36	3.00
T-50	365+55	65	26	2.17
T-49	367+25	70	28	2.33
T-48	368+60	70	28	2.33
T-47	370+10	80	32	2.67
AP17	372+10	50	20	1.67
AP18	373+95	80	32	2.67
AP19	375+70	80	32	2.67
AP20	377+46	80	32	2.67
AP21	385+15	110	44	3.67

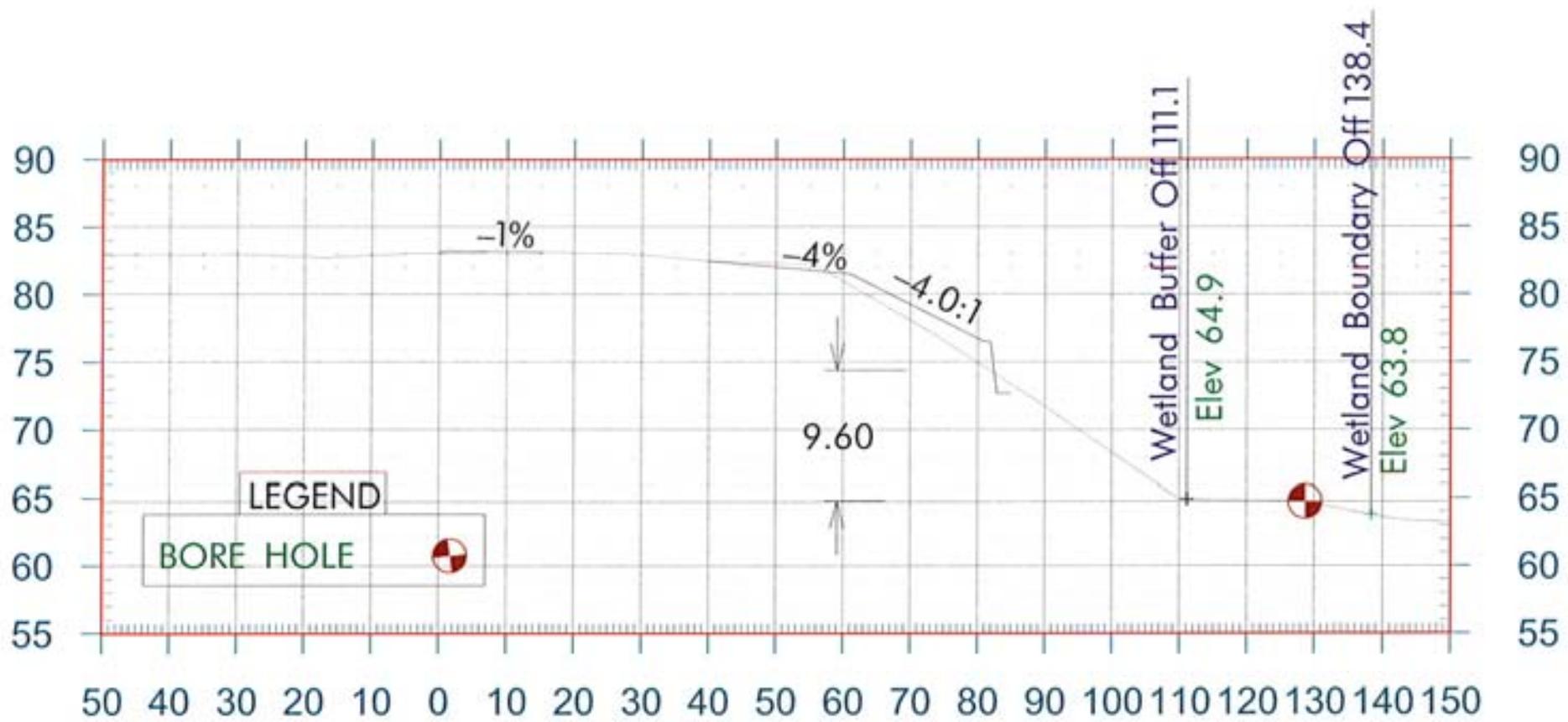
AP No.	Station No.	Depth of Basal Fill (centimeters)	Depth of Basal Fill (inches)	Depth of Basal Fill (feet)
AP22	387+27	70	28	2.33
AP23	389+60	100	40	3.33
AP24	391+20	70	28	2.33
AP25	393+10	60	24	2.00
AP26	394+96	40+	16+	1.33+
AP27	396+15	40+	16+	1.33+
AP28	397+15	80	32	2.67
AP29	398+45	85	34	2.83
AP30	399+65	95	38	3.17
AP31	400+69	75	30	2.50
AP32	402+04	120	48	4.00
AP33	403+30	50	20+	1.67+
AP34	404+48	50	20+	1.67+
AP35	407+07	40	16+	1.25+
AP36	408+60	30	12+	1.00+
AP37	409+67	45	18+	1.50+
AP38	414+05	50	20	1.67
AP39	415+50	50	20	1.67
AP40	416+80	60	24	2.00
AP41	412+90	30	12+	1.00+
AP42	413+15	40	16+	1.33+
AP43	415+40	30	12+	1.00+
AP44	416+40	40	16+	1.33+
AP45	418+55	40	16+	1.33+
AP46	418+10	60	24	2.00
AP47	419+45	50	20	1.67
AP48	420+95	40	16	1.33
AP49	422+60	50	20	1.67
AP50	424+25	40	16	1.33
AP51	425+85	50	20	1.67
AP52	427+55	40	16	1.33
AP53	429+10	60	24	2.00
AP54	430+80	70	28	2.33
AP55	431+80	60	24	2.00
AP56	435+05	50	20	1.67
AP57	436+50	60	24	2.00
AP58	437+96	55	22	1.83
AP59	439+35	50	20	1.67
AP60	440+64	60	24	2.00
AP61	442+05	70	28	2.33
AP62	443+37	70	28	2.33
AP63	444+94	75	30	2.50
AP64	446+35	65	26	2.17
AP65	447+42	60	24	2.00
AP66	448+80	80	32	2.67
AP67	449+94	80	32	2.67
AP68	451+24	75	30	2.50
AP69	452+30	80	32	2.67

Appendix A. Auger probe locations on project engineering sheets

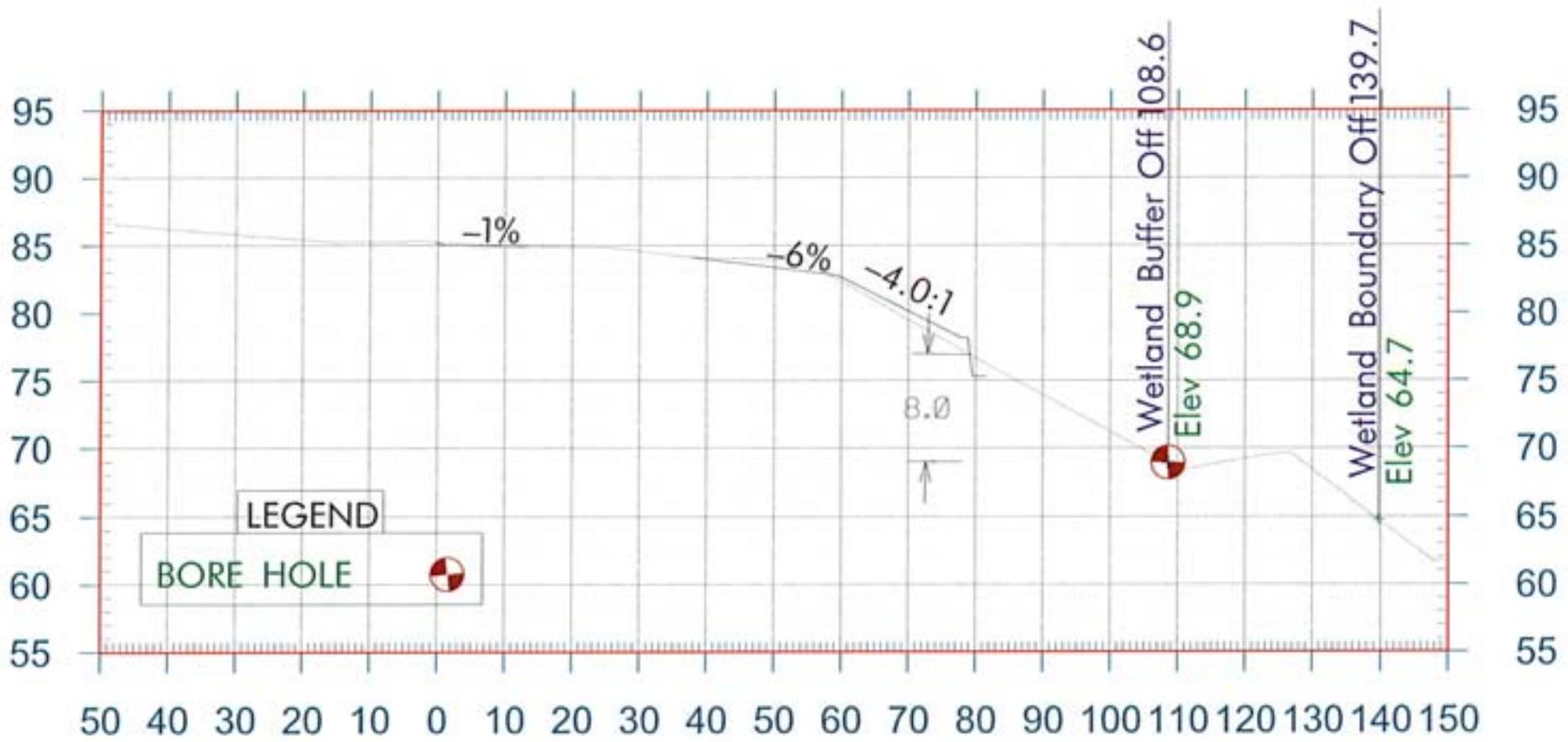
Appendix B. Project cross-sections at auger probe locations adjacent to proposed MSE walls.



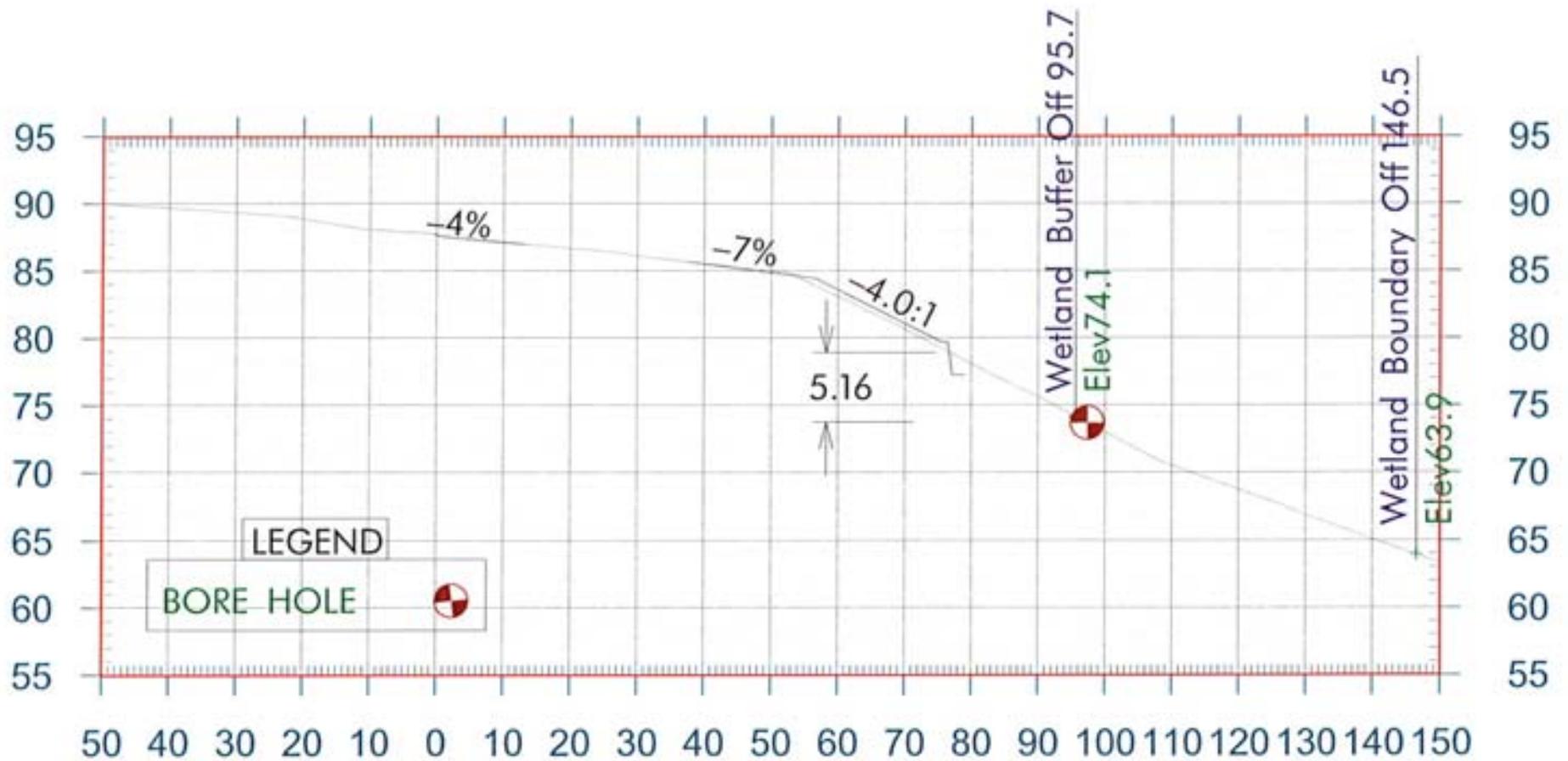
372 + 10



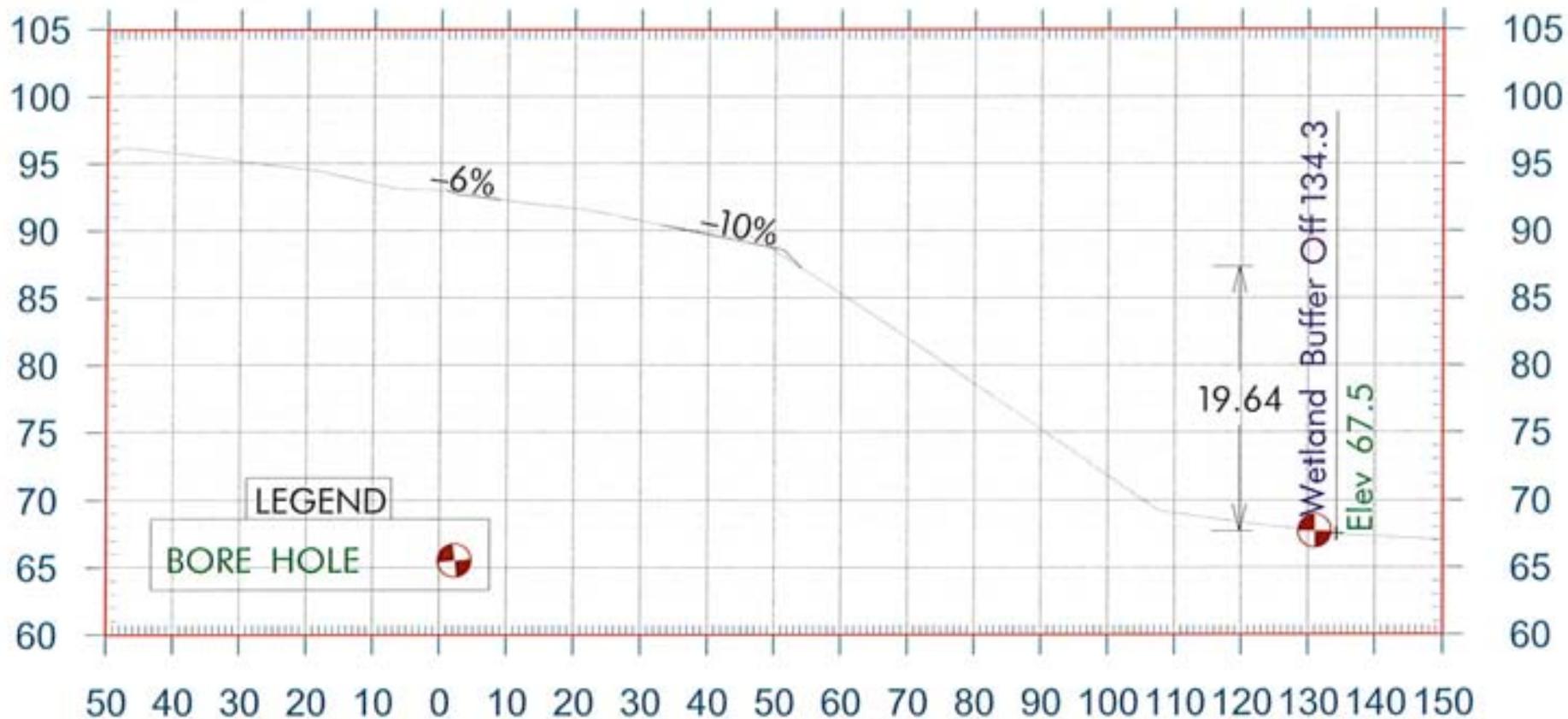
373 + 95



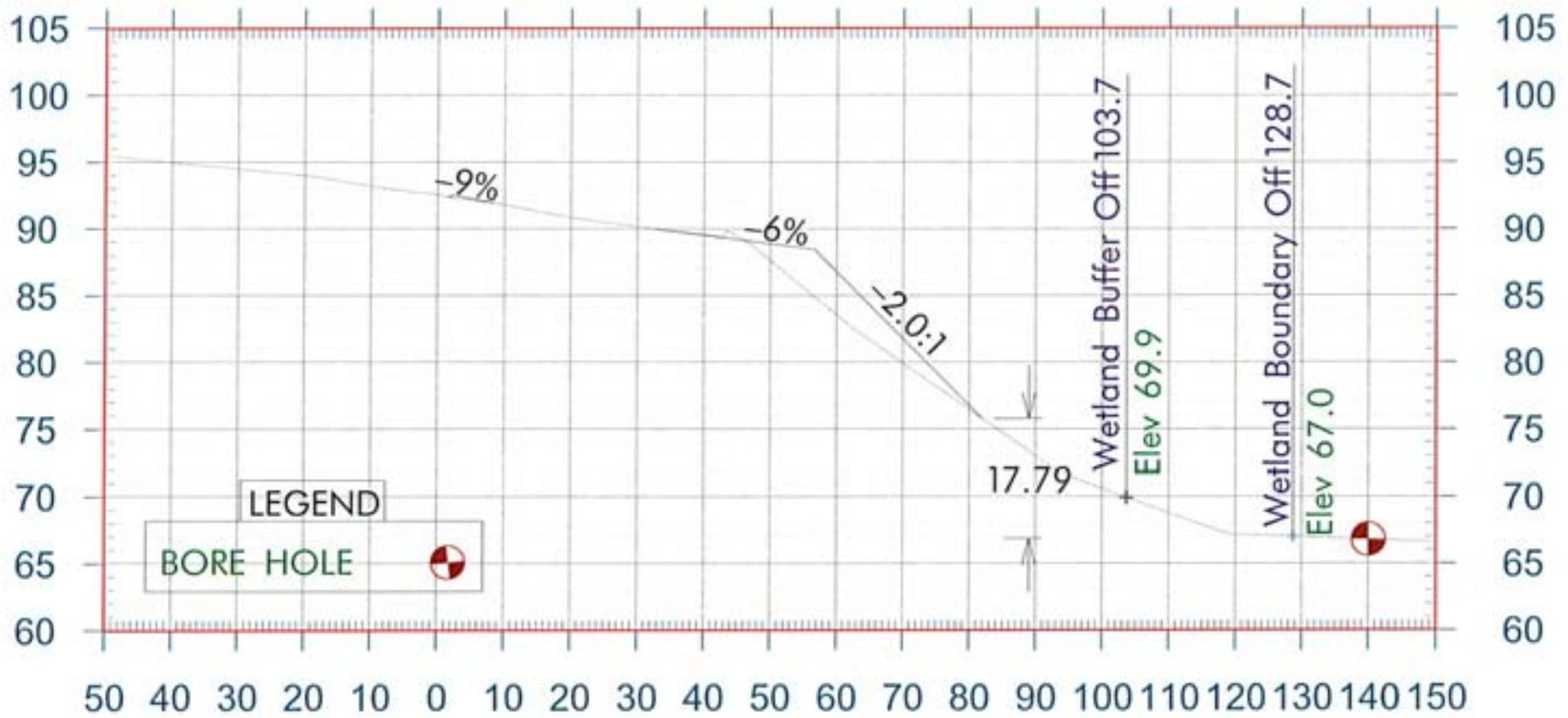
375 + 70



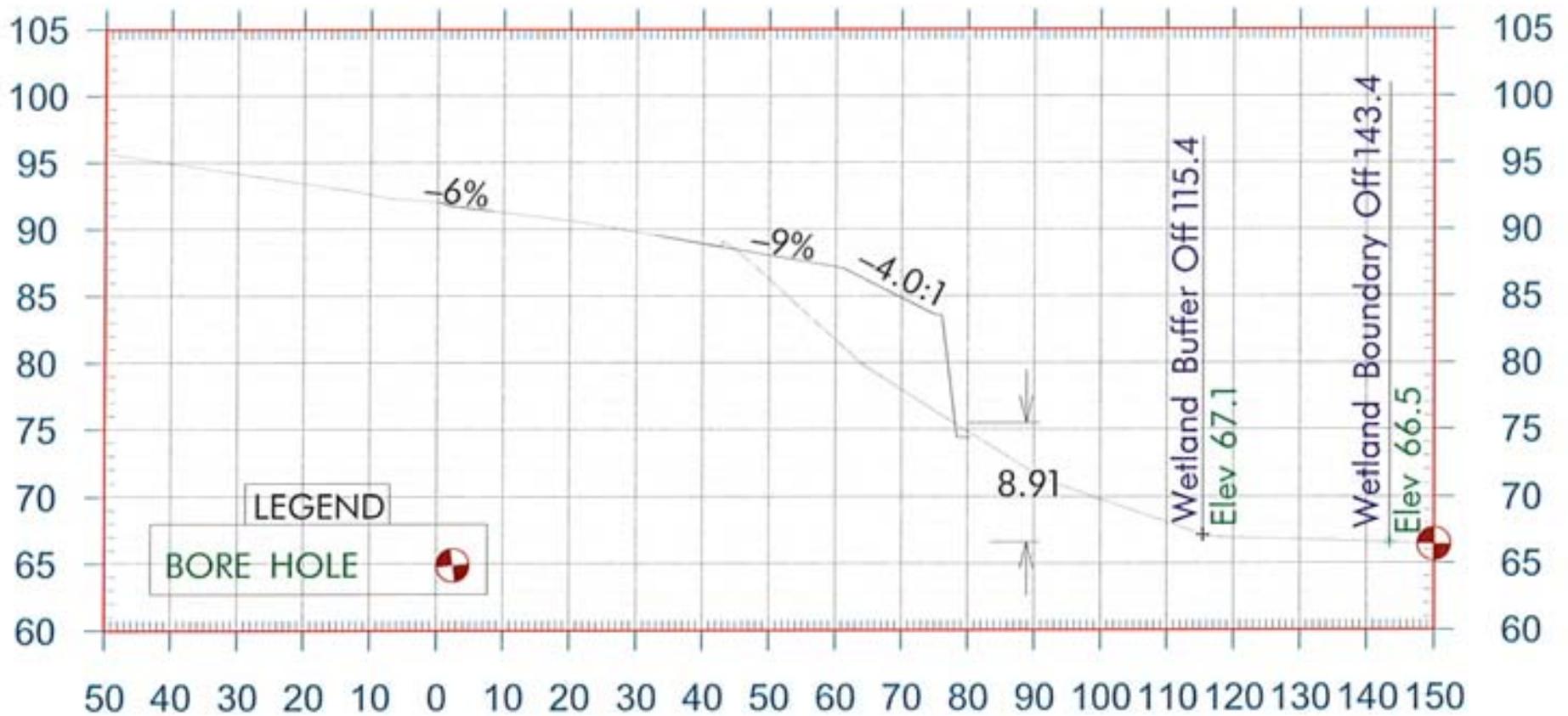
377 + 46



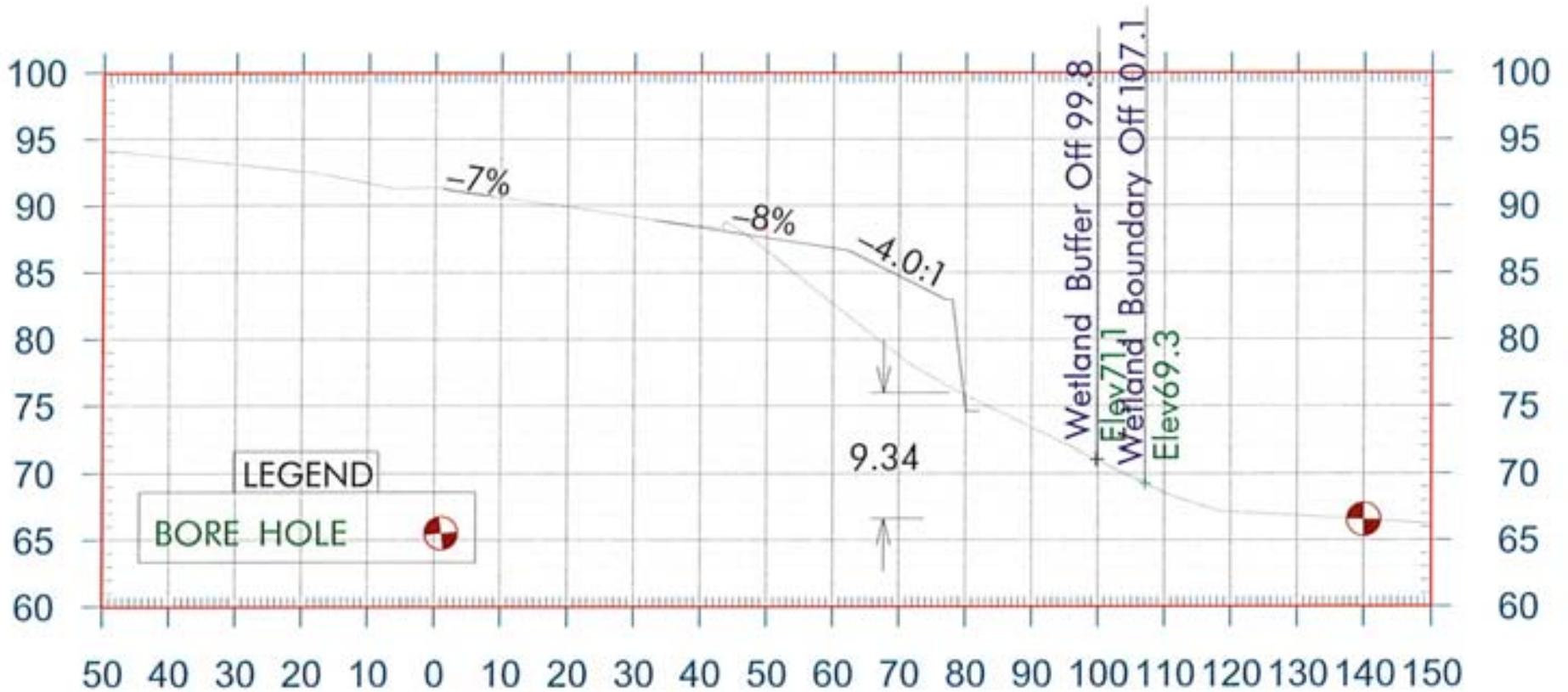
385 + 35



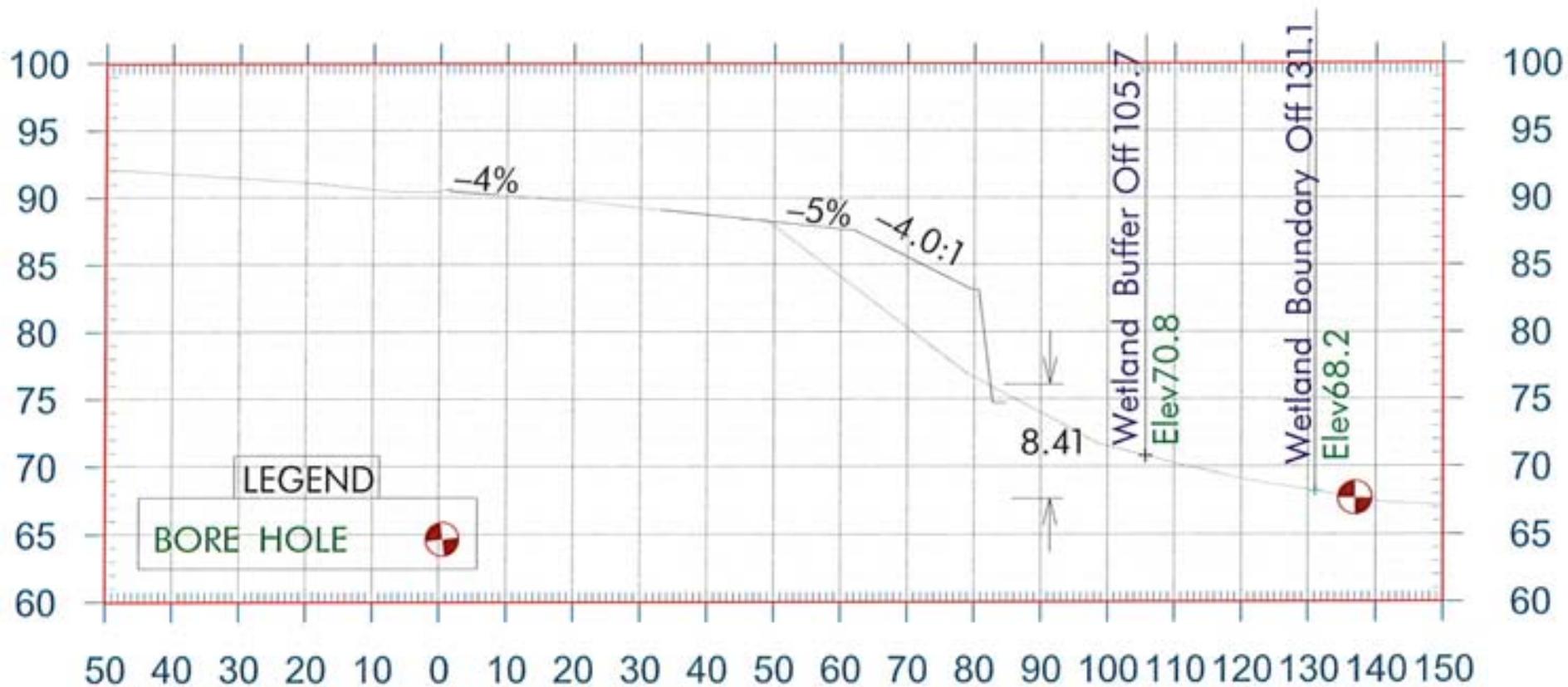
387 + 27



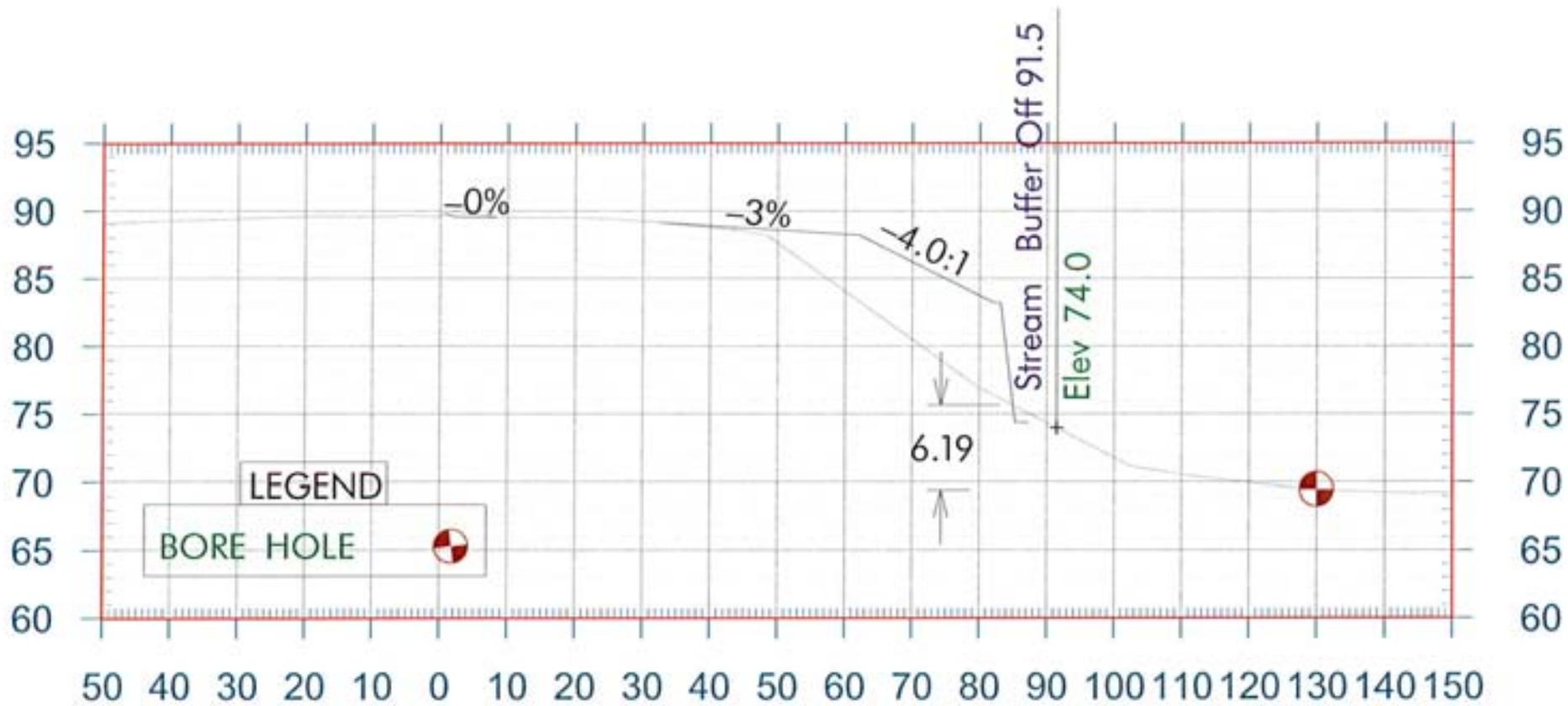
389 + 60



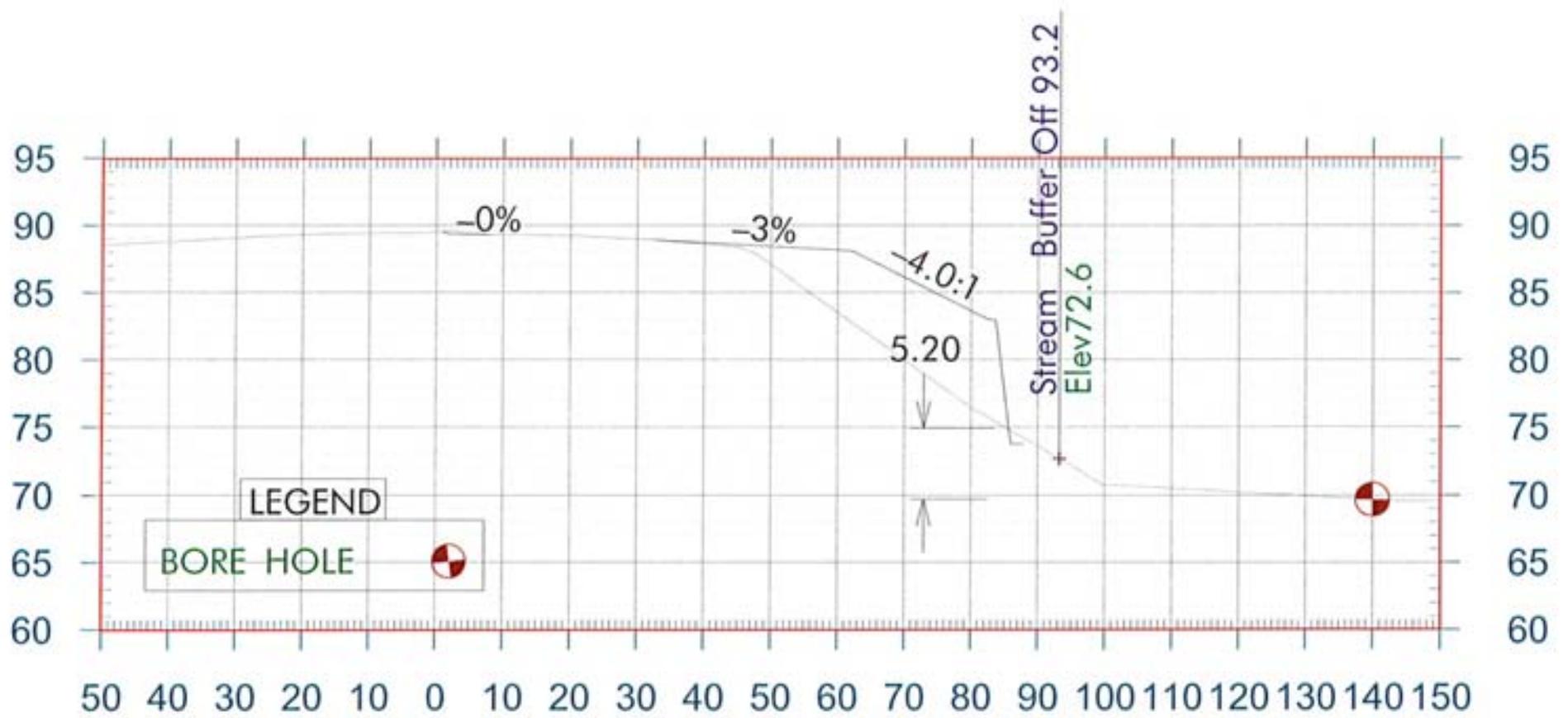
391 + 20



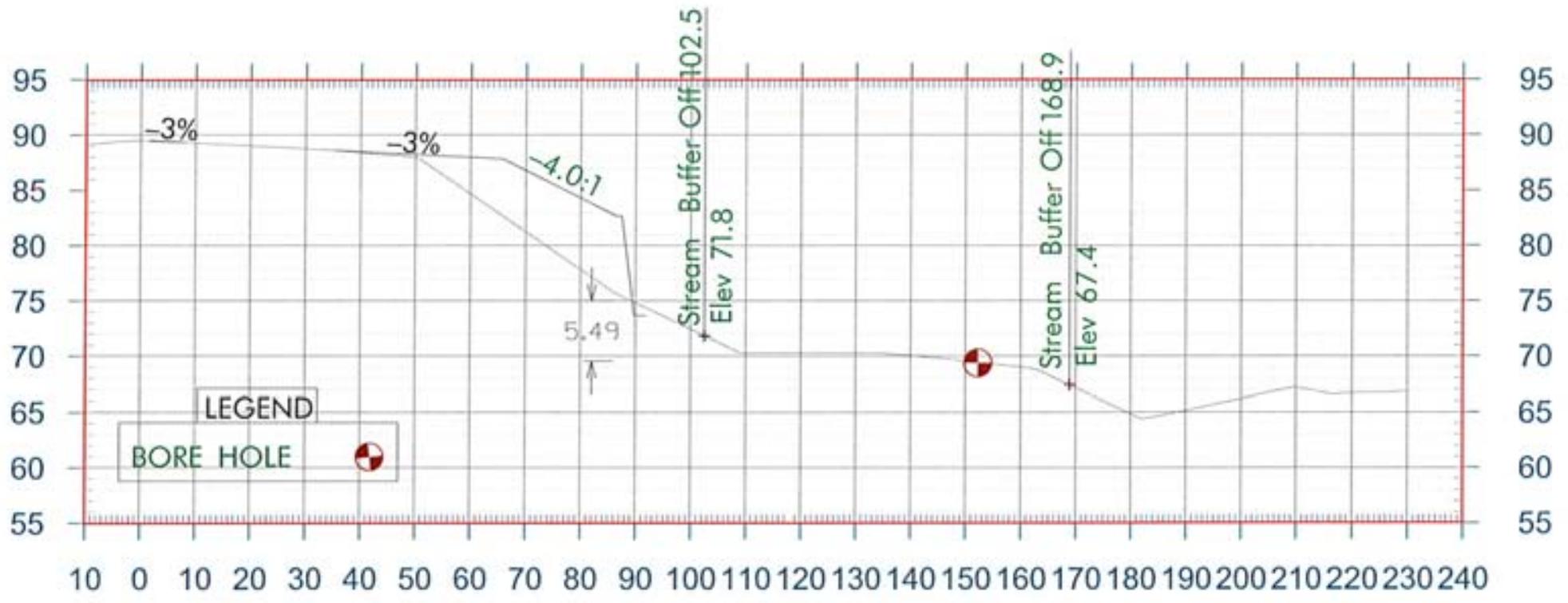
393 + 10



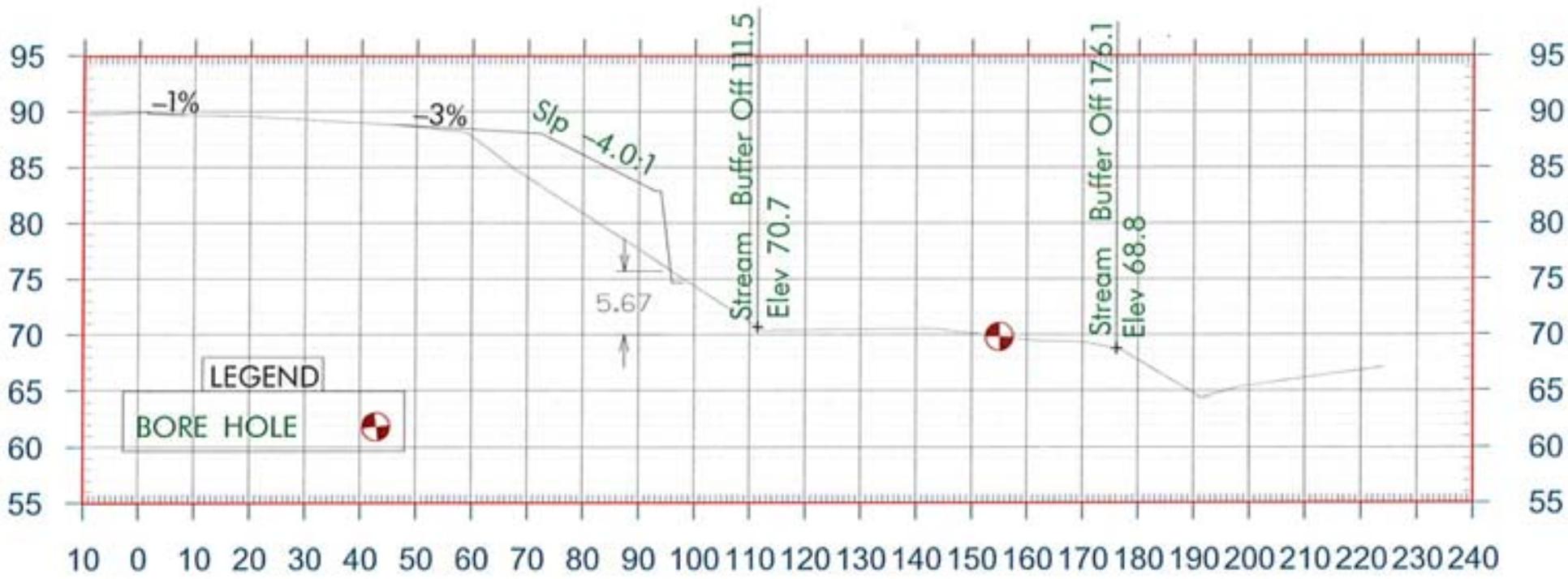
395 + 12



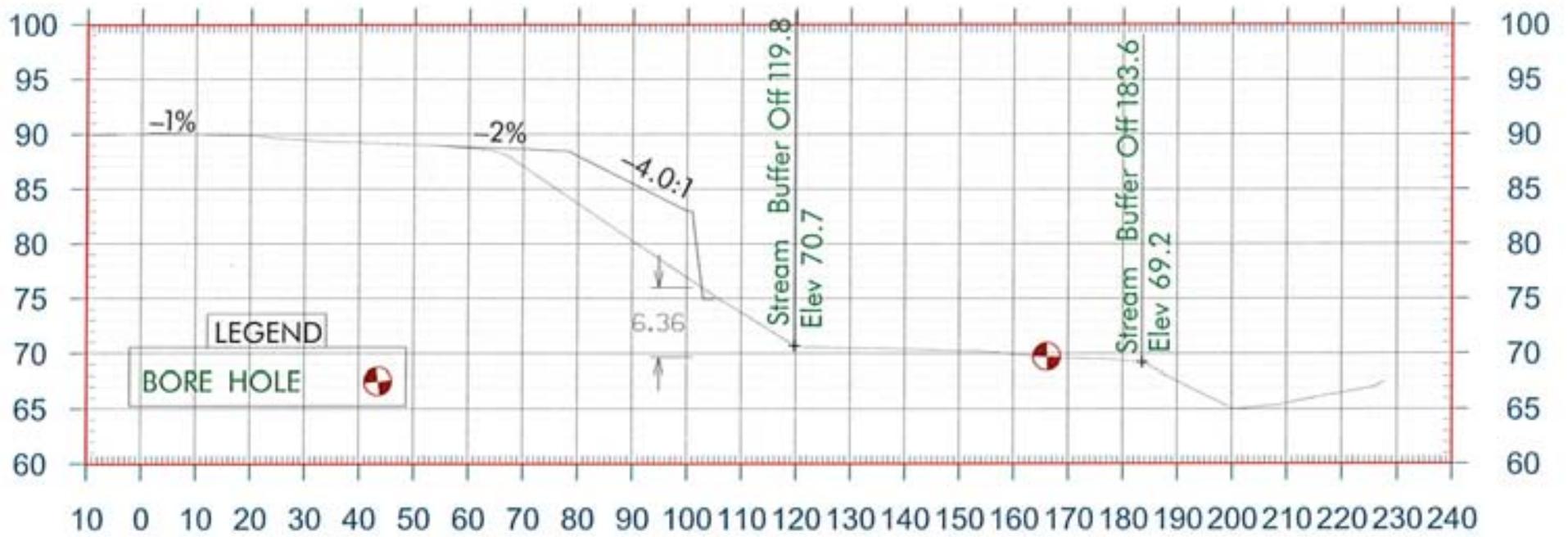
395 + 80



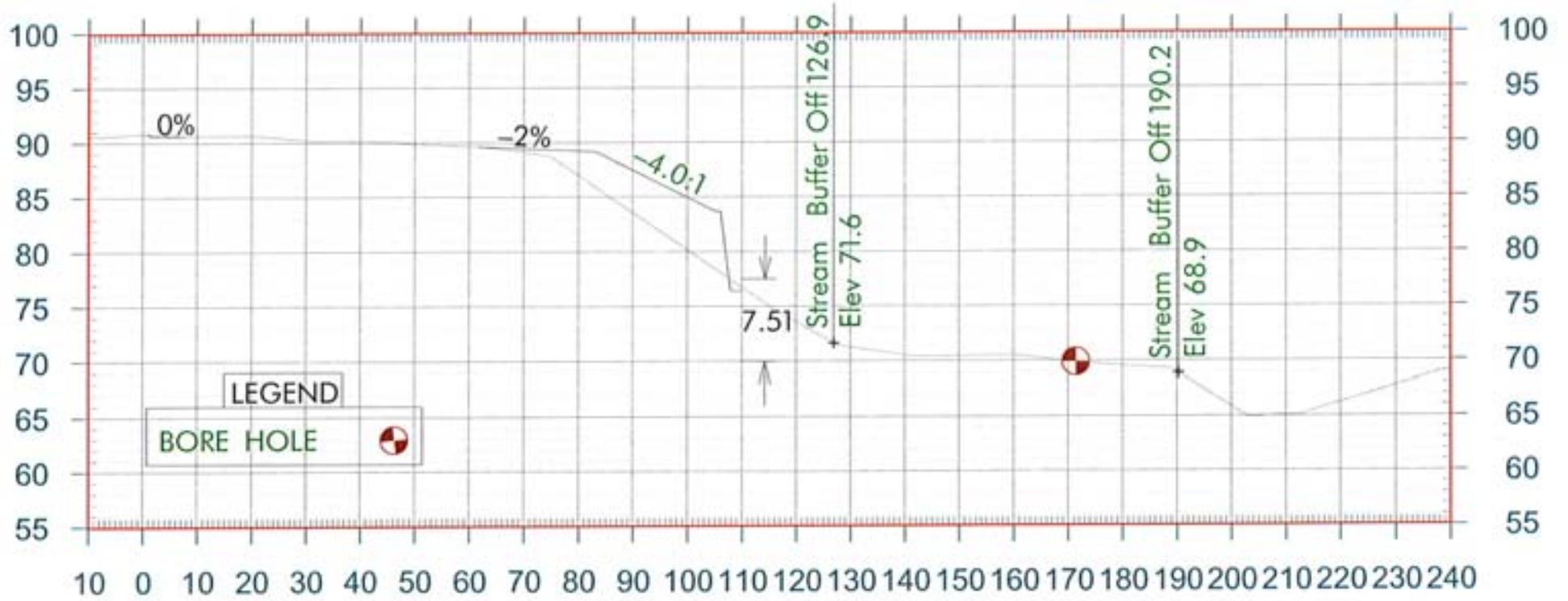
397 + 15



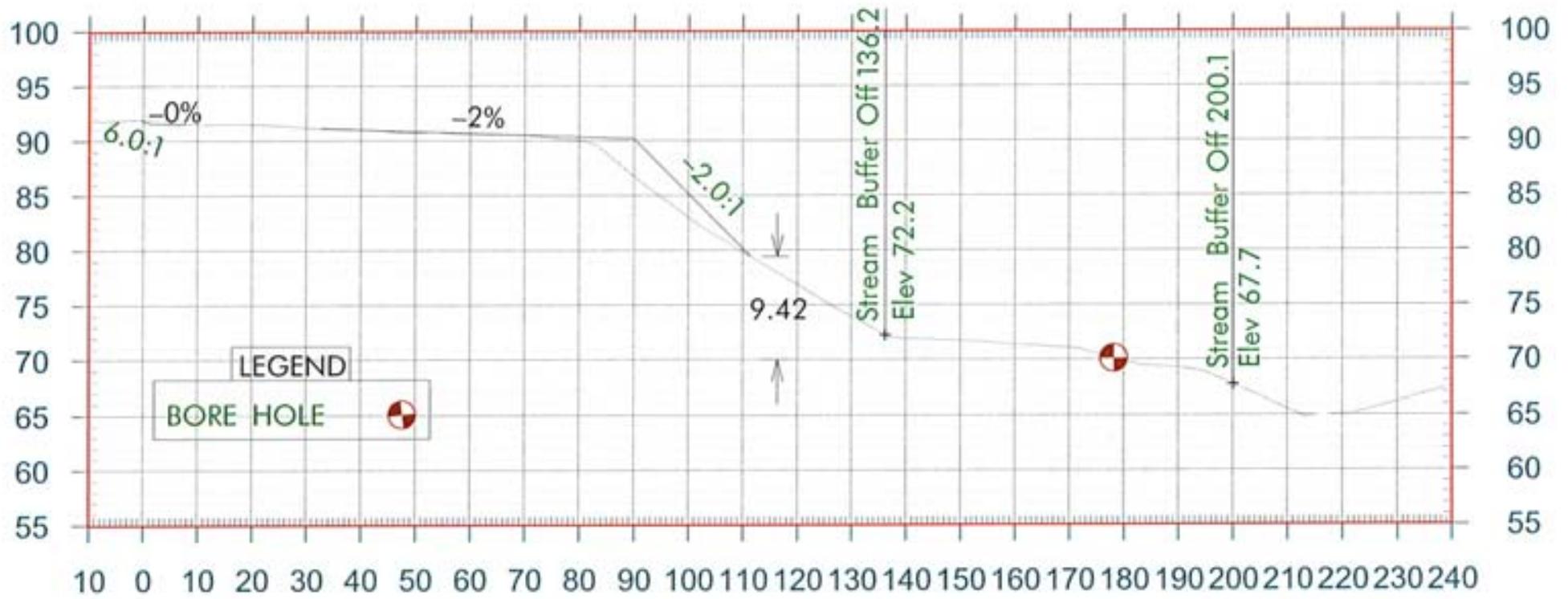
398 + 45



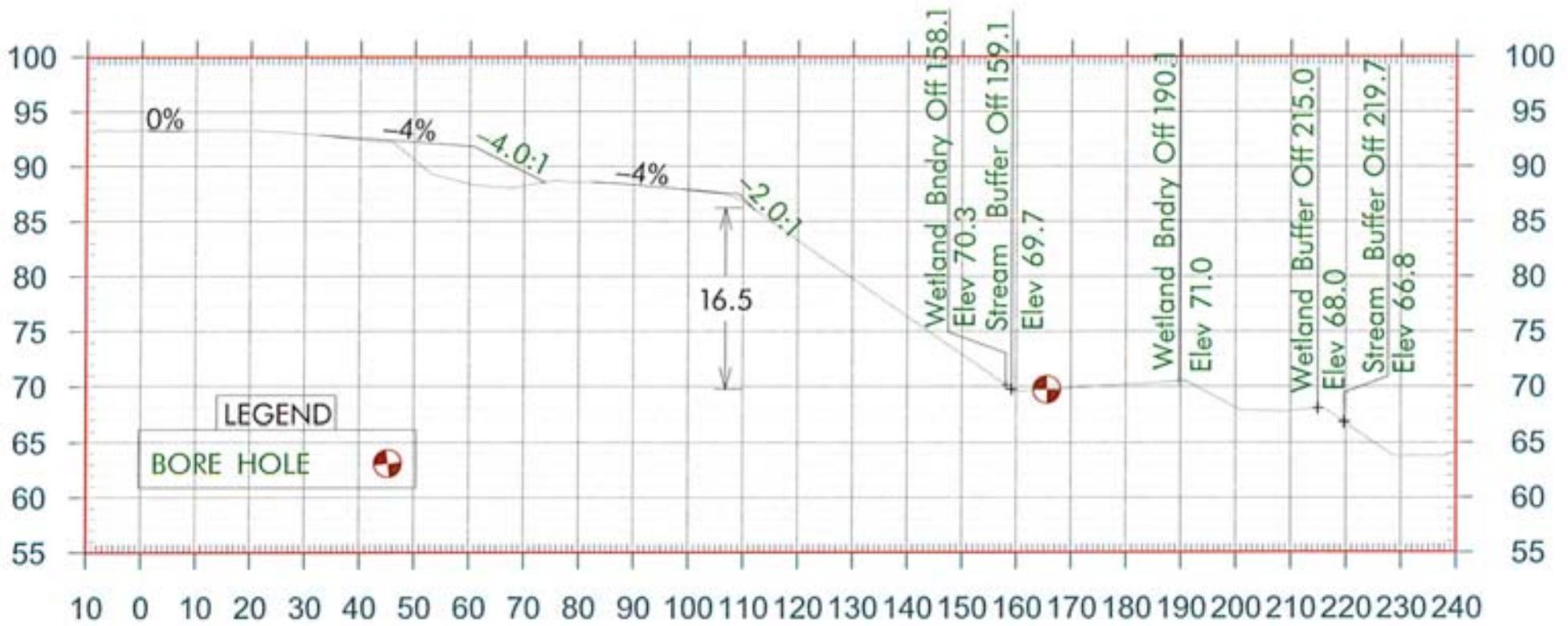
399 + 65



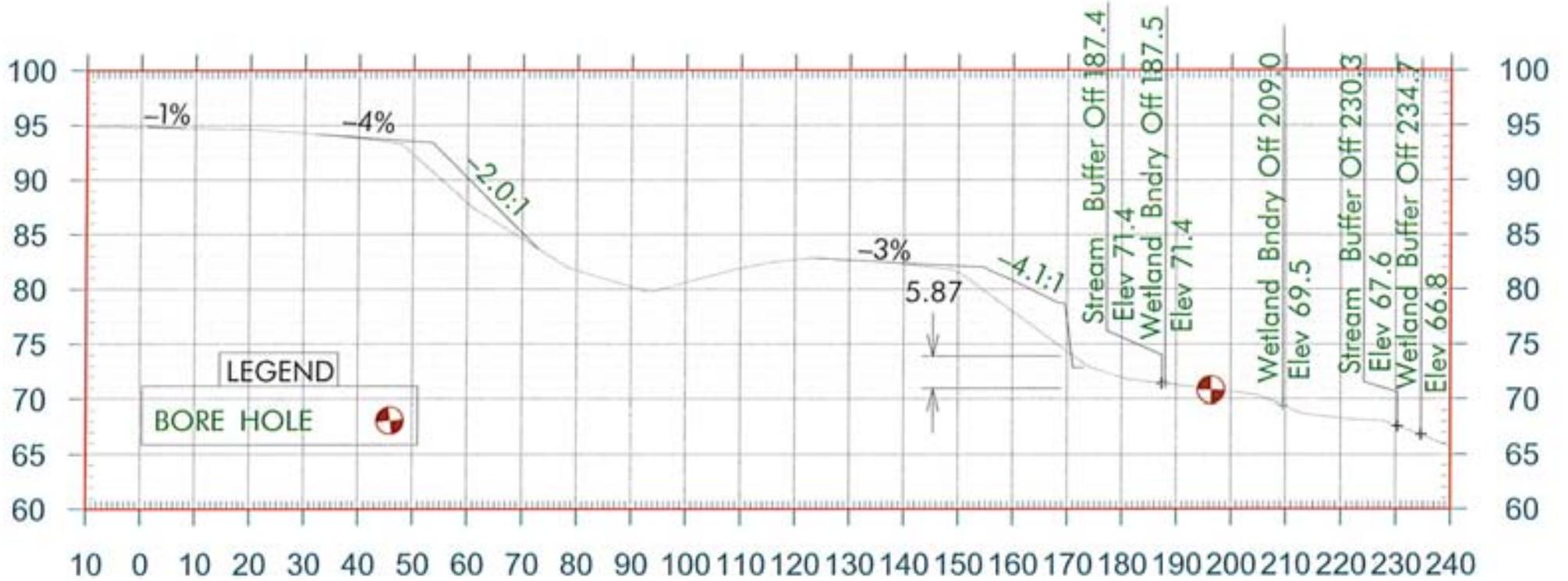
400 + 69



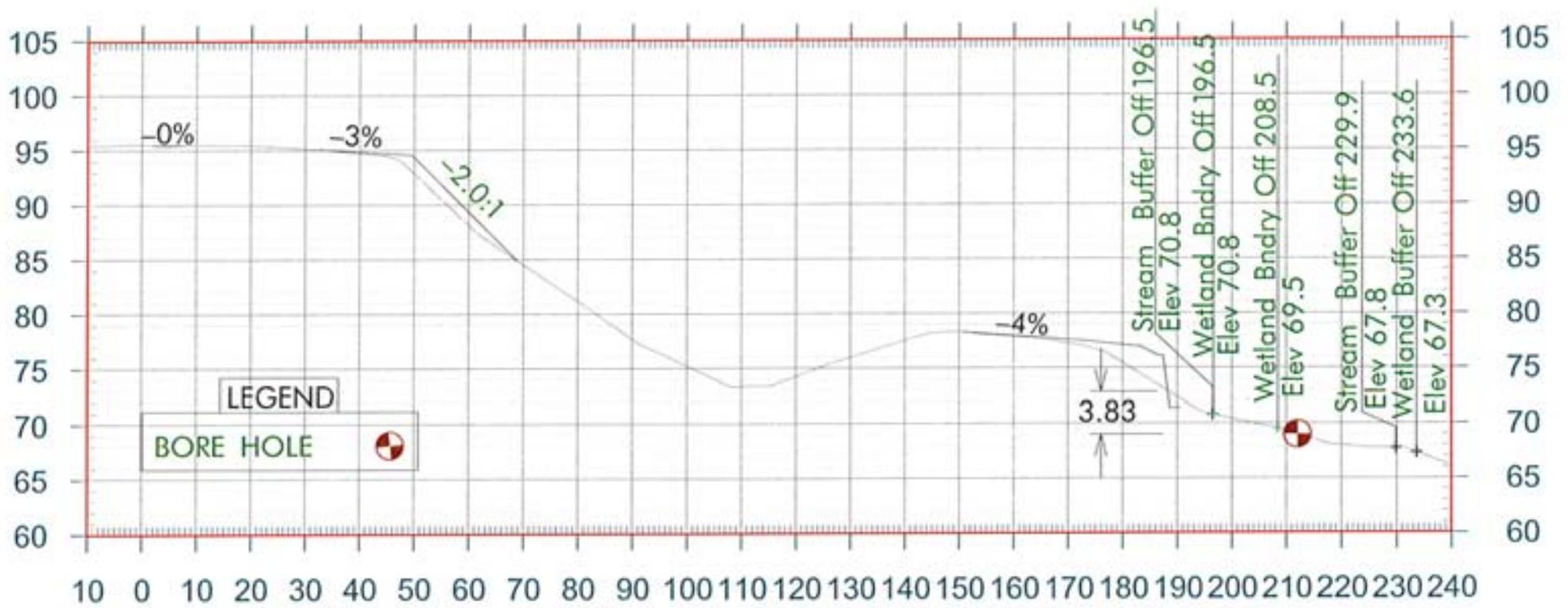
402 + 04



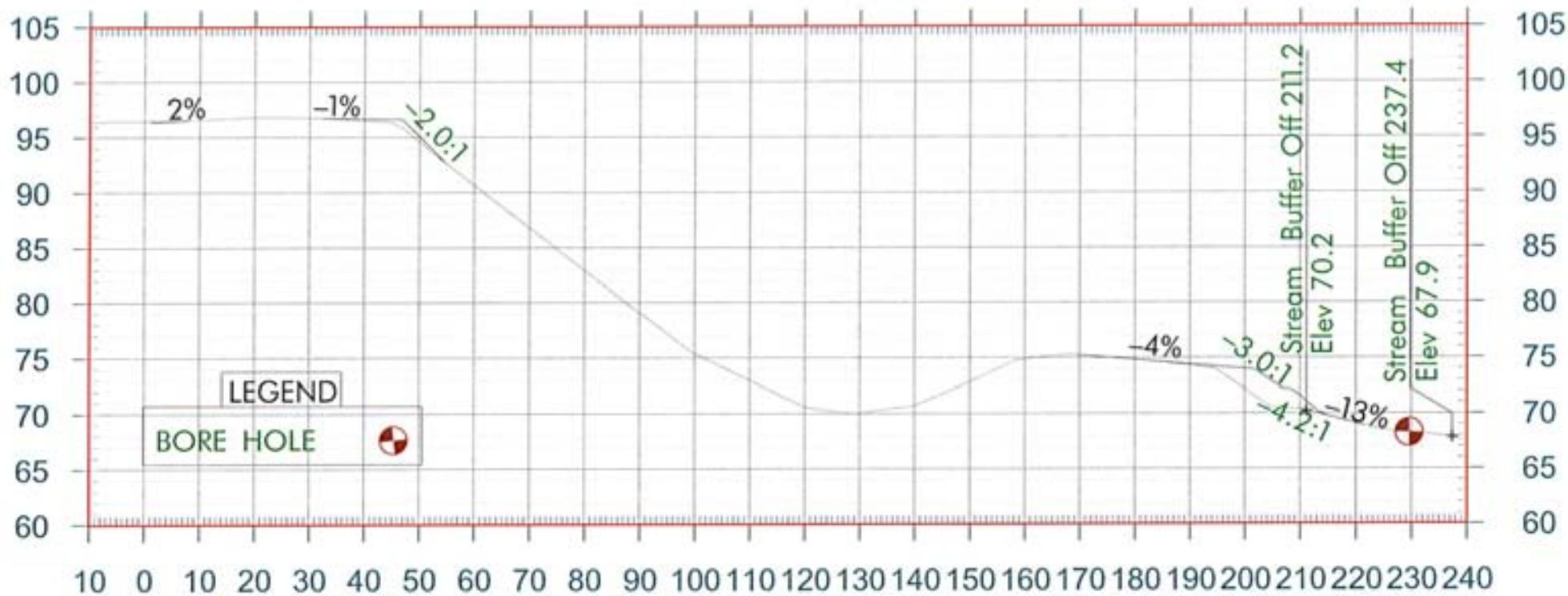
404 + 48



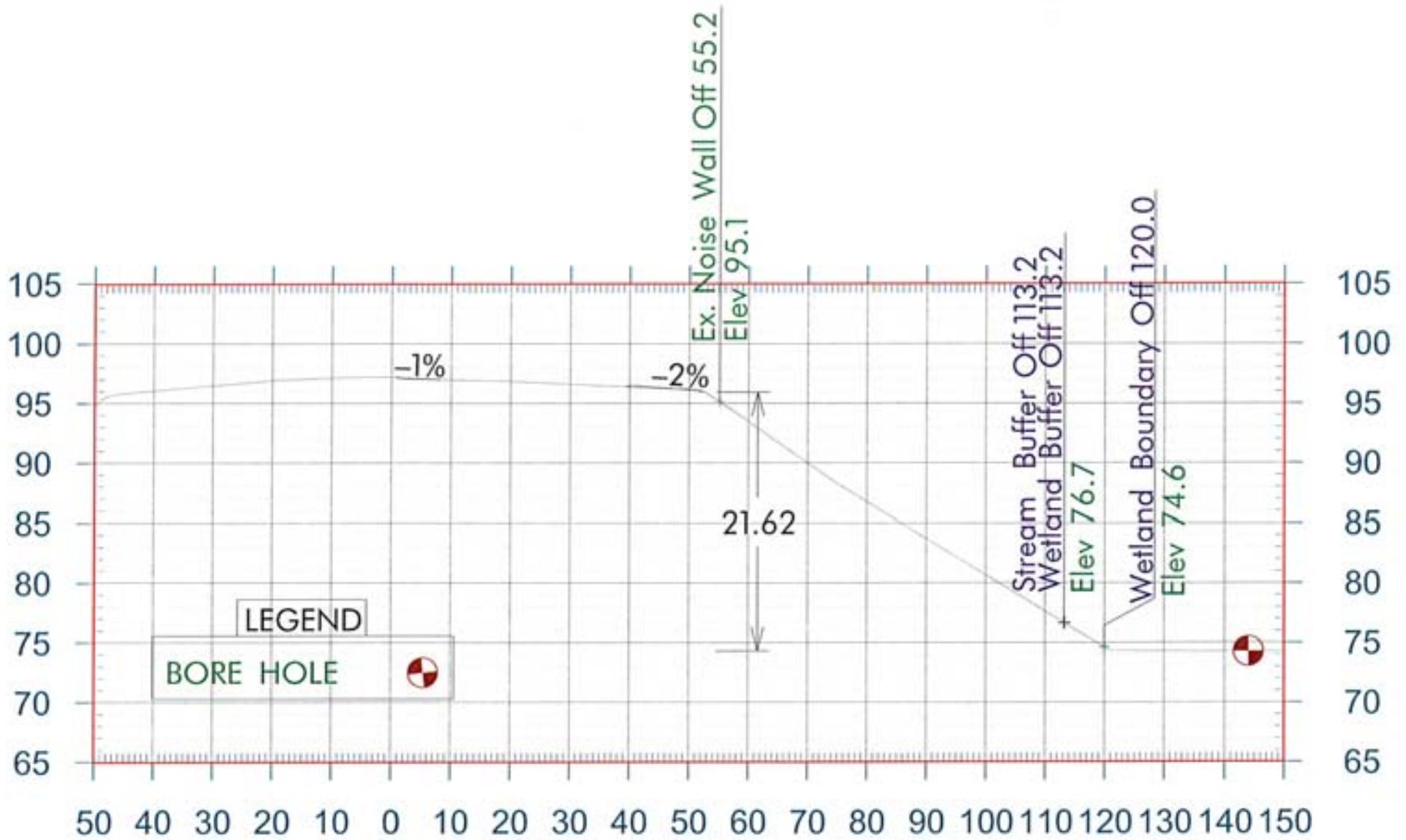
407 + 07



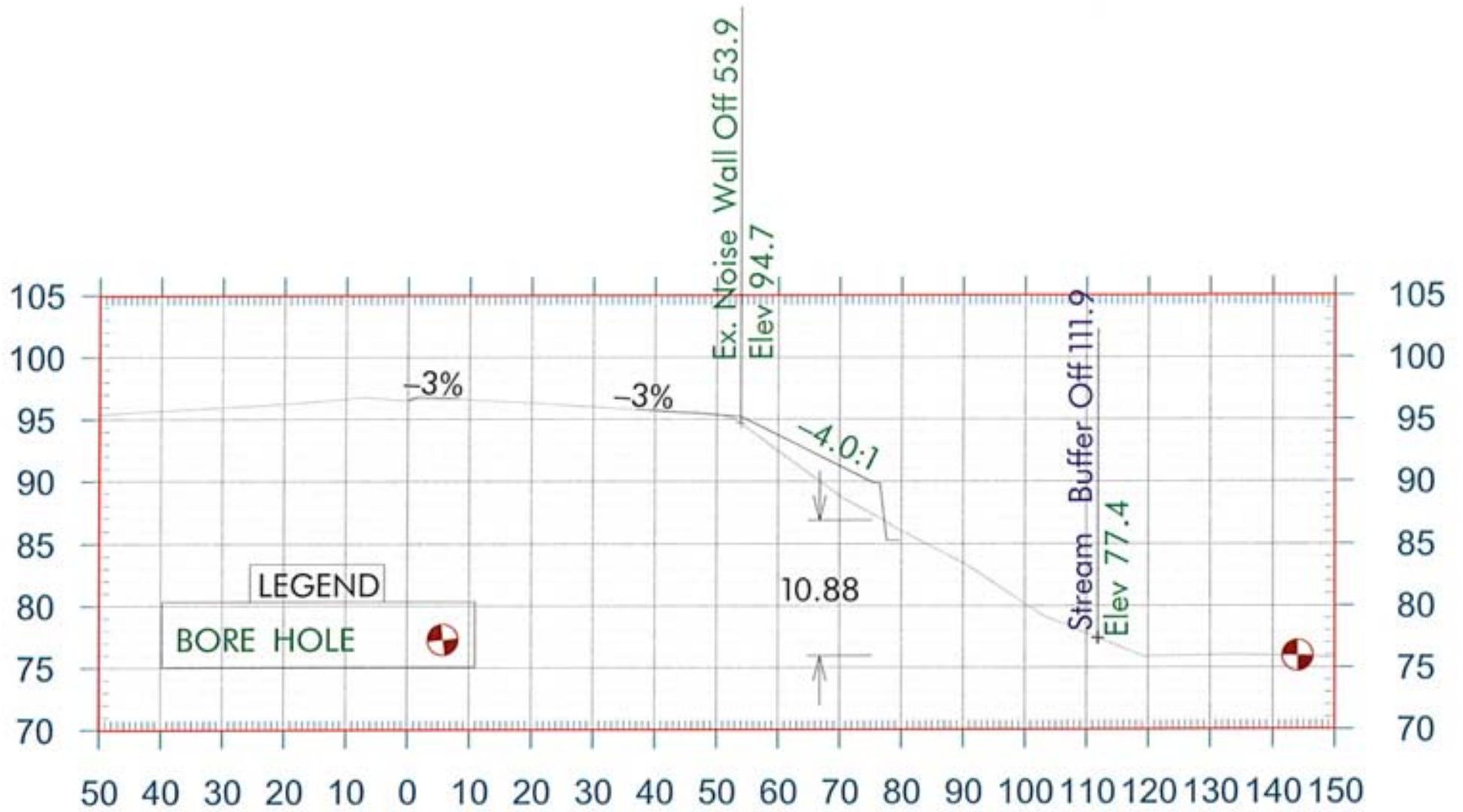
408 + 60



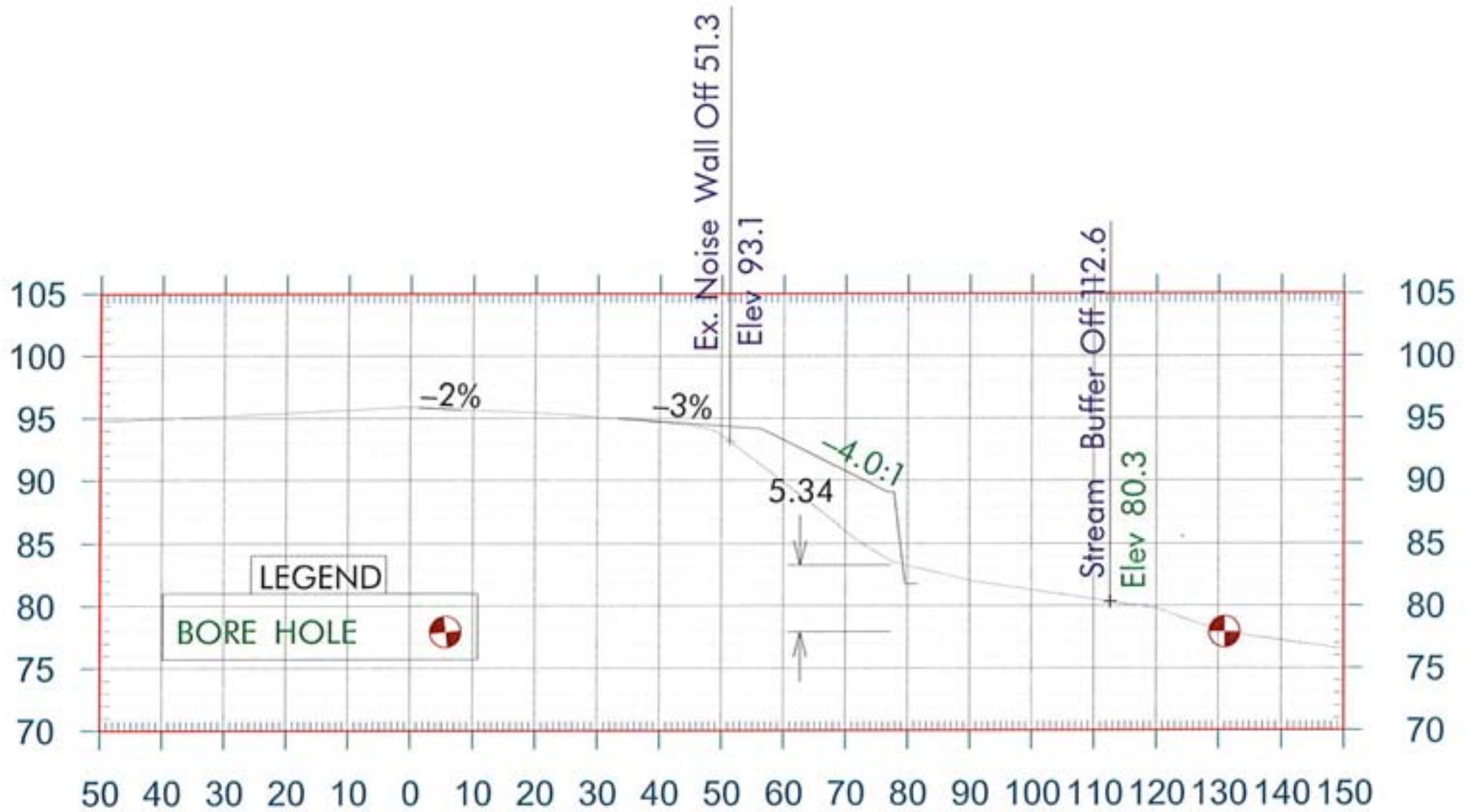
409 + 67



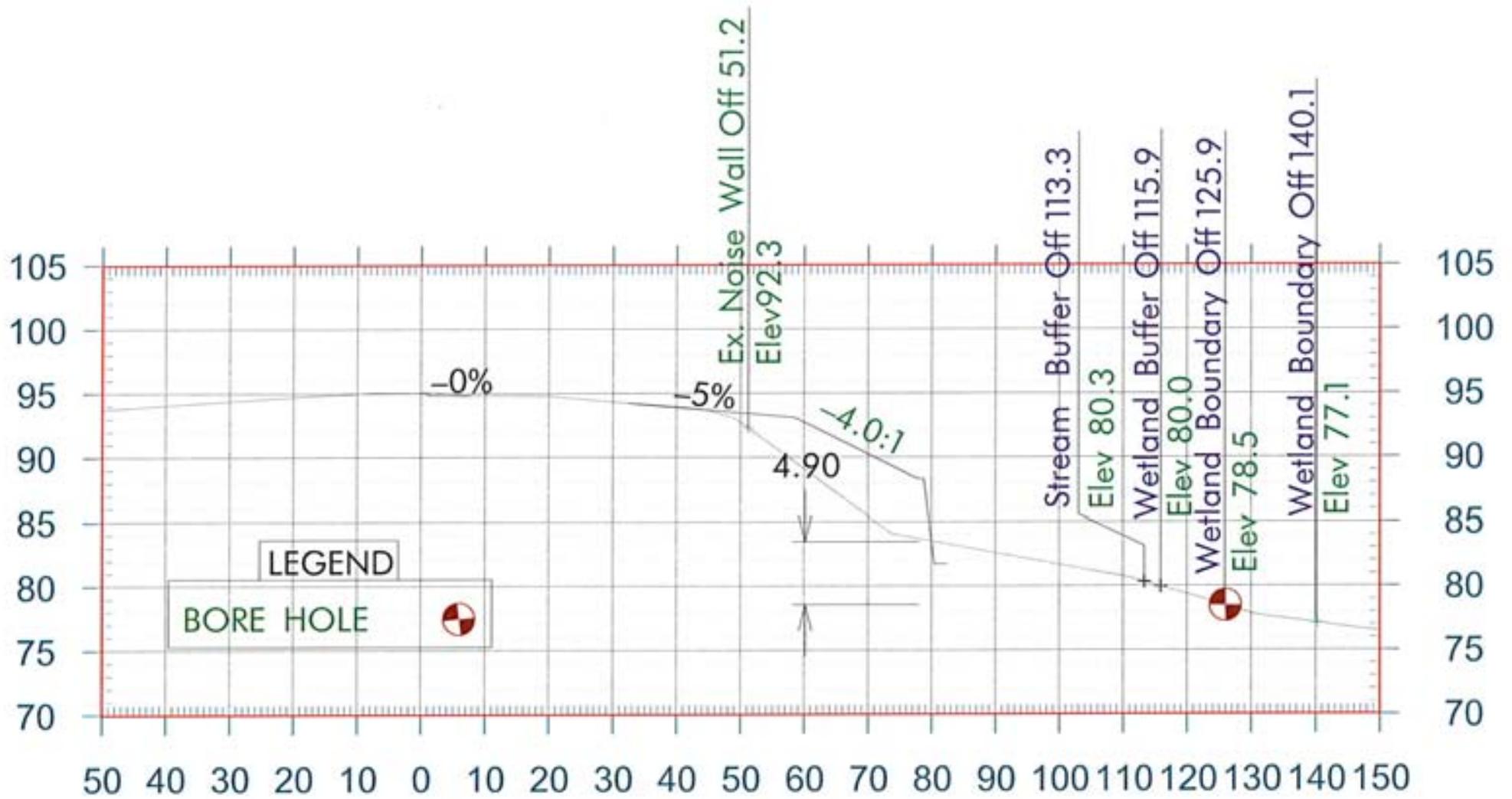
436 + 50



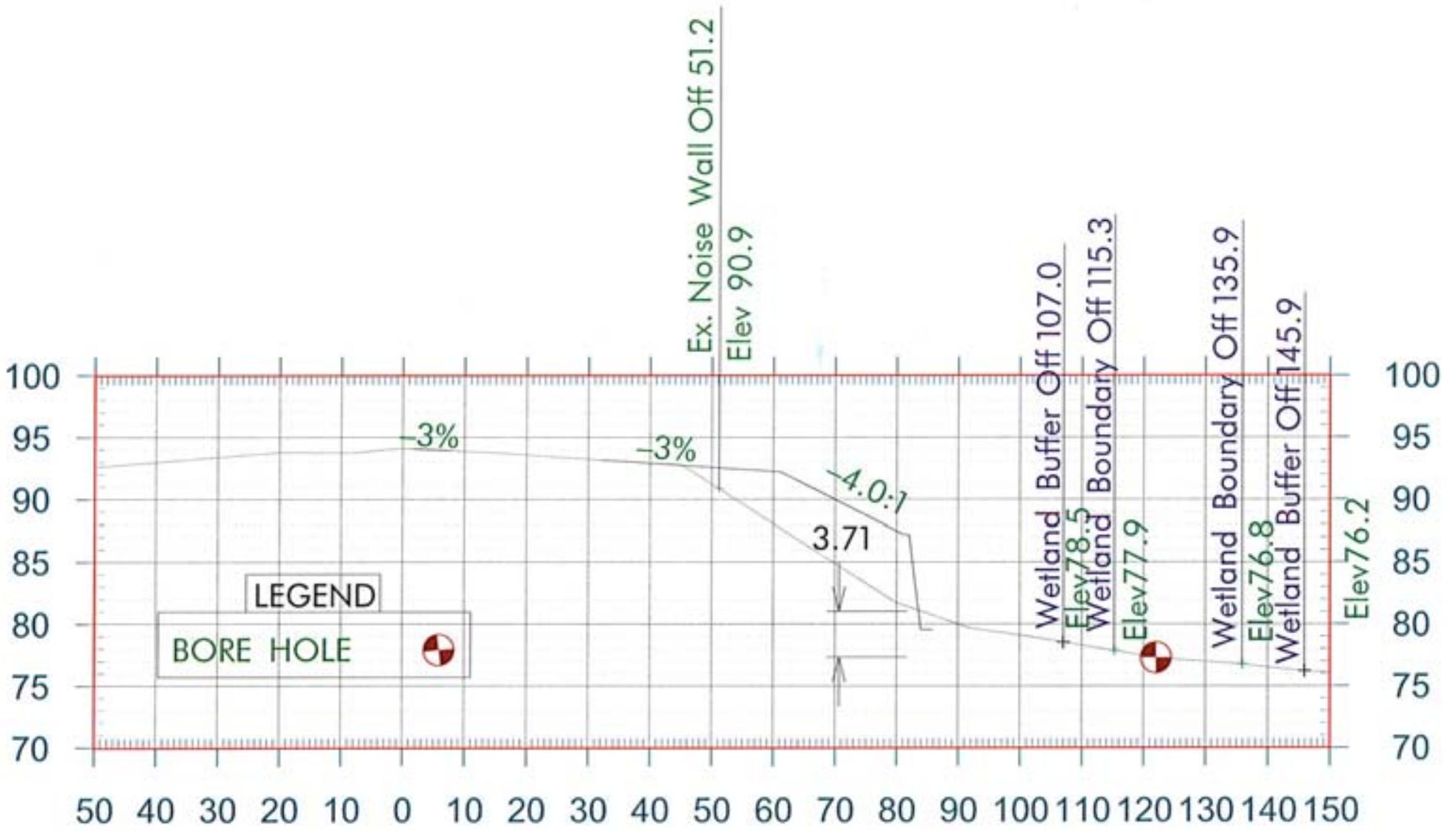
437 + 96



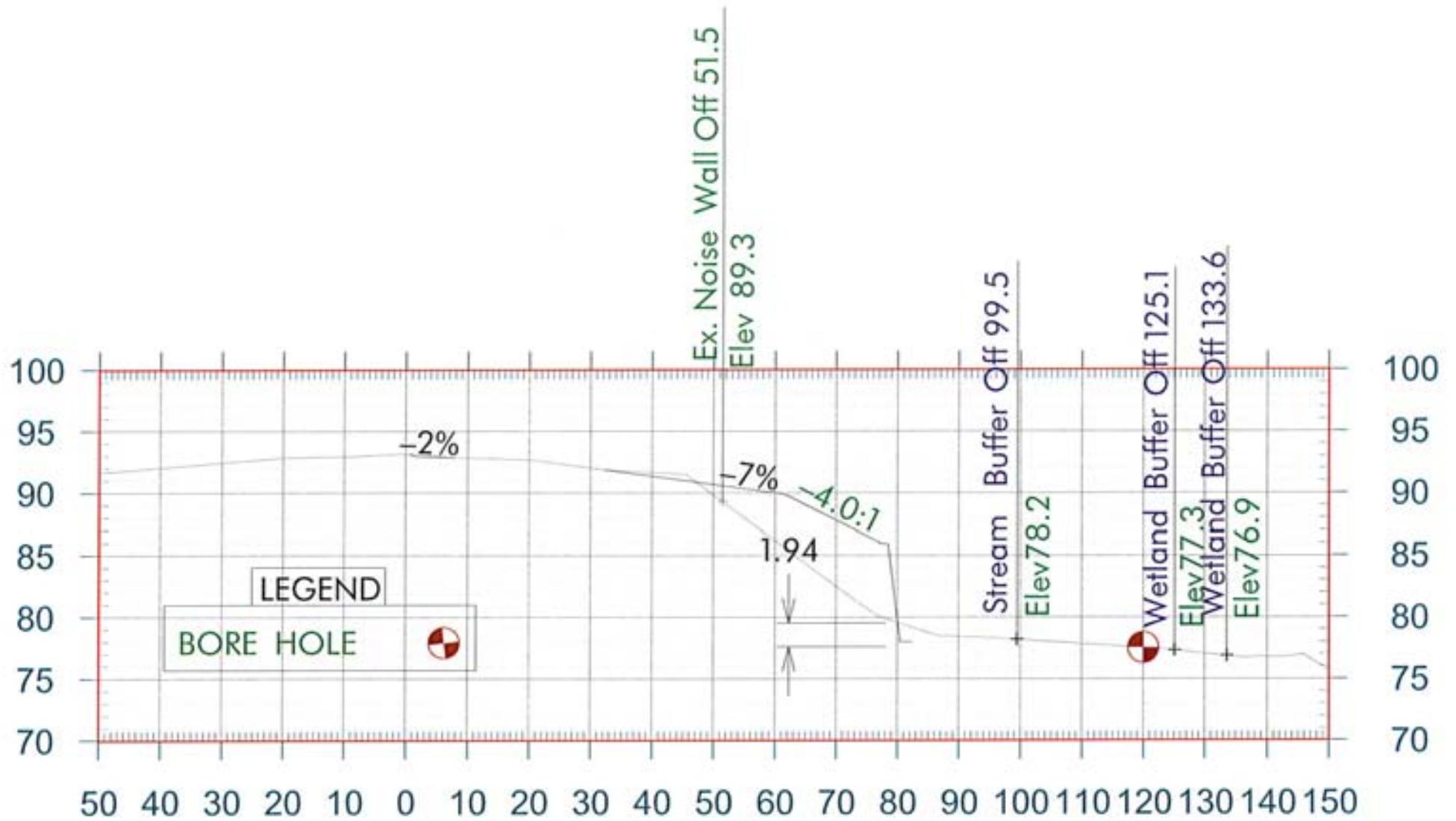
439 + 35



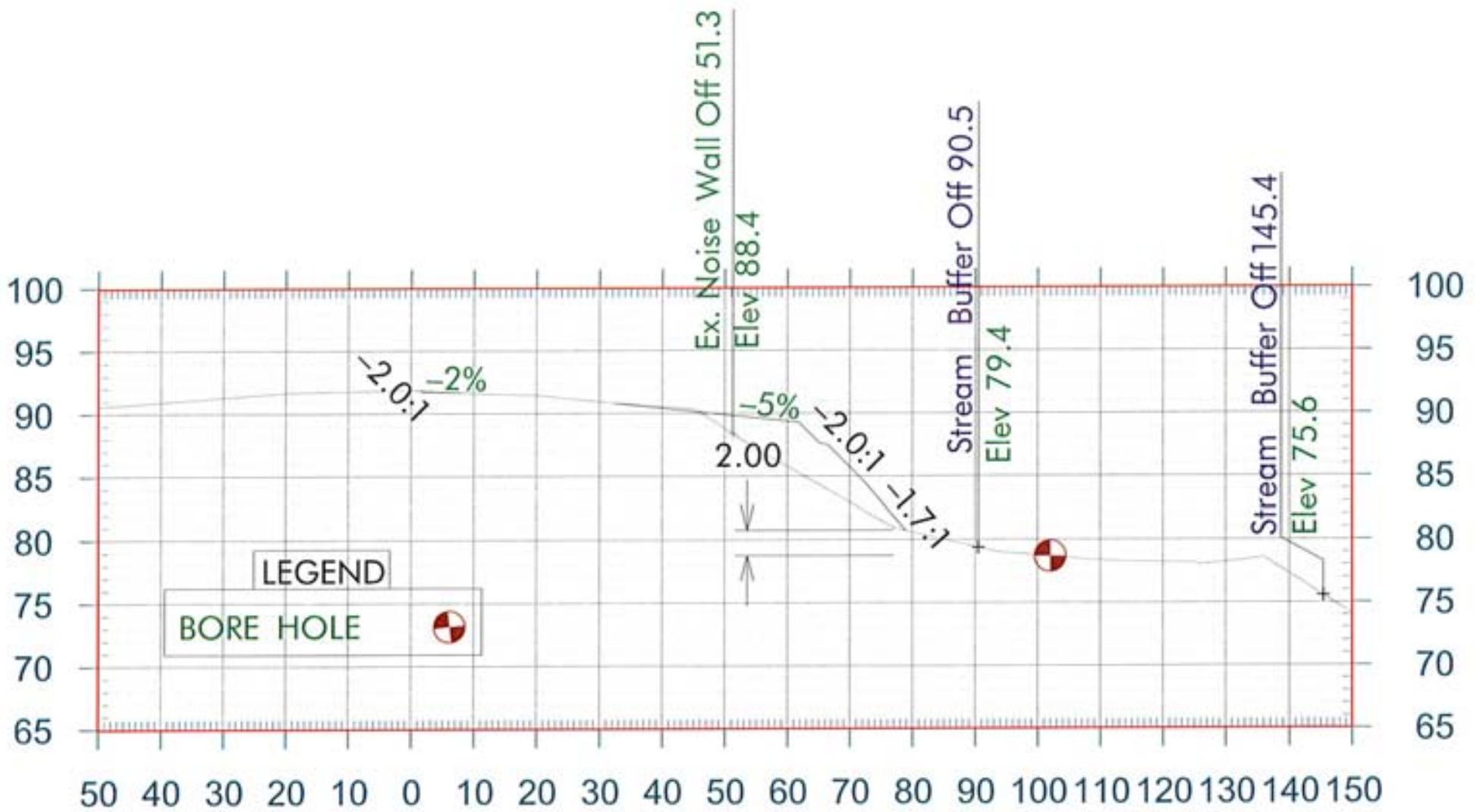
440 + 64



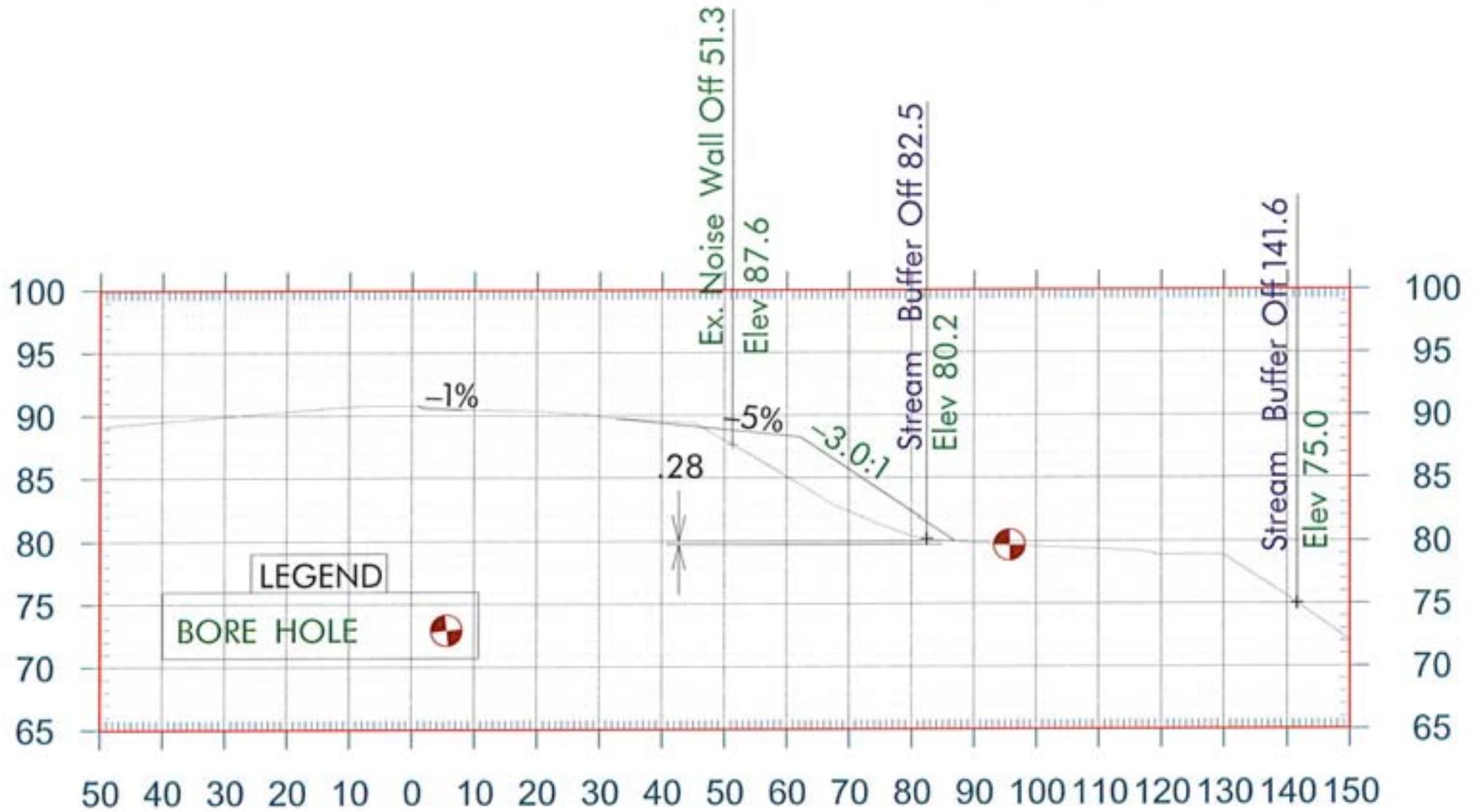
442 + 05



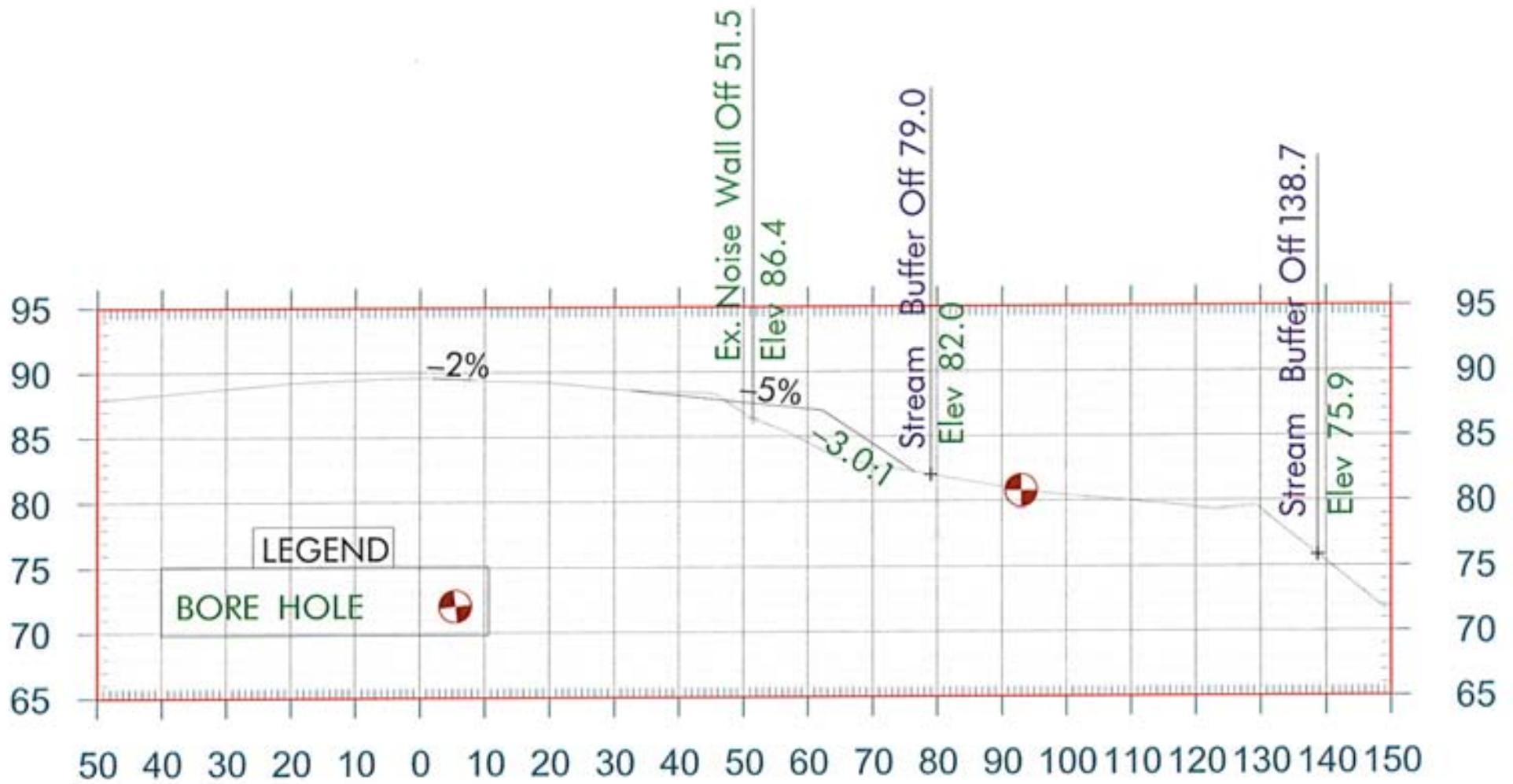
443 + 37



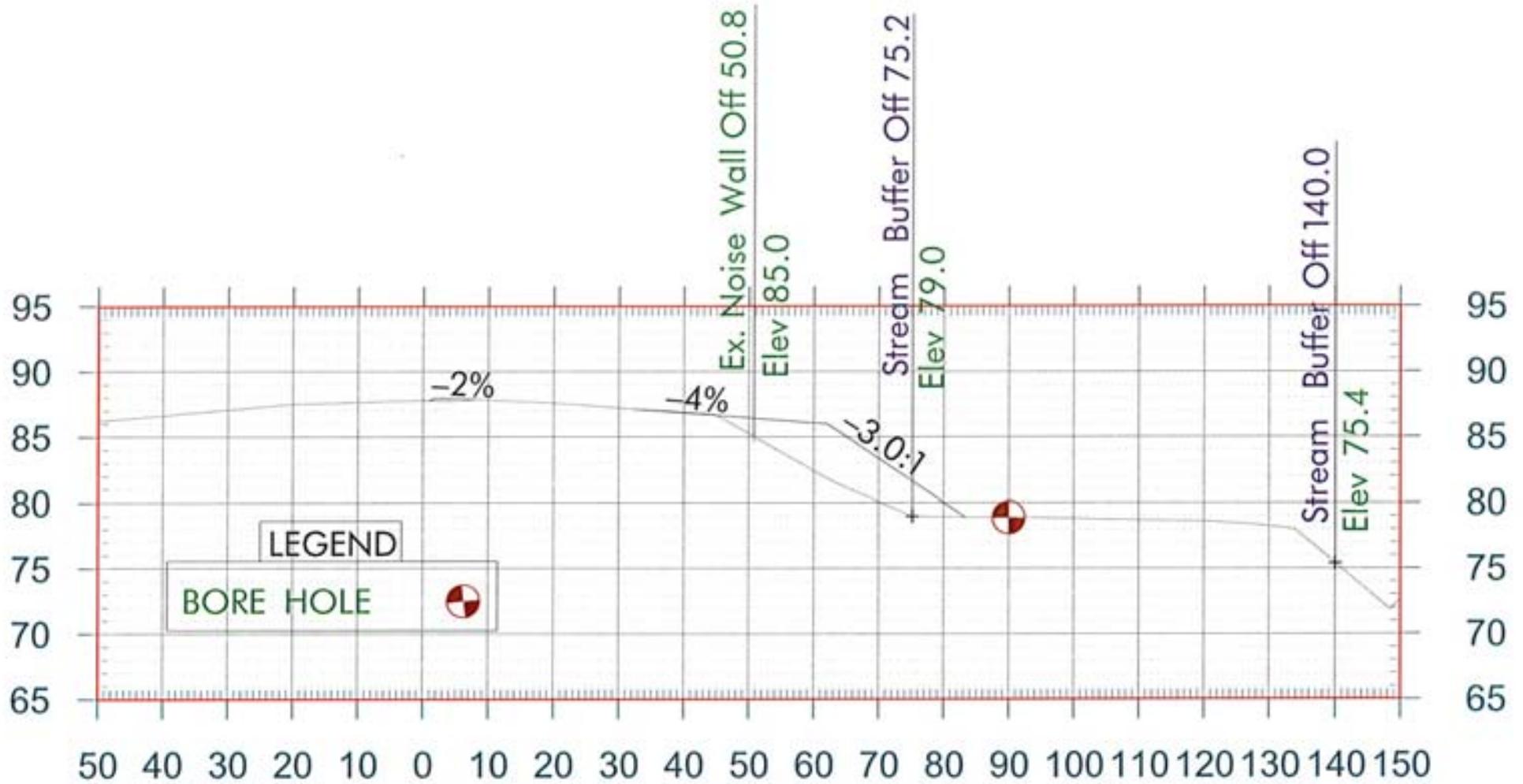
444 + 94



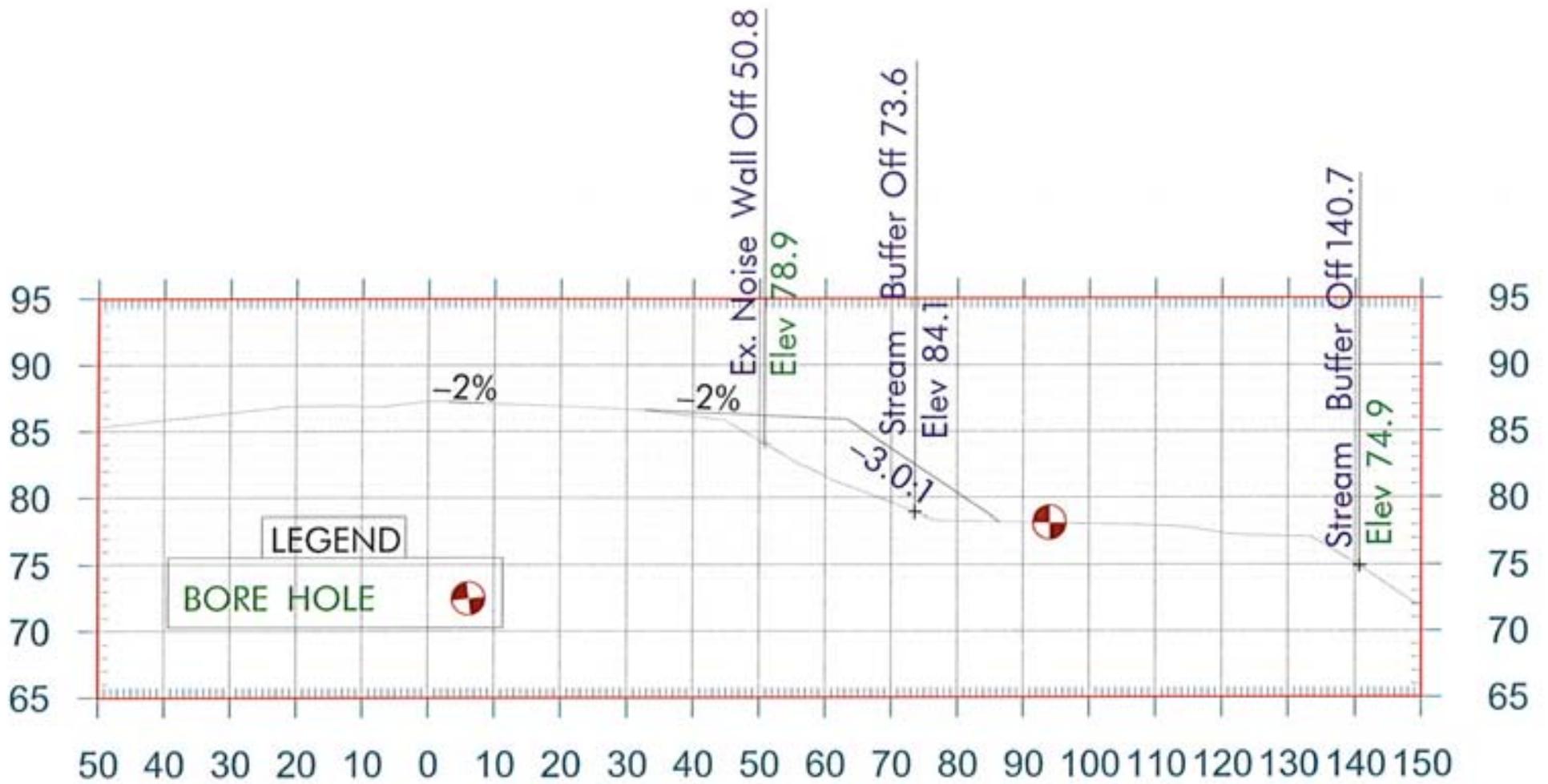
446 + 35



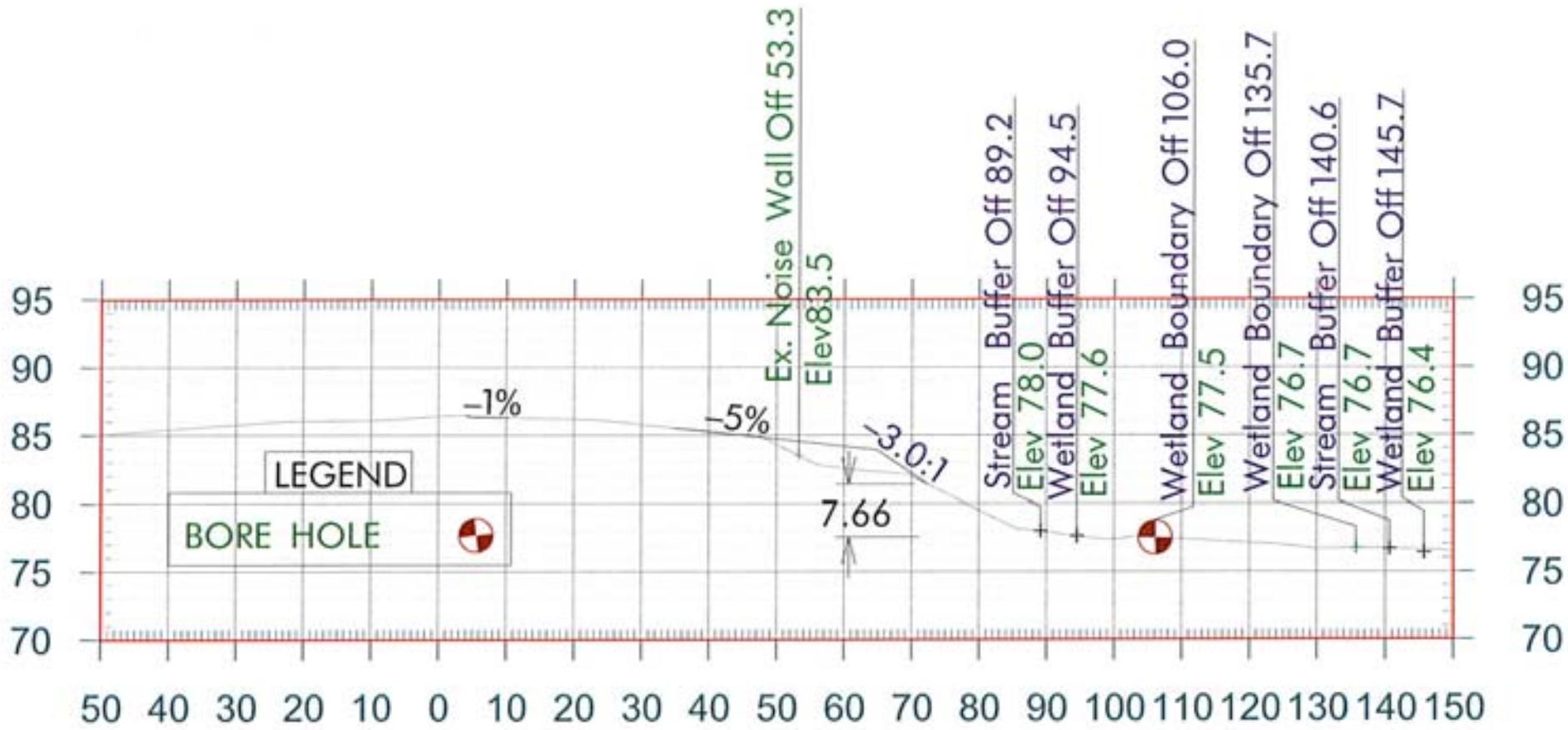
447 + 42



449 + 94



451 + 24



452 + 30