



Natural Resources Conservation Service

National Design, Construction, and Soil Mechanics Center

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Subject: ENG – Soil Mechanics – Texas (WRHB)
Lower Plum Creek Site 28, Caldwell County
Supplemental Report – Seepage Analysis

Date: 4/6/2022

To: Brian Wenberg
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NRCS, Temple, Texas

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FW7800

BACKGROUND

Lower Plum Creek Site 28 was originally constructed as a significant hazard (hazard class “b”) rolled earth fill embankment floodwater retention dam. The structure, located in Caldwell County, Texas, has an as-built total drainage area of 4,691 acres. The current structure is approximately 2,184 feet long with a maximum height of about 28 feet with approximately 237,600 cubic yards of compacted earth fill. The proposed rehabilitation work for this structure includes installing an additional principal spillway conduit along with changes to the auxiliary spillway and the embankment.

Based on information provided to the NDCSMC-Lincoln soil mechanics laboratory the rehabilitation design will include raising the top of dam from an as-built elevation of 480.4 feet to 481.2 feet. The initial design proposal included a downstream slope of 3H:1V with the upstream slope from the top of the dam to the upstream berm also flattened to approximately 2.75H:1V (from the draft design). The existing 24-inch principal spillway conduit (and riser) will remain in place while a new 30-inch inside diameter reinforced concrete pipe (RCP) with a hooded inlet structure and impact basin outlet will be installed using cut-and-cover techniques. The elevation of the new principal spillway crest will be the same as the current spillway at an elevation of 461.2 feet. The structure features two auxiliary spillways, one in each abutment. The auxiliary spillway in the right abutment will be widened approximately 40 feet from 400 feet to a width of 440 feet. The elevation of the control section for the right spillway will be lowered to 475.2 feet. The existing 100 foot wide spillway in the left abutment will remain unchanged but will serve as a secondary auxiliary spillway with an elevation of 475.8 feet.

A soil mechanics report was previously completed for this rehab structure and was submitted on July 8, 2021. This report did not include a full seepage analysis as it was determined by the NDCSMC-Lincoln soil mechanics laboratory that the structure did not warrant it due to on-site conditions. A seepage analysis was conducted in response to the NDCSMC-Fort Worth Design Center review for the project. There was some concern for potential seepage in the left abutment area near BH 610 and BH 611 where the groundwater is elevated and there are wet spots in the downstream toe area of the existing embankment. This report summarizes the seepage analysis that was conducted for the proposed rehabilitated structure and includes the pertinent results. Also included in this summary report are some additional relevant background information that was included in the original report, which is incorporated in this report for quick reference.

INTERPRETATION AND DISCUSSION OF DATA

I. FOUNDATION SOILS

A. General Description

Please refer to the 2019 GIR for a more in-depth discussion on the geology of the site; this section includes a brief summary. The current embankment of compacted earth fill is constructed on alluvial materials overlying weathered claystone of the Wilcox Group. There were some lignite seams in the Wilcox Group from 1 to 20 feet thick. There is also some Carrizo Sand located within the watershed, but soils from this unit were not sampled from this site during the 2019 GI. The alluvial material thickness varies across the length of the dam but are deepest near borehole (BH) 305 with a thickness of about 20 feet.

The alluvial materials encountered in the upstream and downstream toe area boreholes are slightly variable, depending on which side of the original channel the borehole is located. Soils in BH 601 through BH 607 (west of the original channel) contain layers of fine grained lean clay (CL) with sandy clay (SC), fat clay (CH), and silty sand (SM) along with trace amounts of silt (ML) and elastic silt (MH) located deep in the borings. Soils in BH 608 through BH 611 (east of the channel) are relatively homogenous fine grained soils generally classifying as CL and CH with trace amounts of ML and MH. Approximately three quarters of all the samples from the 2019 GI that were tested classify as fine grained CL or CH soil. The soils contain varying amounts of sand from as high as 84 percent to 0 percent in several samples. Small amounts of gravel were encountered in the samples (typically 15 percent or less) which did not affect the classifications of the soils.

The depth to groundwater at seven of the downstream toe area boreholes where water levels were measured varied from a depth of about 3 feet at BH 610 and BH 611 to 8.6 feet at BH 606. All of the auxiliary spillway borings were dry at the time of drilling; no water was encountered. Groundwater was also not encountered in the multiple pool area borrow holes placed west of the current permanent pool.

B. Dispersion

Crumb dispersion indication tests were performed on most of the fine grained samples from the 2019 GI in general accordance with ASTM D6572. A total of 27 samples were tested from BH 609, BH 610, and BH 611. Tested samples included all fine grained CL, CH, and MH soils. Two separate crumb test specimens were obtained for each sample and tested. The crumb tests yielded variable readings ranging from 1 to 4 after 1 hour. According to the ASTM a crumb reading of 1 is an indicator that a soil is nondispersive; eighteen samples had a crumb of 1. The ASTM considers soils with crumb readings of 2 as intermediate dispersion. Crumb readings of 3 and 4 indicate that a soil is potentially dispersive or potentially highly dispersive. Five samples had crumb readings of 3 or higher after 1 hour.

Crumb tests are an indicator of dispersion potential. Double hydrometer dispersion testing is slightly more accurate and measures the amount of dispersive clay present in a soil sample.

Double hydrometer dispersion tests were performed on the sample samples in accordance with ASTM D4221. The double hydrometer yielded results that ranged from 7 percent to 57 percent dispersive clay. Nine of the samples tested had a double hydrometer dispersion reading greater than 30 percent and only one sample was greater than 50 percent (none were over 60 percent).

Dispersion can vary in intensity within short distances in the field. Therefore, when dispersion is detected in the lab, it is an indication that dispersive soils are present in the area. Typically, the crumb and double hydrometer dispersion tests are both performed in the lab to increase the opportunity for detecting the potential problem. However, because each test is performed on a small discrete portion of the sample, it is possible for one test to detect dispersion and another to miss it or for the two tests to indicate different degrees of severity of the dispersion.

According to the ASTM, soils with double hydrometer dispersion test results less than 30 percent are considered as nondispersive. Soils with 30 to 50 percent dispersive clay are intermediate and additional testing, such as a pinhole test may be considered. The ASTM considers soils with greater than 50 percent dispersive clay as dispersive. Guidance provided in NRCS Soil Mechanics Note 13, Dispersive Clays (February 1991) varies slightly as it considers soils with over 60 percent dispersive clay as dispersive. Only two samples had double hydrometer dispersion results that meet the dispersive threshold value. The test results for these samples, as well as select samples with a crumb reading of 4 are included in the following table.

Sample Numbers		Depth ft	Dispersion Tests		Percent clay (% < 0.002 mm)	Dispersive?
Lab	Field		Crumb	Double Hydro.		
F19-134	610-5	12.5-15	4	57	23	YES
F19-136	610-7	22-22.5	4	28	24	N/D*
F19-139	611-1	0-2.5	4	39	20	N/D*
F19-140	611-2	2.5-5	4	38	36	N/D*
F19-142	611-6	15-17.5	1	50	24	N/D*

* No Determination - Conflicting results, Pinhole test would be required for definitive determination.

Based upon the crumb and double hydrometer dispersion testing, there does not appear to be a widespread dispersion problem. Only one sample is likely dispersive, four others would require additional testing to determine their dispersion potential. These being small bag samples, there was not sufficient moist material reserved to perform pinhole dispersion tests. Most of the samples tested from BH 609, BH 610, and BH6 11 are considered as nondispersive. There were only two samples with over 40 percent dispersive clay as determined by the double hydrometer dispersion test and only sample F19-134, field sample 610-5 from 12.5 to 15 feet in depth, has the potential to be truly dispersive. The crumb and double hydrometer dispersion test results are included on form NRCS-ENG-354.

C. Permeability

Several of the soils that were sampled from the structure foundation in the area of the upstream toe, the downstream toe, and along the principal spillway alignment were tested to determine the soils' permeability rate or hydraulic conductivity (k) with the results recorded on form NRCS-ENG-354 in cm/sec. The permeability tests were conducted on undisturbed samples from the

structure centerline (at BH 304), and also at the upstream toe (BH 702, 704, and 705) and downstream toe (BH 602, 604, 605, 607, and 609). The soils tested tend to have very low permeability rates. The highest permeability rate obtained was from a SC-SM soil from BH 705 which had a tested permeability rate of 6.6×10^{-7} cm/sec (1.9×10^{-3} ft/day). All but one of the other tested samples (an SC soil) had permeability rates less than 1.0×10^{-4} ft/day.

Soils with low permeability rates will experience low seepage rates with seepage being a function of head, seepage path length, and permeability. The very low permeability rates of these soils should translate to very low potential seepage for the structure. The permeability rates produced from these tests are vertical permeability rates, k_y . It was necessary to convert the test results to horizontal permeability rates, k_x , for use in the seepage analysis. The permeability rates obtained from the tests performed on these select samples are summarized in the following table and included in the attachments on form NRCS-ENG-354.

Sample Number		Sample Depth	USCS Class	LL	PI	k cm/sec	k ft/day
Lab	Field						
19-728	304.2	10 – 12.5	CL	39	24	1.2×10^{-8}	3.4×10^{-5}
19-729	304.3	15 – 17.5	CL	38	23	3.2×10^{-8}	9.1×10^{-5}
19-738	602.4	7.5 – 10	SC	27	11	3.1×10^{-8}	8.8×10^{-5}
19-741	604.3	5 – 7.5	CL	40	24	2.7×10^{-8}	7.7×10^{-5}
19-744	605.4	7.5 – 10	SC	31	16	1.7×10^{-7}	4.8×10^{-4}
19-748	607.2	7.5 – 10	CL	41	23	3.2×10^{-8}	9.1×10^{-5}
19-752	609.4	7.5 – 10	CL	35	22	3.4×10^{-9}	9.6×10^{-6}
19-759	702.3	5 – 7.5	CL	37	22	2.6×10^{-8}	7.4×10^{-5}
19-763B	704.3	5 – 7.5	CL	44	29	1.4×10^{-9}	4.0×10^{-6}
19-765	705.3	5 – 7.5	SC-SM	25	5	6.6×10^{-7}	1.9×10^{-3}
19-766	705.4	7.5 – 10	CH	55	34	1.4×10^{-8}	4.0×10^{-5}

The foundation soils at this site are mostly fine grained soils predominately classifying as medium to high plasticity lean clay (CL) and fat clay (CH) soils. There were some silty sand (SM) and clayey sand (SC) soils in lesser quantities, primarily West of the old channel encountered in BH 601 – BH 607 and BH 305 with a couple samples upstream of the structure at BH 702 and 704. As noted previously, the soils in the area of BH 609, BH 610, and BH 611 are all fine grained soils. The only material approaching coarse grained were intermixed samples of sandy lean clay, CL soil with 38 to 48 percent sand, at BH 610 between 5 and 17.5 feet in depth.

II. EMBANKMENT

A. General Characteristics and Zoning

This structure was originally designed and constructed as a hazard class “b” (significant hazard) rolled earth embankment composed primarily of clay soils (CL and CH). Due to changes downstream of the structure, the dam is to be upgraded to a high hazard classification which

requires changes to the structure to bring it into compliance with high hazard criteria and to extend the life of the structure. The proposed rehabilitation to the structure is to include an increase to the height of the existing structure of about 0.9 feet to a maximum top of dam elevation of 481.2 feet. The centerline of the structure will be shifted downstream slightly, and the downstream slope of the structure will be flattened to a 3H:1V slope with a 17 foot downstream crossing berm included at an elevation of 456.0 feet.

Based upon a few Shelby tube samples obtained from the 2019 investigation of the current structure, the existing embankment soils classify as sandy lean clay and lean clay with sand, CL soils with Plasticity Index (PI) between 21 and 24. The primary borrow area was identified West of the current pool area. Eight holes were drilled in this proposed borrow area (gridded out into A, B, and C) with multiple samples obtained for testing. These samples were combined into seven composite samples for testing (A-1, A-2, A-3, B-1, B-2, C-1, and C-2). Additional borrow material may be obtained from the auxiliary spillway widening excavation. Samples from the expansion area were also combined into three composite samples for testing (AS-1, AS-2, and AS-3).

The borrow soils range from high plasticity lean clay (CL) soil to medium plastic clayey sand (SC) soil with some silty sand (SM) soil encountered in the auxiliary spillway. The proposed borrow soils did not contain a significant amount of gravel. All samples had some plasticity with the PI of the composite samples ranging from 3 (SM soil) up to 29 (a CL soil with only 14 percent sand).

Most of these soils from the auxiliary spillway and pool area borrow sources will be suitable for use as additional fill material for the proposed embankment structure and if any raise of the existing auxiliary spillway(s) is necessary with the exception of soils from grid C represented by composite field samples C-1 and C-2 from BH 181, BH 182, and BH 183. These high plasticity CL soils exhibit dispersive characteristics that should be avoided. Soils similar to AS-3, the SM borrow soil, should also be avoided provided that there are sufficient quantities of the fine grained quality CL soils available.

A strict zoning plan for the placement of the additional embankment fill may not be necessary for this structure as most of the soils recommended for use are similar clay soils. The routine field direction for placement or wasting some of these less desirable fill materials (such as the soils from grid C and SM soils in the auxiliary spillway) in any low impact areas will be necessary for this structure.

B. Dispersion

Crumb dispersion indication tests were performed on nine of the ten composited borrow samples from the 2019 GI in accordance with ASTM D6572. Dispersion testing was not performed on the SM sample (AS-3) as the dispersion testing does not apply to this material. Crumb readings were taken after 1 and 4 hours for these test specimens. The crumb tests yielded readings that were either 1, 2, or 4 for each of the samples at 4 hours. The majority of the samples have crumbs of 1, however the two samples from grid C had crumbs of 2 (C-1) and 4 (C-2). Grid C is representative of soils from BH 181, BH 182, and BH 183.

Double hydrometer dispersion tests were then performed according to ASTM D4221 on each CL sample and the SC sample. These double hydrometer dispersion tests correlated relatively well with the crumb dispersion indications tests. The double hydrometer dispersion tests on the soils with crumbs of 1 generally ranged from 12 percent to 29 percent dispersive clay with a single sample (B-2) having a reading of 35 percent. The samples from grid C had double hydrometer readings of 37 percent (C-1) and 83 percent (C-2).

Based on the crumb and double hydrometer dispersion tests, soils similar to sample C-1 may be slightly dispersive while soils similar to C-2 are dispersive. Soils similar to sample C-2 are not recommended for use as embankment material. If excluding the thin layer of soil similar to C-1 is unavoidable, the material should be placed in internal locations within the structure in areas upstream of the new centerline thereby locating them upstream of the seepage protection filter. The dispersion results are included in Attachment 1 on form NRCS-ENG-354 with the more critical results for the soils from grid C summarized in the table below.

Sample Numbers		Depth ft	Dispersion Tests		Percent clay (% < 0.002 mm)	Dispersive?
Lab	Hole		Crumb	Double Hydr.		
19-960	181,182,183	3-5	2	37	33	N/D*
19-961	181,182,183	10-15	4	83	33	YES

* Inconclusive results, pinhole test required for definitive determination.

C. Permeability Tests

Flexible wall permeability testing was performed on select disturbed borrow samples in accordance with ASTM D5084. The testing was performed after test specimens were back-pressure saturated in order to provide a saturated hydraulic conductivity, k , recorded in cm/sec. The testing was performed to evaluate the permeability rate of the untreated soils when compacted to 95 percent of Standard Proctor maximum dry density. The molding water contents of the permeability test specimens at the time of compaction varied from about optimum water content minus 0.5 percent to optimum water content plus 2.0 percent for the soils.

The permeability testing was conducted until a relatively constant permeability rate was obtained for each sample. The well compacted medium to high plasticity CL soils represented by samples F19-183, F19-185, and F19-189 (field samples A-2, B-1, and AS-1) had very low permeability rates as tested. The permeability test results are included on form NRCS-ENG-354. The results for the tests performed on the samples considered for use as borrow material are summarized in the following table.

Sample Numbers		Compaction % of Max γ_d	Test w_c (%) Ref To W_{Opt}	Saturation %	k cm/sec	k ft/day
Lab	Field					
F19-183	A-2	95.3	-0.2	71.4	8.0×10^{-8}	2.3×10^{-4}
F19-185	B-1	95.1	-0.2	71.1	4.7×10^{-9}	1.3×10^{-5}
F19-189	AS-1	95.0	+2.1	79.6	8.5×10^{-8}	2.4×10^{-4}

III. SEEPAGE ANALYSIS

Seepage analysis was performed on the proposed structure site using Seep/W finite element analysis software from GeoStudio (2016 edition) using the permeability rates as described above. The structure was analyzed near centerline station 15+50 approximately BH 610. Two analysis trial conditions were examined with the vertical to horizontal permeability (soil anisotropy) and the permeability rates of the soils varied. All analysis trials included a new additional foundation drainage system in the analysis.

The phreatic line in all seepage analyses was considered fully developed from the permanent pool elevation and the seepage head was evaluated at the higher secondary auxiliary spillway elevation for these long term steady-state analyses. The seepage analysis was made with all materials below the phreatic line modeled as saturated. The embankment soils (both existing and new fill) above the phreatic line were modeled as unsaturated/saturated. The foundation soils were modeled using the permeability rates for field samples 605.4 (an SC soil which was included to be conservative), 607.2, 609.4, and 705.4. The existing embankment was modeled using field samples 304.2 and 304.3. The new embankment fill material was modeled using borrow samples A-2, B-1, and AS-1.

For the initial seepage analysis condition, the ratio of vertical permeability (k_y) to horizontal permeability (k_x) of the materials varied, depending upon the soil. The initial analysis was conducted with the foundation soils modeled with a k_y/k_x of 0.05 (k_x is 20 times k_y). The k_y/k_x of the saturated existing embankment soils was also set at 0.05. The moist existing embankment soils and new fill (which will also be modeled as unsaturated/saturated) use a k_y/k_x ratio of 0.1 (k_x is 10 times k_y). The permeability rates that are recorded on form NRCS-ENG-354 are vertical permeability rates in cm/sec which had to be adjusted accordingly to horizontal permeability rates in ft/sec.

A second analysis was performed with an increase to the original k_x ; the k_x was increased tenfold to conservatively account for variability in the foundation soils. The k_y/k_x ratio was also reduced. These combined changes produces higher horizontal permeability which produces higher seepage. The k_y/k_x ratio for the foundation soils in this scenario was reduced to $k_y/k_x = 0.033$ (k_x was increased to 30 times greater than k_y). The saturated existing embankment was also reduced to $k_y/k_x = 0.033$. The moist embankment soils were adjusted with both existing and new embankment soils reduced to $k_y/k_x = 0.05$ (k_x is 20 times k_y).

Seepage volumes were estimated for these two analysis conditions. Almost all of the seepage quantities occur through the foundation with some occurring in the existing saturated embankment. The most significant seepage occurs when the upper layer of the foundation is modeled using sample 605.4, the SC soil. The maximum seepage volume collected by the drain was 3.0 gallon per day per linear foot of drain. This a relatively low amount of seepage. For a drain system that is approximately 1050 feet long (extended from centerline station 21+50 out to 11+00) the total seepage collected by the system would be about 3150 gallons per day for the drain or approximately 2.2 gallons per minute. This low quantity should not be unexpected considering the low soil permeability rates that are used in the analysis.

CONCLUSIONS AND RECOMMENDATIONS

The current site would have attained a fully developed phreatic line and seepage paths over the life of the structure. While there is a wet spot in the downstream toe of the structure near this location (BH 610) and the groundwater levels are elevated, the water does not appear to be direct seepage from the structure. The seepage also does not appear to have any negative effect on the slope stability of the existing structure. This downstream toe area wet spot might be a nuisance hindering maintenance of the structure in this area but should not affect the stability or performance of the rehabilitated embankment.

Based on information in the as-built plans, it appears that the existing structure currently includes a foundation drain system. As discussed in the original soil mechanics report, the inclusion of a new additional two-stage foundation trench drainage system (placing it underneath the new downstream berm fill that is to be placed for the rehabilitated downstream slope) is still recommended. A two stage system should be more than adequate in conveying the amount of potential seepage that is anticipated. The new drain system will be about 32 to 39 feet downstream of the existing drain system. This new system can help to pick up any potential seepage as well as help to reduce downstream wet spots in low areas.

If you have any questions about this additional seepage analysis and report or require any further testing or analysis for this project, please contact the NDCSMC-Lincoln at 402-437-5337.

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Attachments:

Form NRCS-ENG-354, Summary of Test Results, 21 sheets

Seepage Analysis, 42 sheets

cc: (electronic distribution)

Dave Wolff, Design Engineer, NRCS, Temple, TX

Shawn Higgins, Design Engineer, NRCS, Temple, TX

Job No. 7800

F19

6/6/19		TX Lower Plum 28 Bore Hole-Index testing Caldwell Location and Description	0		Mechanical Analysis Grain Size Distribution Expressed as Percent Finer by Dry Weight													Atterberg Limits		Unified Classification	Soluble Salts %	Natural Moisture (%)	Natural Dry Unit Weight (lb/ft ³)	Percent Saturation	Dispersion			Moisture-Density		G _s	G _M	pH	Remarks		
Lab. Sample No.	Field Sample No.		Depth (ft)	Sample Type	Fines					Sand					Gravel			L.L.	P.I.						Double Hydrometer	Crumb Test		Pinhole	ASTM D698						
					0.002 mm	0.005 mm	0.02 mm	0.05 mm	#200 0.074 mm	#140 0.105 mm	#60 0.250 mm	#40 0.42 mm	#20 0.84 mm	#10 2.0 mm	#4 4.76 mm	3/8" 9.525 mm	1/2" 12.7 mm									3/4" 19.05 mm	1" 25.4 mm		1 1/2" 38.1 mm					3" 76.2 mm	1 Hr
39	207-4	SPT 6-9-7	13.5-15	1	15	27	35	56	56	57	92	99	99	100							31	16	CL	<0.5	9.0		41	1	1						
40	271-3	SPT 11-22-29 not to ASTM	8-9.5	2	32	46	67	92	94	-	-	-	-	100							45	25	CL	<0.5	10.5		37	1	1						
41	271-4	SPT 12-20-25	13.5-15	3	15	23	34	69	74	-	-	-	-	100							37	16	CL	<0.5	7.9		61	1	1						
42	273-3	SPT 14-27-33	13.5-15	4	9	14	27	34	43	50	92	99	-	100							27	4	SM	<0.5	6.6										
43	274-2	SPT 8-12-13	10-11.5	5	18	26	36	45	49	55	90	98	-	100							30	8	SC	<0.5	17.7		46	1	1						
44	304-6	SPT 4-9-12	42.5-44	6	41	59	72	75	82	-	-	-	-	100							50	27	CH	<0.5	23.1		27	1	1						
45	304-7	SPT 6-19-27	45-46.5	7	33	43	54	63	72	-	-	-	-	100							40	19	CL	<0.5	25.5		40	1	1						
46	305-1	Extruded Sample	0-2.5	8	28	37	50	55	62	71	86	94	98	100							35	17	CL	<0.5	16.6		32	1	1						
47	305-2	Extruded Sample	2.5-5	9	36	45	54	61	70	-	-	-	-	100							41	23	CL	<0.5	15.3		22	1	1						
48	305-5	SPT 2-3-7	10-11.5	10	15	23	28	30	33	45	-	-	-	100							21	8	SC	<0.5	19.7		70	3	3						
49	305-7	SPT 10-14-19	20-21.5	11	29	36	51	57	66	80	87	93	98	100							37	18	CL	<0.5	13.3		33	1	1						
50	305-8	SPT 15-26-35	28-29.5	12	15	19	23	26	29	32	50	74	92	100							31	5	SM	<0.5	25.0										
51	305-9	SPT 12-17-25	35-36.5	13	35	53	61	76	85	-	-	-	-	100							48	25	CL	<0.5	23.5		31	1	1						
52	305-10	SPT 29-42-46	45-46.5	14	6	10	15	20	22	28	96	99	-	100							24	1	SM	<0.5	27.6										
53	305-11	SPT 29-50 for 6"	50-51	15	11	17	27	60	89	-	-	-	-	100							33	19	CL	0.7	28.2		59	2	2						

Job No. 7800

6/6/19		TX Lower Plum 28 Bore Hole-Index testing Caldwell County Location and Description	0		Mechanical Analysis Grain Size Distribution Expressed as Percent Finer by Dry Weight													Atterberg Limits		Unified Classification	Soluble Salts %	Natural Moisture (%)	Natural Dry Unit Weight (lb/ft ³)	Percent Saturation	Dispersion			Moisture-Density		G _s	G _M	pH	Remarks						
Lab. Sample No.	Field Sample No.		Depth (ft)	Sample Type	Fines					Sand					Gravel			L.L.	P.I.						Double Hydrometer	Crumb Test		Pinhole	ASTM D698										
					0.002 mm	0.005 mm	0.02 mm	0.05 mm	#200 0.074 mm	#140 0.105 mm	#60 0.250 mm	#40 0.42 mm	#20 0.84 mm	#10 2.0 mm	#4 4.76 mm	3/8" 9.525 mm	1/2" 12.7 mm									3/4" 19.05 mm	1" 25.4 mm		1 1/2" 38.1 mm					3" 76.2 mm	1 Hr	4 Hr	Max γ _d (pcf)	w ₀ %	
69	602-9	STP 15-22-30	30-31.5		31	44	65	89	97	-	-	-	-	100							50	25	CH	<0.5	22.9				34	1	1								
70	602-10	STP 17-22-25	35-36.5		33	47	69	96	97	-	-	-	-	100							51	26	CH	<0.5	23.2				32	1	1								
71	602-11	STP 12-43-50 for 3"	40-41.5		33	44	52	63	66	70	77	81	89	100							67	34	MH	1.0	45.4				44	1	1								
72	603-1	Extruded Sample	0-2.5		35	42	49	59	66	71	88	95	98	100							44	27	CL	<0.5	17.6				10	1	1								
73	603-2	Extruded Sample	2.5-5		29	34	42	49	56	62	83	91	97	100							35	20	CL	0.5	14.1				21	1	1								
74	603-5	Extruded Sample	10-12.5		27	34	46	54	63	65	87	95	99	100							30	16	CL	<0.5	15.5				41	4	4								
75	603-6A 603-6B	Extruded Sample	15-16.5		10	13	15	16	19	26	67	90	99	100								NP	SM	<0.5	19.2														
			16.5-17.5		42	53	68	89	92	-	-	-	-	100							65	40	CH	<0.5	25.7				28	4	4								
76	603-7	STP 7-9-12	20-21.5		39	48	65	76	83	-	-	-	-	100							63	41	CH	<0.5	28.0				44	4	4								
77	303-8	STP 4-9-20	25-26.5		22	27	34	52	58	65	93	96	98	100							33	14	CL	<0.5	28.9				37	1	2								
78	603-9	STP 15-22-36	30-31.5		43	62	80	90	91	-	-	-	-	100							69	39	CH	<0.5	28.3				34	1	1								
79	603-10	STP 19-39-50 for 5.75"	35-36.5		36	49	86	96	98	-	-	-	-	100							62	32	CH	0.5	24.5				18	1	1								
80	603-11	SPT 20-21-50 for 4"	40		34	45	71	85	93	-	-	-	-	100							54	27	CH	<0.5	23.9				31	1	1								
81	604-1	Extruded Sample	0-1.5		25	34	43	57	63	71	88	96	100							29	16	CL	<0.5	13.3				24	1	1									
82	604-2	Extruded Sample	2.5-4.5		36	43	56	71	80	-	-	-	-	100							43	26	CL	<0.5	17.8				32	1	3								
83	604-5	Extruded Sample	10-12.5		11	14	14	14	16	19	27	45	71	86	94	100							28	14	SC	<0.5	16.2				88	1	2						

Job No. 7800

F19

6/6/19		TX Lower Plum 28 Bore Hole-Index testing Caldwell County Location and Description	0		Mechanical Analysis Grain Size Distribution Expressed as Percent Finer by Dry Weight														Atterberg Limits		Unified Classification	Soluble Salts %	Natural Moisture (%)	Natural Dry Unit Weight (lb/ft ³)	Percent Saturation	Dispersion			Moisture-Density		G _s	G _M	pH	Remarks		
Lab. Sample No.	Field Sample No.		Depth (ft)	Sample Type	Fines					Sand					Gravel				L.L.	P.I.						Double Hydrometer	Crumb Test		Pinhole	ASTM D698						
					0.002 mm	0.005 mm	0.02 mm	0.05 mm	#200 0.074 mm	#140 0.105 mm	#60 0.250 mm	#40 0.42 mm	#20 0.84 mm	#10 2.0 mm	#4 4.76 mm	3/8" 9.525 mm	1/2" 12.7 mm	3/4" 19.05 mm									1" 25.4 mm	1 1/2" 38.1 mm		3" 76.2 mm					1 Hr	4 Hr
146	701-1	Extruded Sample	0-2.5	1	28	34	43	63	71	-	-	-	-	100							34	18	CL	<0.5	15.0			24	1	1						
147	701-2	Extruded Sample	2.5-5	2	33	41	51	69	82	-	-	-	-	100							38	20	CL	<0.5	19.6			66	1	2						
148	701-5	Extruded Sample	10-12.5	3	24	27	32	34	41	51	72	88	98	100							32	16	SC	<0.5	11.8			37	1	1						
149	701-6	SPT 6-10-16	15-16.5	4	13	20	25	36	36	39	86	88	91	100							NP	NP	SM	<0.5	21.2											
150	701-7	SPT 4-8-12	20-21.5	5	37	50	61	65	71	77	87	89	93	100							48	26	CL	<0.5	23.3			26	1	1						
151	701-8	SPT 6-9-12	25-26.5	6	37	52	76	91	100												59	36	CH	<0.5	21.8			56	1	1						
152	701-9	SPT 13-20-25	30-31.5	7	31	47	71	90	97	-	-	-	-	100							53	28	CH	<0.5	20.3			32	1	1						
153	701-10	Spt 15-25-29	35-36.5	8	29	50	75	90	93	-	-	-	-	100							60	33	CH	<0.5	21.8			32	1	1						
154	702-1	Extruded Sample	0-2	9	35	42	55	69	72	-	-	-	-	100							40	22	CL	<0.5	17.0			21	1	1						
155	702-2	Extruded Sample	2.5-4.25	10	39	53	58	70	76	-	-	-	-	100							46	25	CL	<0.5	16.0			17	1	1						
156	702-5	Extruded Sample	10-12.5	11	29	36	57	67	76	-	-	-	-	100							41	24	CL	<0.5	15.0			39	1	1						
157	702-6	Extruded Sample	15-17.5	12	32	43	54	65	65	72	87	94	99	100							41	24	CL	<0.5	19.2			21	1	1						
158	702-7	Extruded Sample	20-22.5	13	7	8	12	13	16	17	90	-	-	100							NP	NP	SM	<0.5	28.8											
159	703-1	Extruded Sample	0-2.5	14	35	42	54	71	78	-	-	-	-	100							42	24	CL	<0.5	19.1			19	1	1						
160	703-2	Extruded Sample	2.5-5	15	35	50	56	69	70	-	-	-	-	100							49	30	CL	<0.5	16.3			16	1	1						

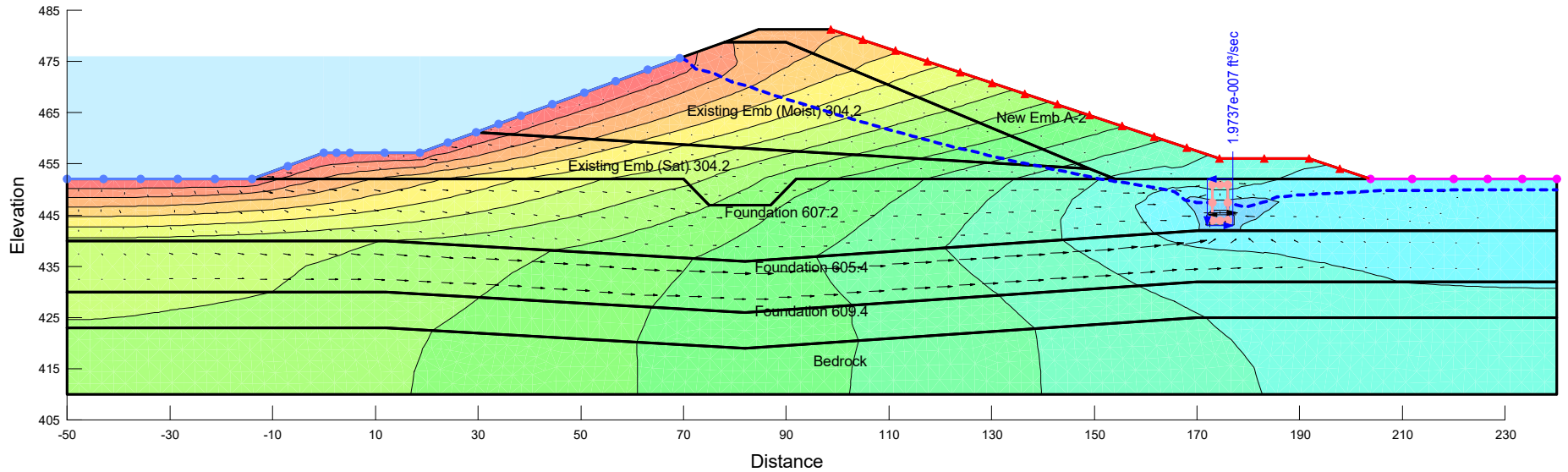
Job No. 7800

6/6/19		TX Lower Plum 28 Bore Hole-Index testing Caldwell County Location and Description	0		Mechanical Analysis Grain Size Distribution Expressed as Percent Finer by Dry Weight													Atterberg Limits		Unified Classification	Soluble Salts %	Natural Moisture (%)	Natural Dry Unit Weight (lb/ft ³)	Percent Saturation	Dispersion			Moisture-Density		G _s	G _M	pH	Remarks				
Lab. Sample No.	Field Sample No.		Depth (ft)	Sample Type	Fines					Sand					Gravel			L.L.	P.I.						Double Hydrometer	Crumb Test		Pinhole	ASTM D698								
					0.002 mm	0.005 mm	0.02 mm	0.05 mm	#200 0.074 mm	#140 0.105 mm	#60 0.250 mm	#40 0.42 mm	#20 0.84 mm	#10 2.0 mm	#4 4.76 mm	3/8" 9.525 mm	1/2" 12.7 mm									3/4" 19.05 mm	1" 25.4 mm		1 1/2" 38.1 mm					3" 76.2 mm	1 Hr	4 Hr	Max γ _d (pcf)
161	703-5	Extruded Sample	10-12.5	16	25	34	54	56	57	60	85	98	-	100							33	18	CL	<0.5	17.6			35	1	1							
162	703-6	Extruded Sample	15-17.5	17	43	57	78	91	92	-	-	-	-	100							63	37	CH	<0.5	22.6			14	1	1							
163	703-7	Extruded Sample	20-22.5	18	38	54	67	82	88	-	-	-	-	100							50	28	CH	<0.5	29.9			19	1	1							
164	704-1	Extruded Sample	0-1	19	24	34	52	60	66	71	87	94	98	100							34	18	CL	<0.5	7.9			29	1	1							
165	704-2	Extruded Sample	2.5-4.5	20	42	51	61	65	66	73	77	93	99	100							50	32	CH	<0.5	19.9			63	4	4							
166	704-5	Extruded Sample	10-12.5	21	72	81	87	87	89	-	-	-	-	100							53	30	CH	0.6	16.0			20	2	2							
167	704-6	Extruded Sample	15-17.5	22	25	36	42	58	76	-	-	-	-	100							35	17	CL	<0.5	0.6			28	3	3							
168	704-7	SPT 17-28-30	20-21.5	23	9	12	16	18	20	31	97	-	-	100							NP	NP	SM	<0.5	28.8												
169	705-1	Extruded Sample	0-1.75	24	15	20	26	43	44	51	75	91	99	100							NP	NP	SM	<0.5	4.6												
170	705-2	Extruded Sample	2.5-4	25	43	55	58	71	80	-	-	-	-	100							36	20	CL	<0.5	15.1			18	1	1							
171	705-5	SPT 6-9-13	10-11.5	26	24	30	34	46	57	72	98	98	99	100							39	18	CL	<0.5	22.4			33	1	1							
172	705-6	Extruded Sample	15-17.5	27	21	29	34	38	41	46	99	99	-	100							38	17	SC	<0.5	26.9			35	3	3							
173	705-7	SPT 16-23-36	20-21.5	28	22	30	33	41	58	67	88	90	93	100							34	15	CL	<0.5	16.4			50	1	1							
174	706-1	Extruded Sample	0-2	29	26	42	49	49	57	64	81	91	98	100							35	19	CL	<0.5	13.1			24	1	1							
175	706-2	Extruded Sample	2.5-5	30	41	56	67	72	75	-	-	-	-	100							54	32	CH	<0.5	21.0			16	1	1							

6/05/2019		TEXAS (WHRB) (REGULATED) Lower Plum Creek Site 28 Caldwell County	Sample Type	Depth ft.	Mechanical Analysis Grain Size Distribution Expressed as Percent Finer by Dry Weight															Atterberg Limits		Unified Classification	Crumb	Dispersion %	Moisture-Density Relationships <input type="checkbox"/> Standard <input type="checkbox"/> Modified			Undisturbed Sample Data		G _s <#4	Special Tests										
Lab. Sample No.	Field Number				Fines				Sand					Gravel						L.L.	P.I.				Curve No.	Max γ _d p.c.f.	w ₀ %	γ _d p.c.f.	w _c %		W _{Sat} %										
					0.002 mm	0.005 mm	0.02 mm	0.05 mm	#200 0.074 mm	#140 0.105 mm	#60 0.250 mm	#40 0.42 mm	#20 0.84 mm	#10 2.0 mm	#4 4.76 mm	3/8" 9.525 mm	1/2" 12.7 mm	3/4" 19.05 mm	1" 25.4 mm																	1 1/2" 38.1 mm	3" 76.2 mm				
19-749	608.3	Downstream Toe	ST	5-7.5	21	22	28	41	46	54	78	95	100								26	11	SC	2	18				107.2	20.5	2.64	20.3	q _u /2 = c _u = 478 psf								
		Alluvial																																							
750	608.4	Downstream Toe	ST	7.5-10	27	28	33	41	49	51	69	87	98	100							34	21	SC	1				110.3	17.5	2.64	18.7	φ = 14.7° c = 386 psf φ' = 33.7° c' = 52 psf									
		Alluvial																																							
751	609.3	Downstream Toe	ST	5-7.5	27	31	38	53	62	68	89	99	100								35	21	CL	2	12			102.2	22.8	2.63	23.0	φ = 5.0° c = 480 psf									
752	609.4	Downstream Toe	ST	7.5-10	28	30	39	51	59	66	91	99	100								35	22	CL	1				113.4	16.4	2.61	16.7	Permeability Rate k = 3.4x10 ⁻⁹ cm/sec									
753	610.3	Downstream Toe	ST	5-7.5	29	31	37	51	62	69	89	99	100								34	21	CL	2	26			109.6	18.6	2.65	19.2	φ = 17.8° c = 71 psf φ' = 29.2° c' = 50 psf									
754	610.4	Downstream Toe	ST	10-12.5	33	36	49	65	73	79	91	98	100								39	25	CL	1				111.5	17.7	2.61	17.7	φ = 17.4° c = 309 psf φ' = 28.9° c' = 132 psf									

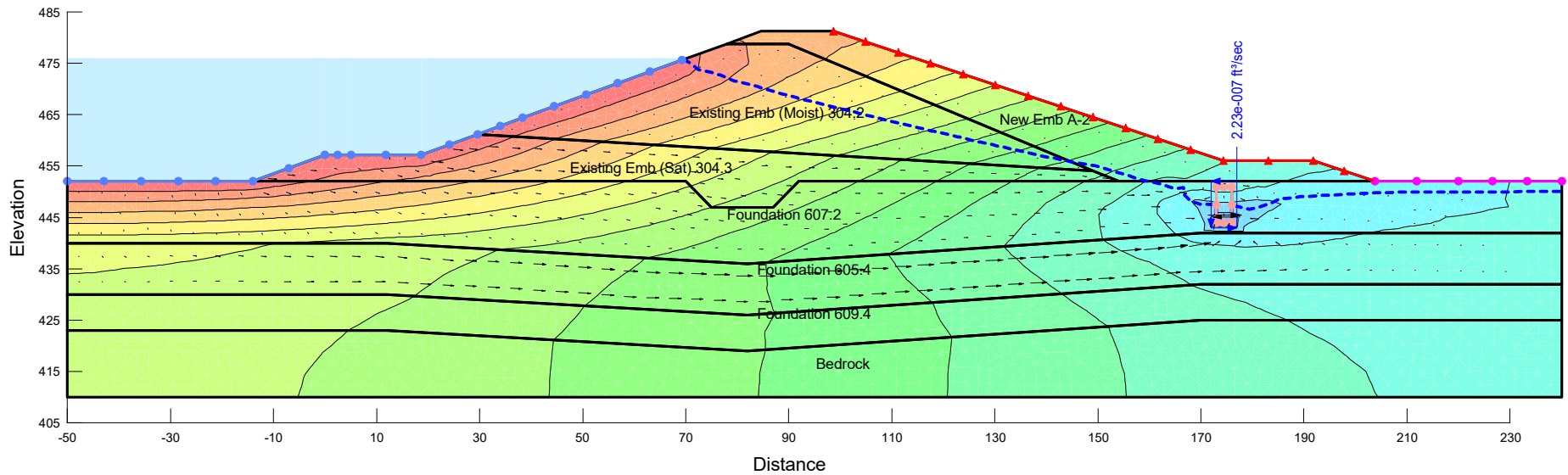
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Dark Green	Existing Emb (Sat) 304.2	Saturated Only	1.2e-008	0.05	0.188		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Light Brown	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Dark Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Bright Green	New Emb A-2	Saturated / Unsaturated		0.1	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: A-2
 Existing Emb: 304.2
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.973655e-007 ft³/sec
 ~ 0.13 gallon/day



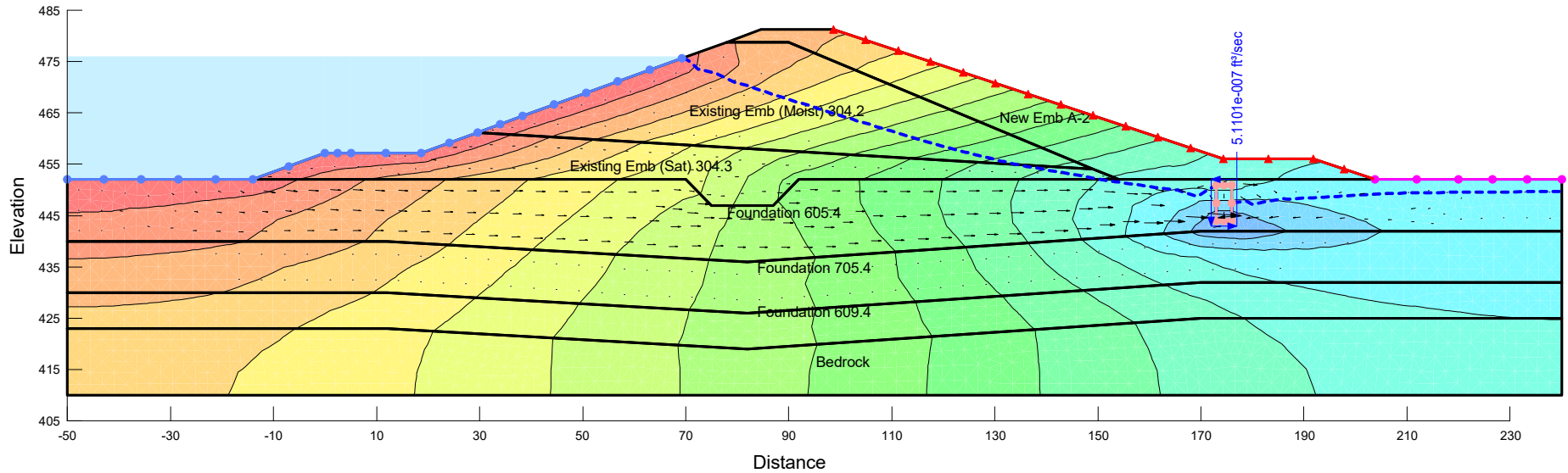
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Dark Yellow	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Green	New Emb A-2	Saturated / Unsaturated		0.1	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: A-2
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 2.2300022e-007 ft³/sec
 ~ 0.14 gallon/day



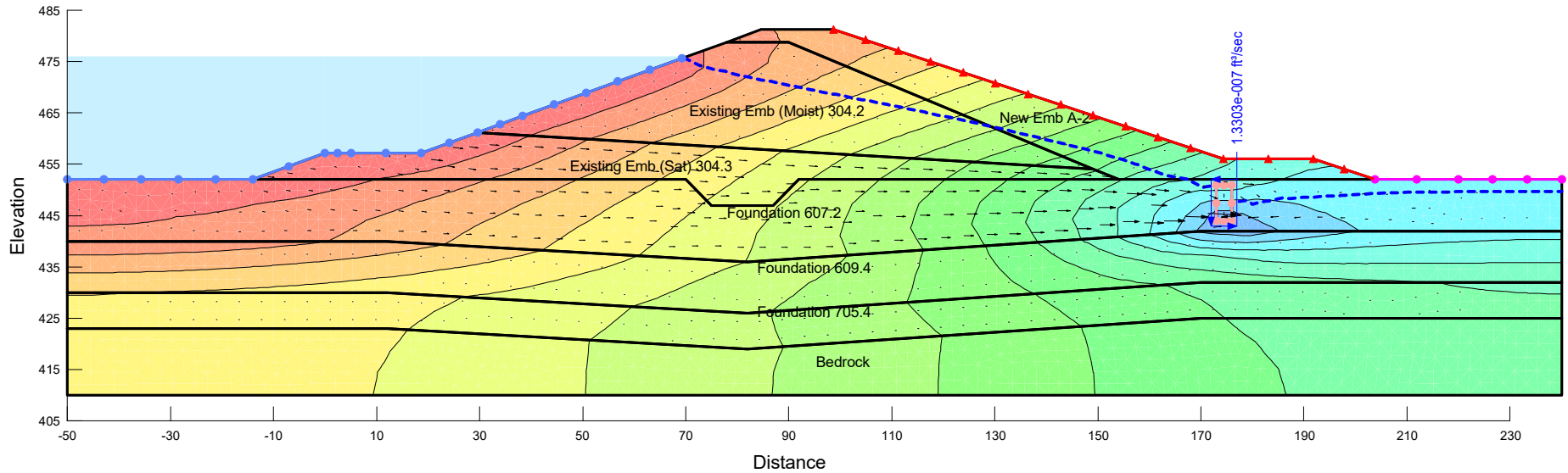
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Green	New Emb A-2	Saturated / Unsaturated		0.1	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: A-2
 Existing Emb: 304.2, 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 5.1101046e-007 ft³/sec
 ~ 0.33 gallon/day



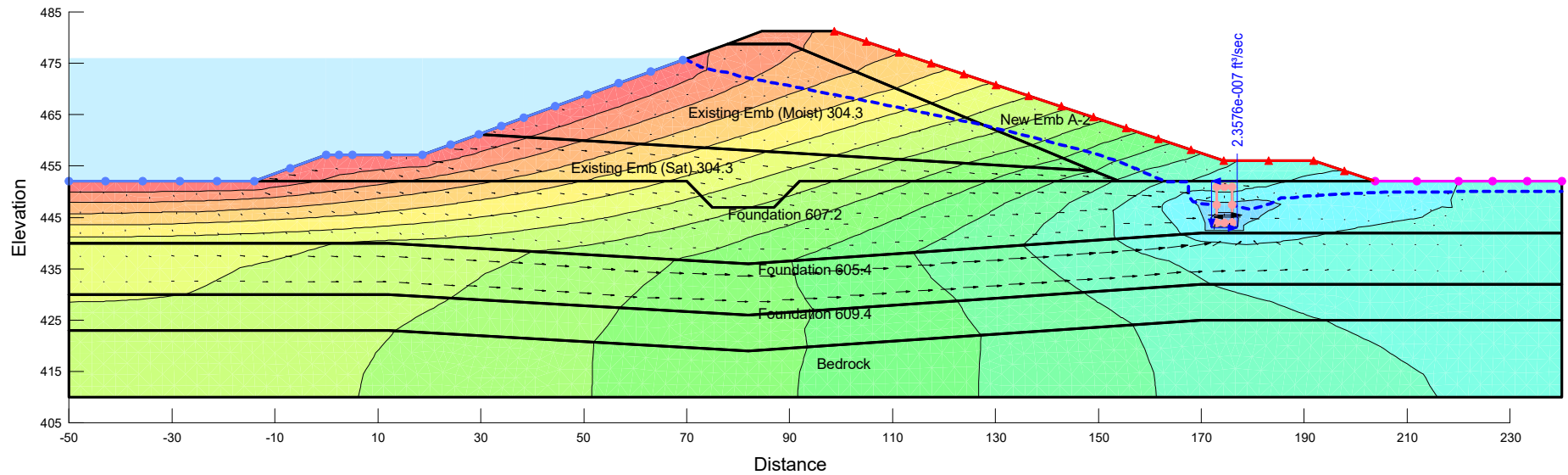
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Bright Green	New Emb A-2	Saturated / Unsaturated		0.1	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: A-2
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 609.4, 705.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.3302748e-007 ft³/sec
 ~ 0.1 gallon/day



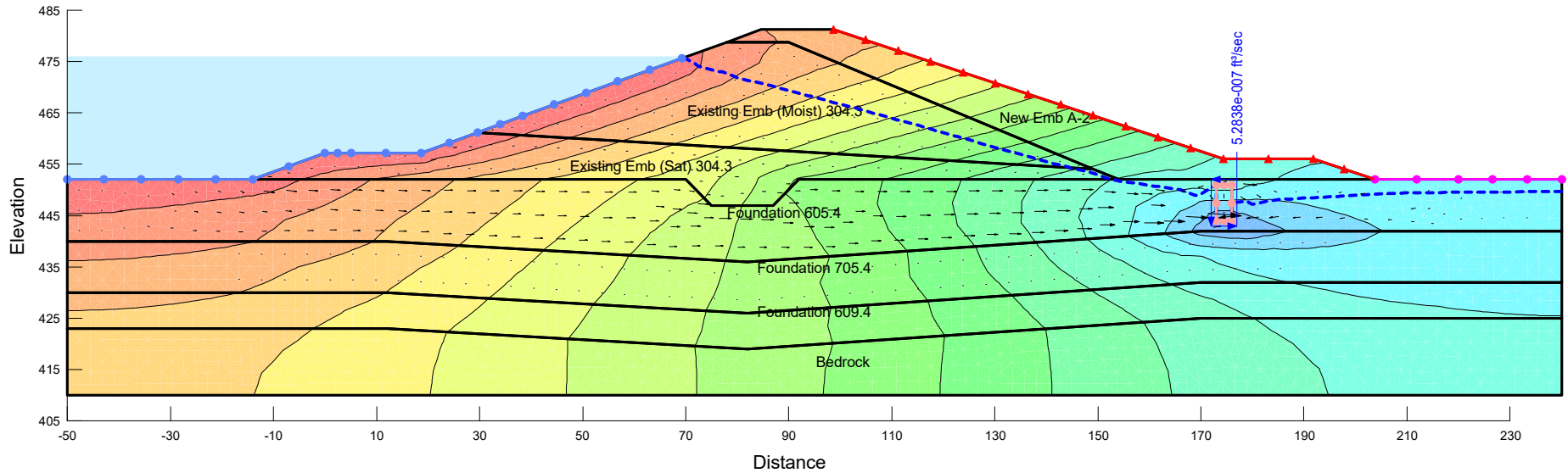
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated	3.2e-008	0.1	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Light Green	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Dark Green	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Bright Green	New Emb A-2	Saturated / Unsaturated		0.1	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: A-2
 Existing Emb: 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 2.35763e-007 ft³/sec
 ~ 0.15 gallon/day



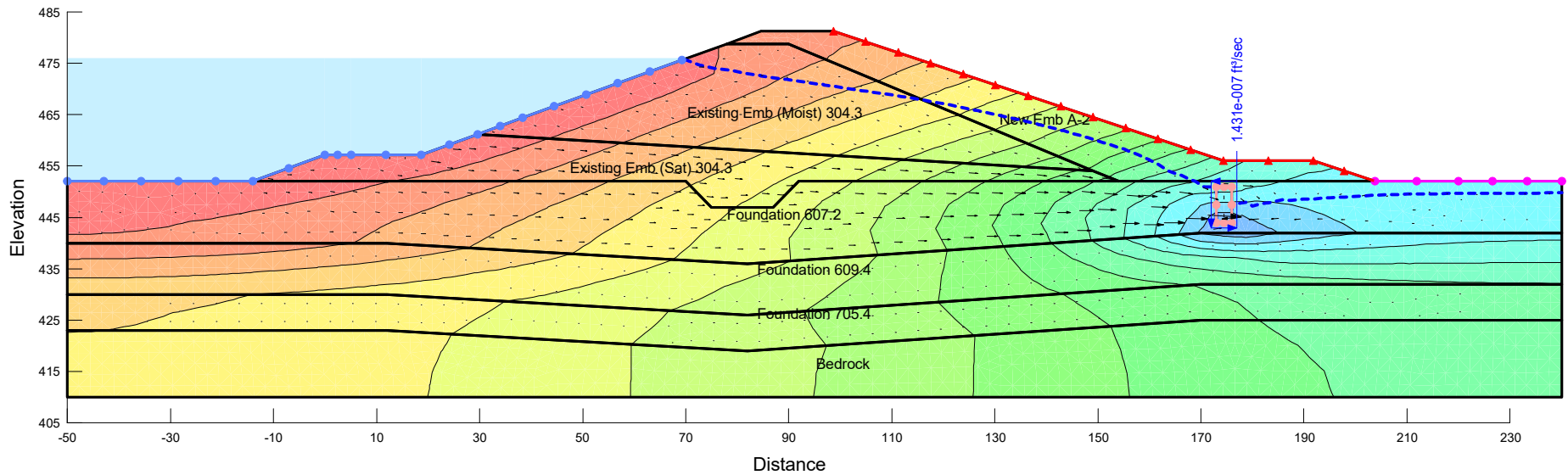
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated	3.2e-008	0.1	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Green	New Emb A-2	Saturated / Unsaturated		0.1	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: A-2
 Existing Emb: 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 5.2838097e-007 ft³/sec
 ~ 0.34 gallon/day



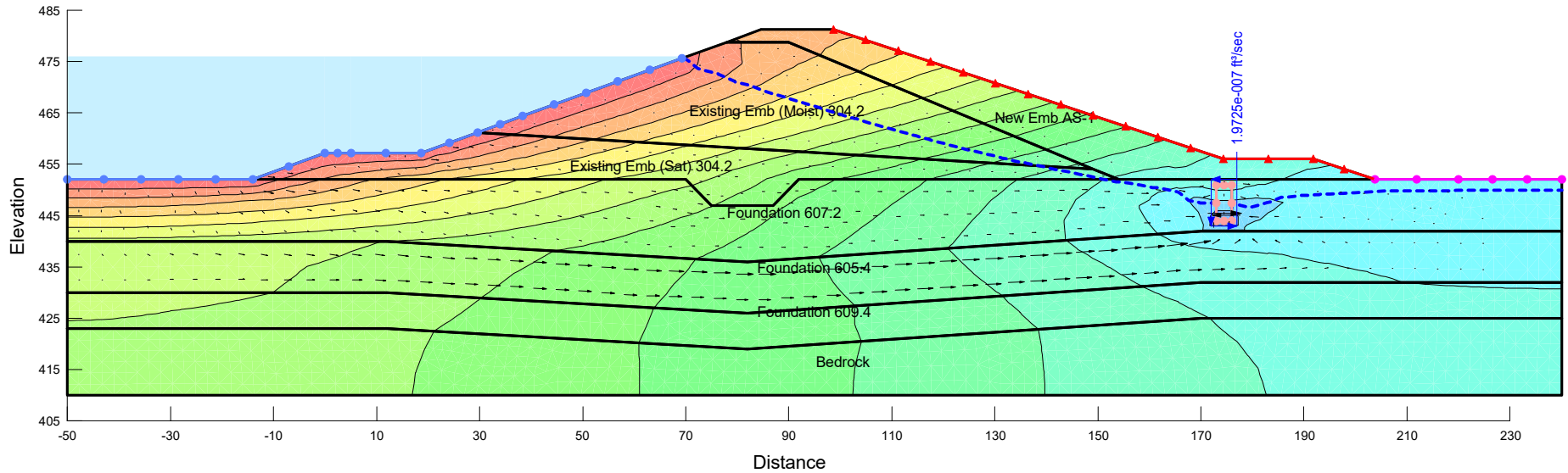
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated	3.2e-008	0.1	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Yellow	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Green	New Emb A-2	Saturated / Unsaturated		0.1	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: A-2
 Existing Emb: 304.3
 Foundation: 607.2, 609.4, 705.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.4309826e-007 ft³/sec
 ~ 0.1 gallon/day



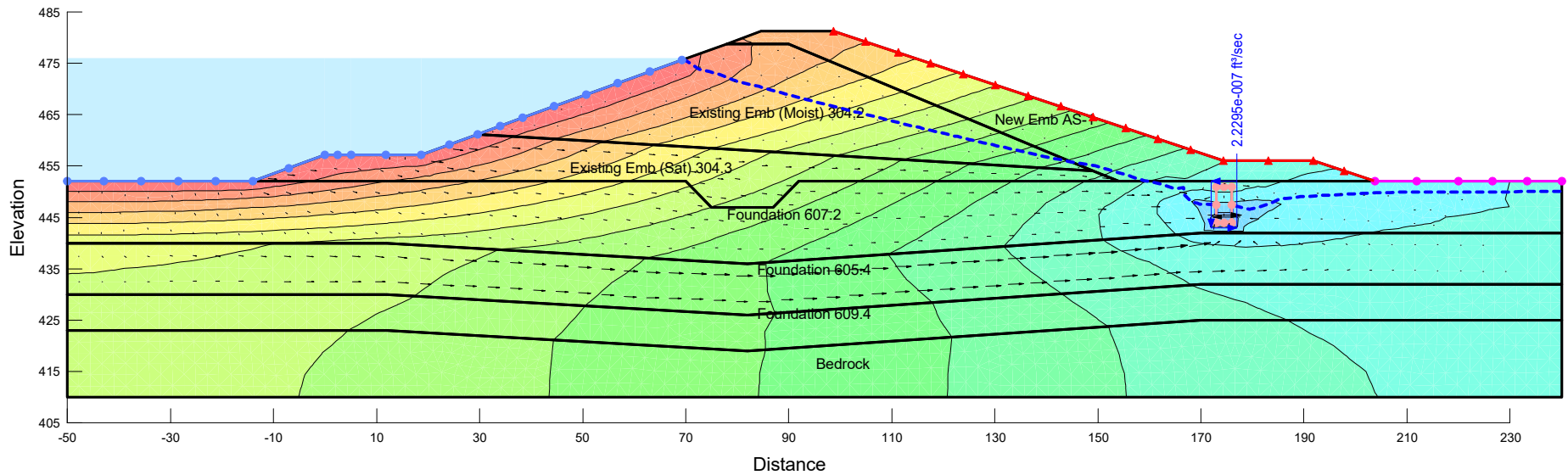
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Dark Green	Existing Emb (Sat) 304.2	Saturated Only	1.2e-008	0.05	0.188		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Orange	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Light Blue	New Emb AS-1	Saturated / Unsaturated		0.1	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: AS-1
 Existing Emb: 304.2
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.9725303e-007 ft³/sec
 ~ 0.13 gallon/day



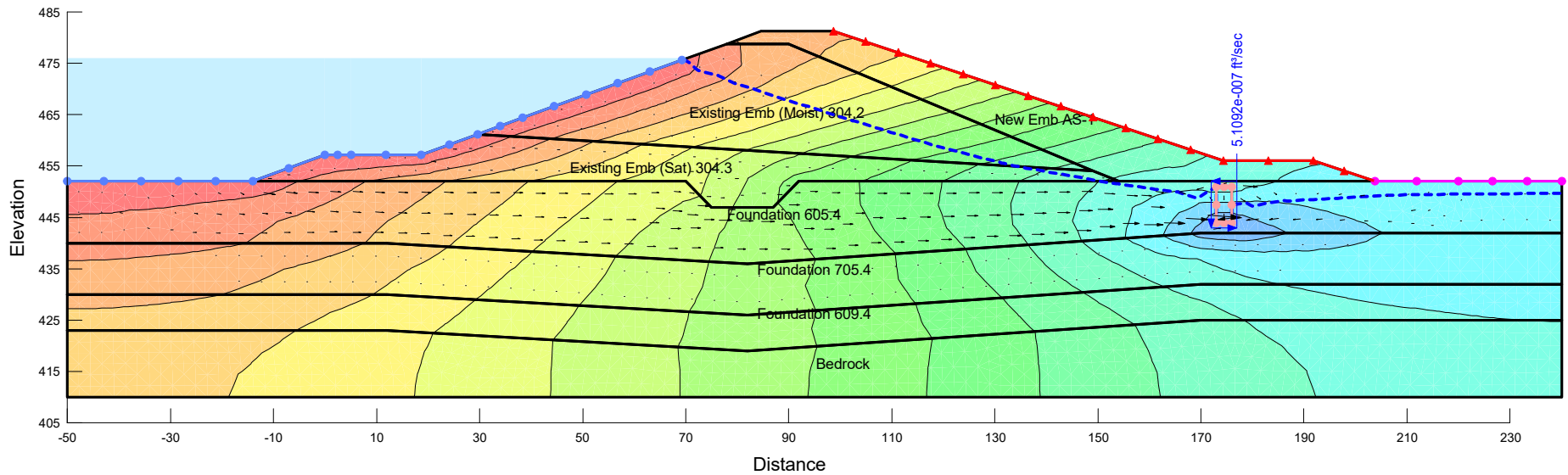
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Dark Yellow	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.1	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: AS-1
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 2.2295404e-007 ft³/sec
 ~ 0.15 gallon/day



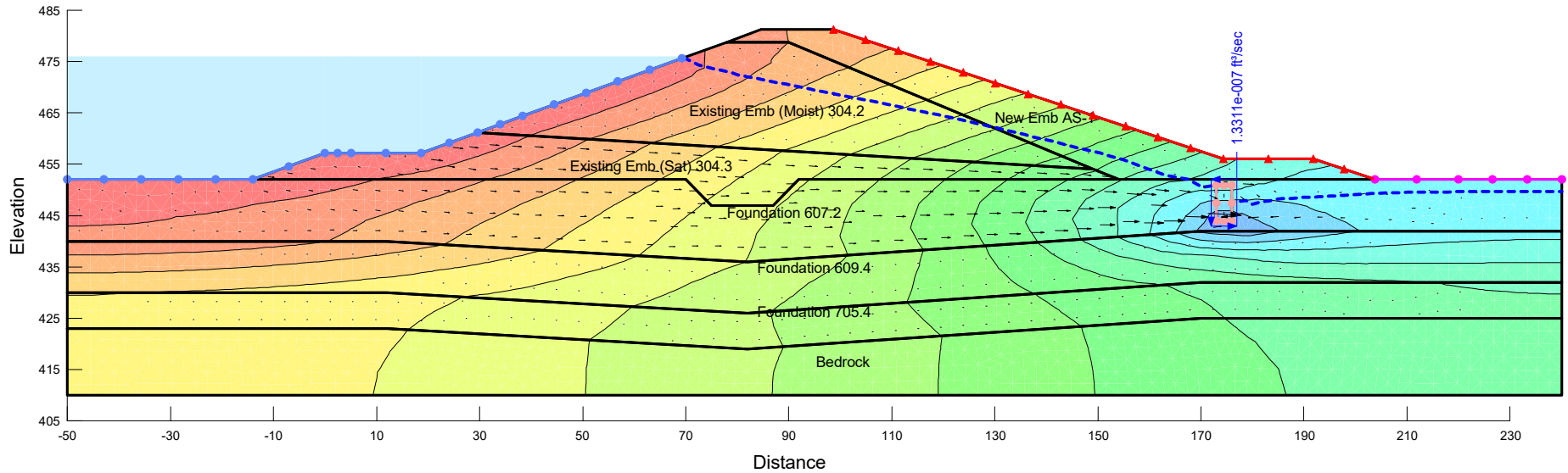
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.1	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: AS-1
 Existing Emb: 304.2, 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 5.1091697e-007 ft³/sec
 ~ 0.33 gallon/day



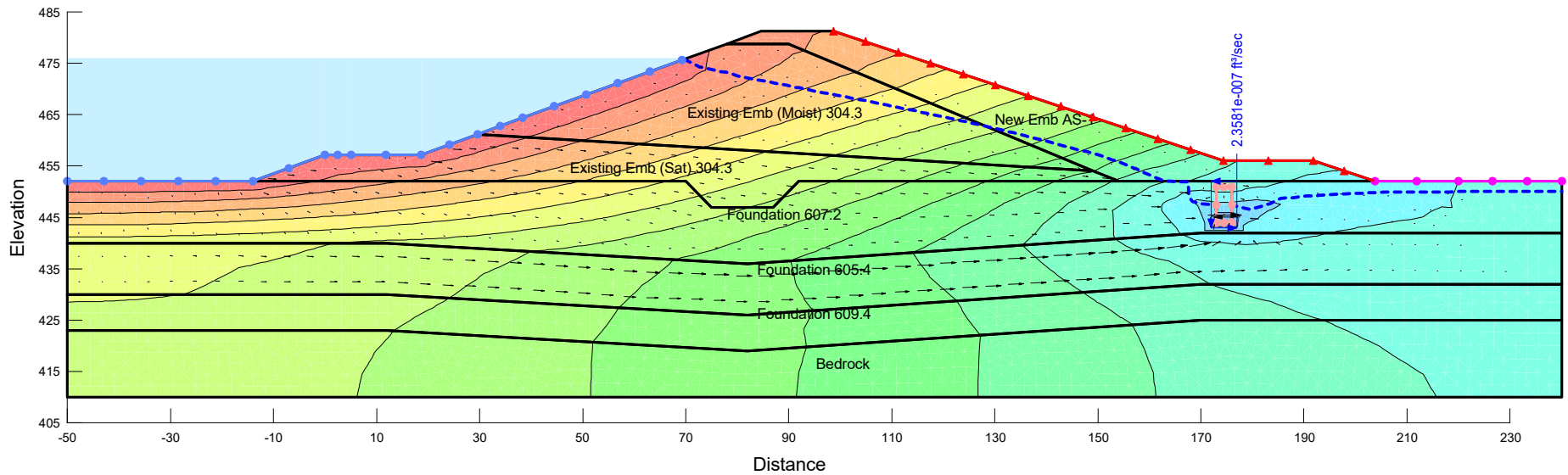
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.1	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: AS-1
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 609.4, 705.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.3310675e-007 ft³/sec
 ~ 0.1 gallon/day



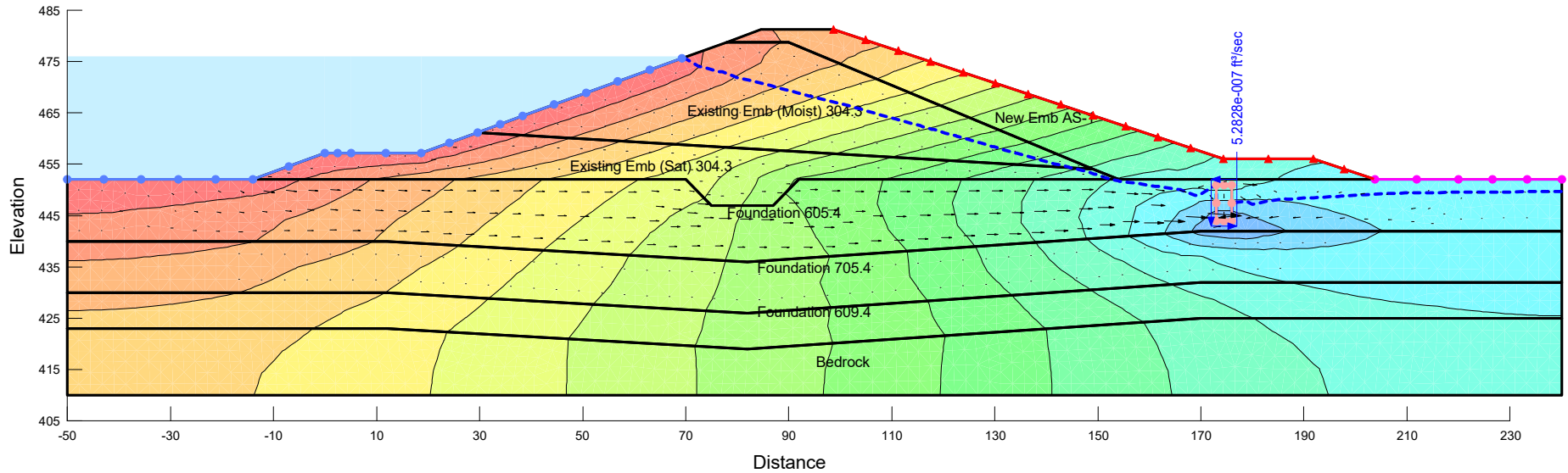
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated	3.2e-008	0.1	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Dark Yellow	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.1	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: AS-1
 Existing Emb: 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 2.3580715e-007 ft³/sec
 ~ 0.15 gallon/day



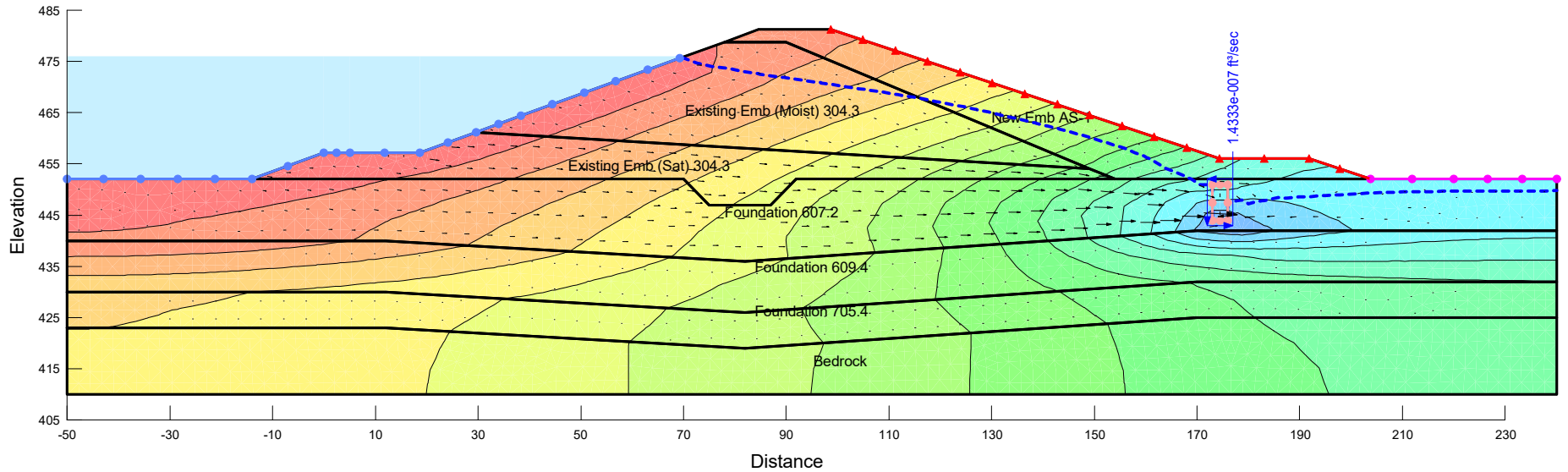
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated	3.2e-008	0.1	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.1	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: AS-1
 Existing Emb: 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 5.2828233e-007 ft³/sec
 ~ 0.34 gallon/day



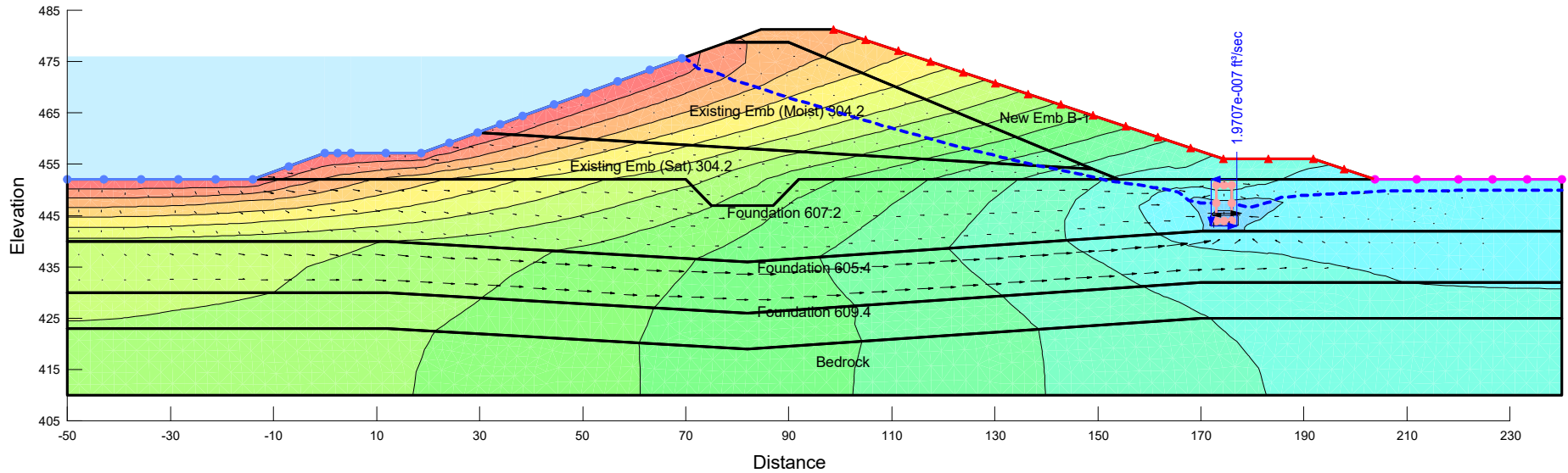
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated	3.2e-008	0.1	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.1	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: AS-1
 Existing Emb: 304.3
 Foundation: 607.2, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.433342e-007 ft³/sec
 ~ 0.1 gallon/day



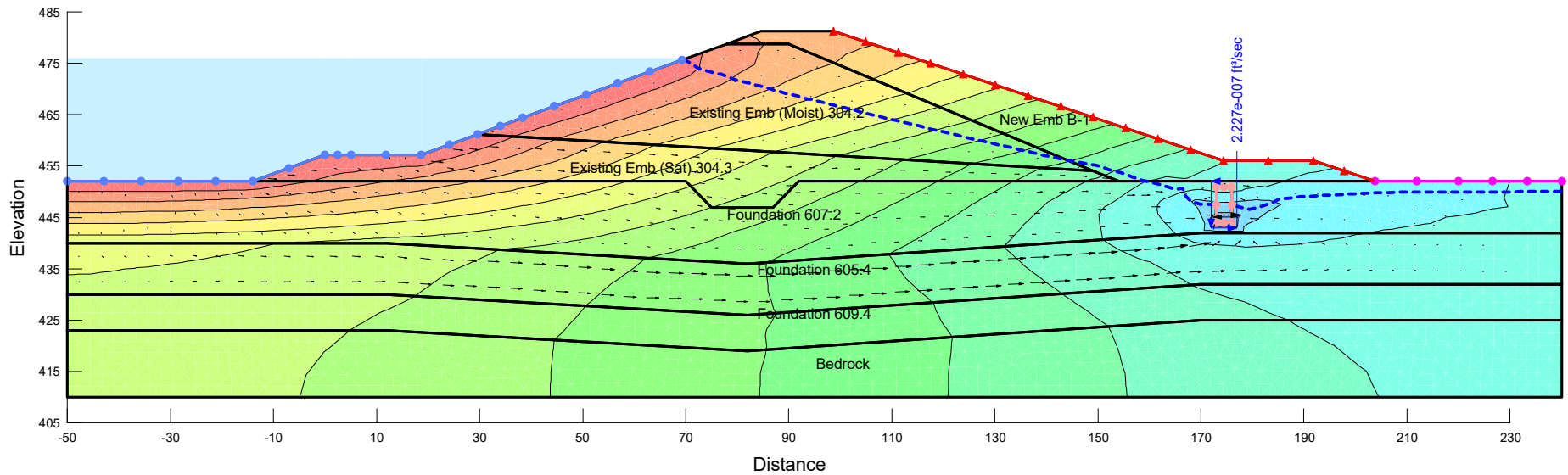
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Dark Green	Existing Emb (Sat) 304.2	Saturated Only	1.2e-008	0.05	0.188		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Light Brown	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Dark Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	New Emb B-1	Saturated / Unsaturated		0.1	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: B-1
 Existing Emb: 304.2
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.9706841e-007 ft³/sec
 ~ 0.13 gallon/day



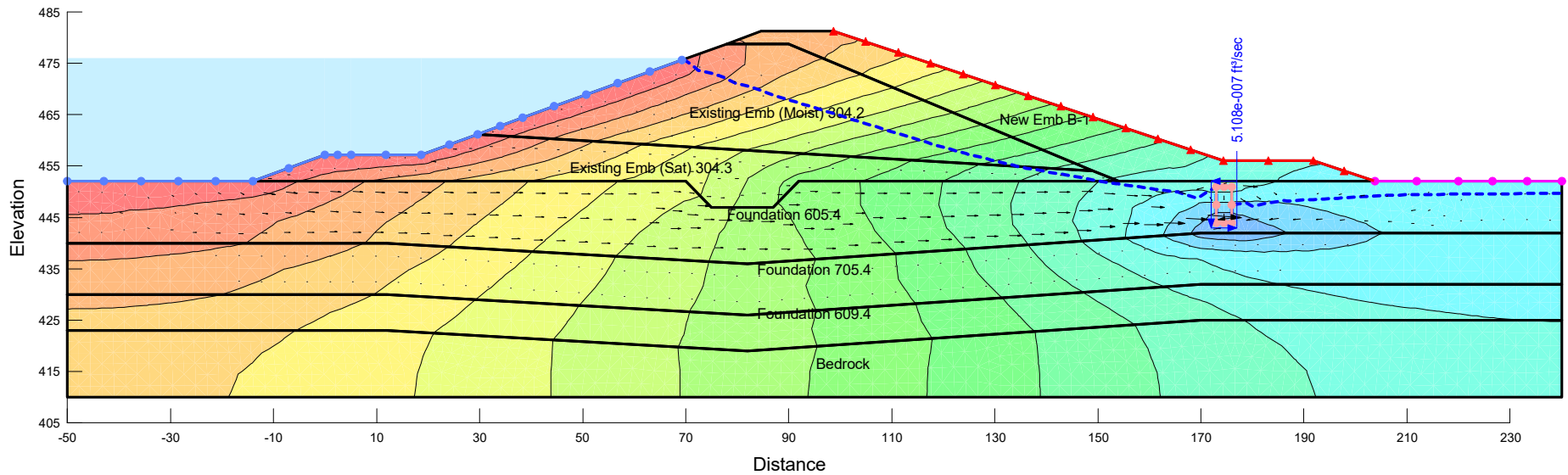
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Light Brown	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Dark Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Green	New Emb B-1	Saturated / Unsaturated		0.1	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: B-1
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 2.2269651e-007 ft³/sec
 ~ 0.15 gallon/day



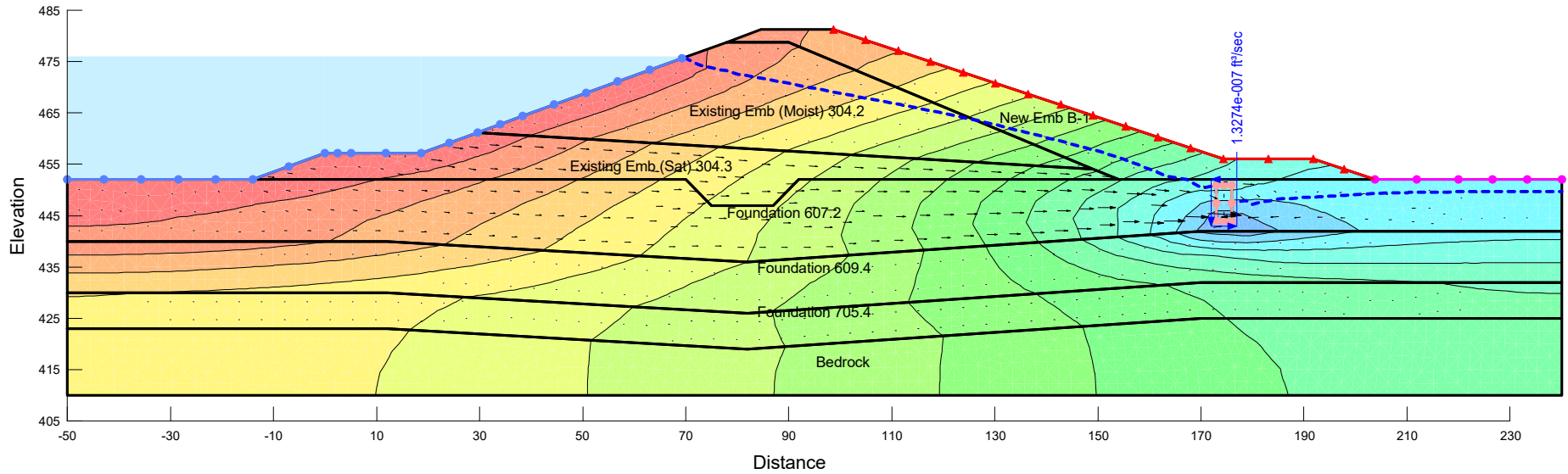
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Green	New Emb B-1	Saturated / Unsaturated		0.1	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: B-1
 Existing Emb: 304.2, 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 5.1079606e-007 ft³/sec
 ~ 0.33 gallon/day



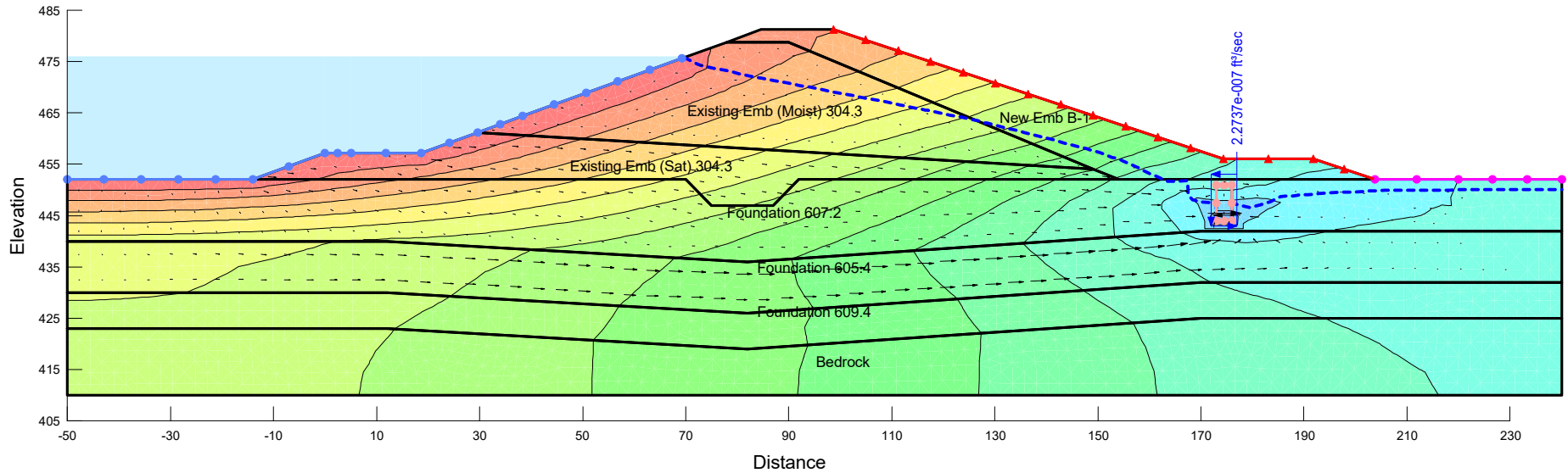
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.1	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Green	New Emb B-1	Saturated / Unsaturated		0.1	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: B-1
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 609.4, 705.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.3274163e-007 ft³/sec
 ~ 0.1 gallon/day



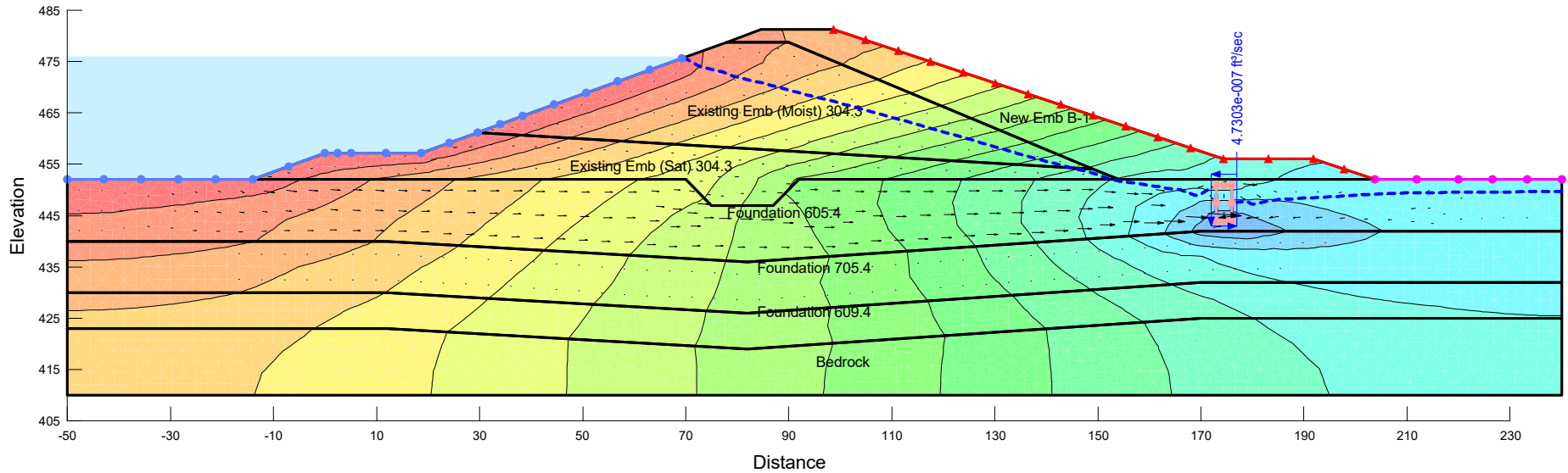
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated	3.2e-008	0.1	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Light Green	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Dark Green	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Green	New Emb B-1	Saturated / Unsaturated		0.1	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: B-1
 Existing Emb: 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 2.2736669e-007 ft³/sec
 ~ 0.15 gallon/day



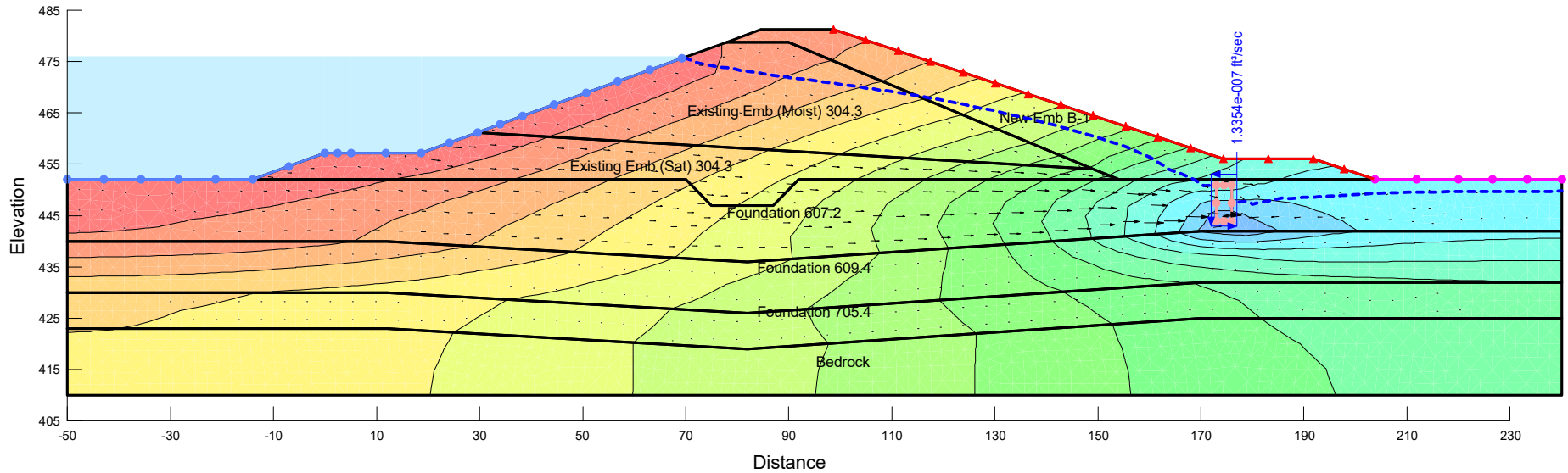
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated	3.2e-008	0.1	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-007	0.05	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Green	New Emb B-1	Saturated / Unsaturated		0.1	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: B-1
 Existing Emb: 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 4.7302634e-007 ft³/sec
 ~ 0.31 gallon/day



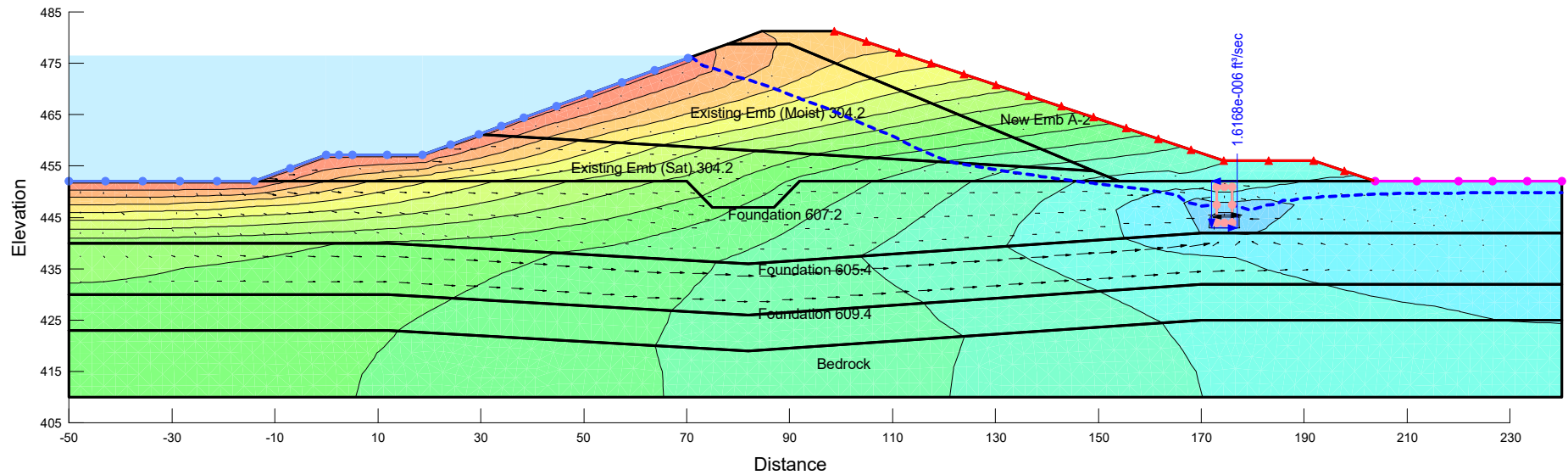
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.15	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated	3.2e-008	0.1	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-008	0.05	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-008	0.05	0.224		
Yellow	Foundation 609.4	Saturated Only	3.4e-009	0.05	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-008	0.05	0.288		
Green	New Emb B-1	Saturated / Unsaturated		0.1	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 New Emb Fill: B-1
 Existing Emb: 304.3
 Foundation: 607.2, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.3353662e-007 ft³/sec
 ~ 0.1 gallon/day



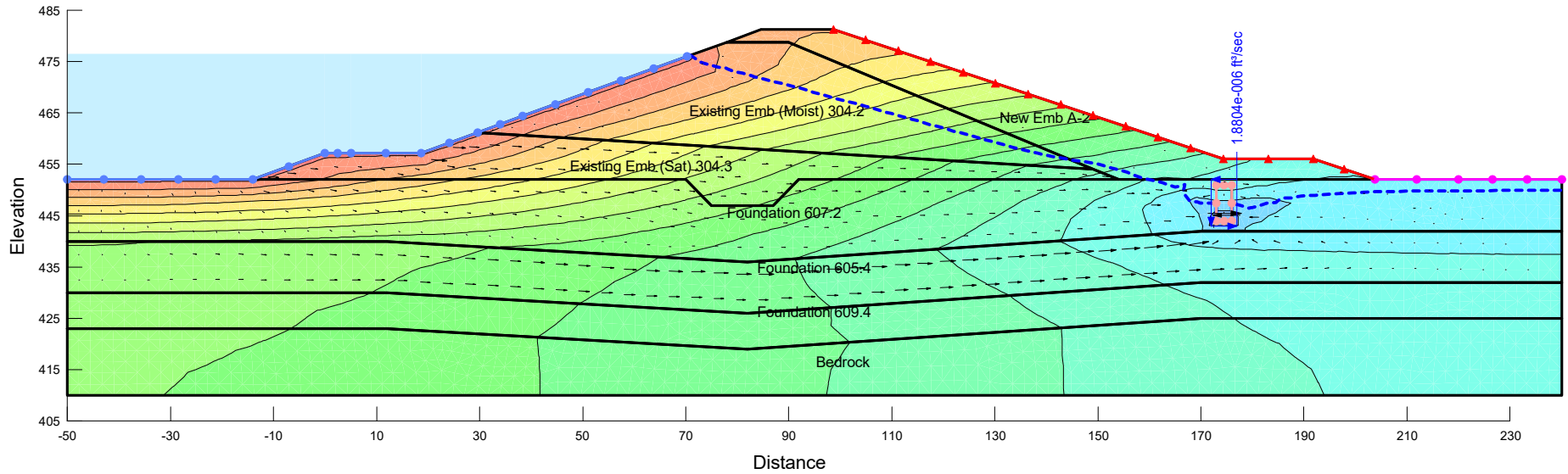
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Dark Green	Existing Emb (Sat) 304.2	Saturated Only	1.2e-007	0.033	0.188		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Orange	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	New Emb A-2	Saturated / Unsaturated		0.05	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: A-2
 Existing Emb: 304.2
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.6168458e-006 ft³/sec
 ~ 1.05 gallon/day



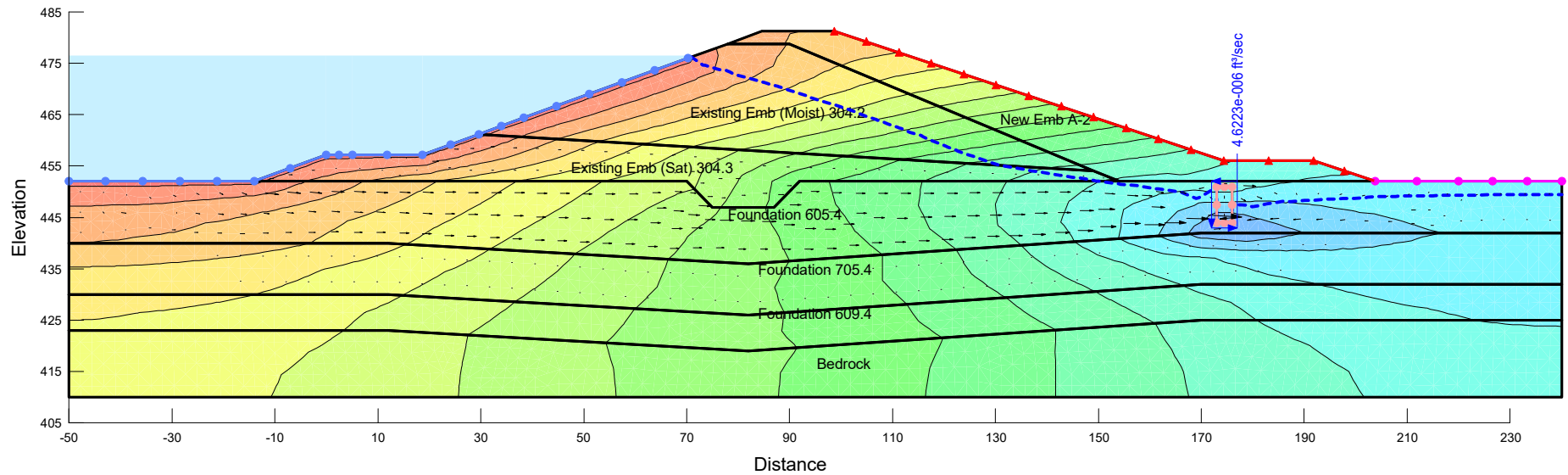
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Light Brown	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Dark Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Green	New Emb A-2	Saturated / Unsaturated		0.05	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: A-2
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.8804081e-006 ft³/sec
 ~ 1.22 gallon/day



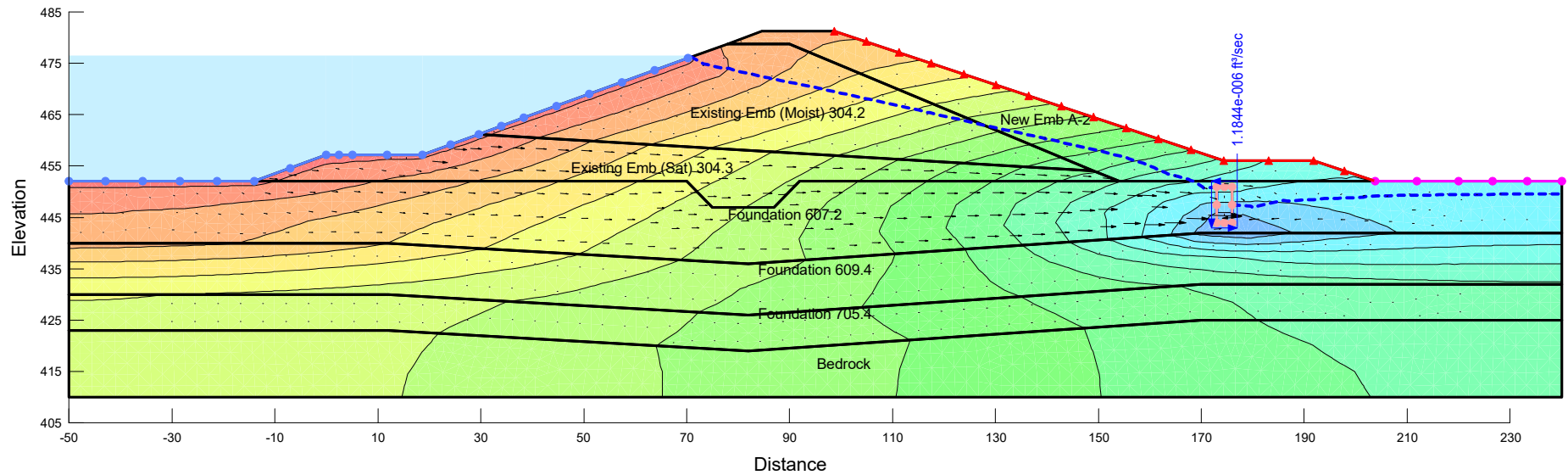
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Green	New Emb A-2	Saturated / Unsaturated		0.05	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: A-2
 Existing Emb: 304.2, 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 4.6222704e-006 ft³/sec
 ~ 3.0 gallon/day



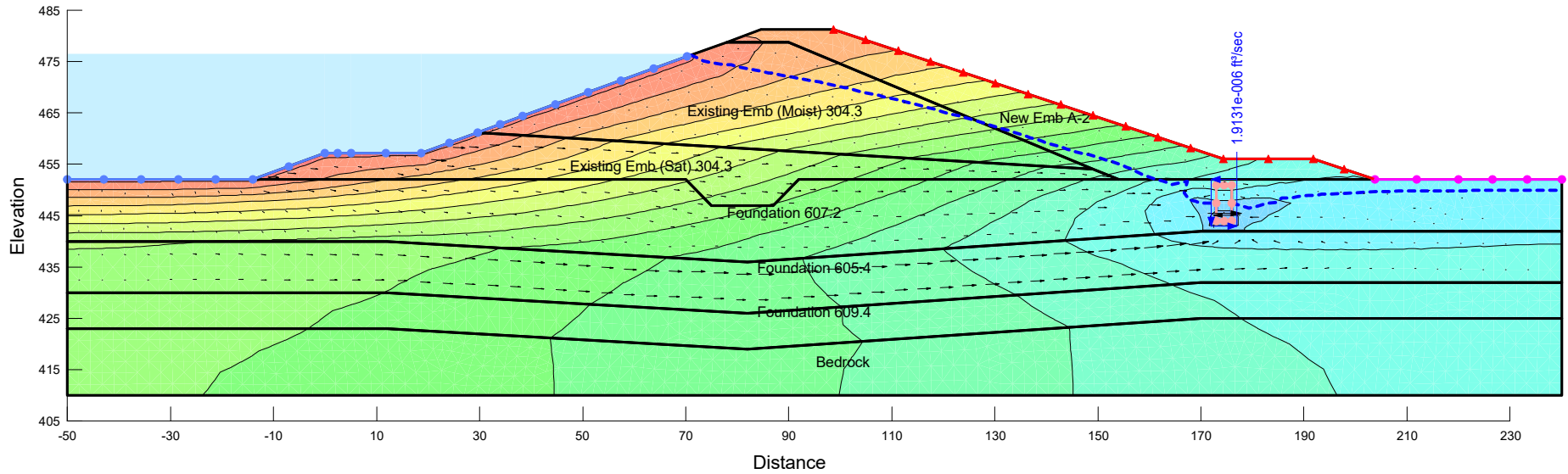
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Green	New Emb A-2	Saturated / Unsaturated		0.05	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: A-2
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 609.4, 705.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.1843861e-006 ft³/sec
 ~ 0.77 gallon/day



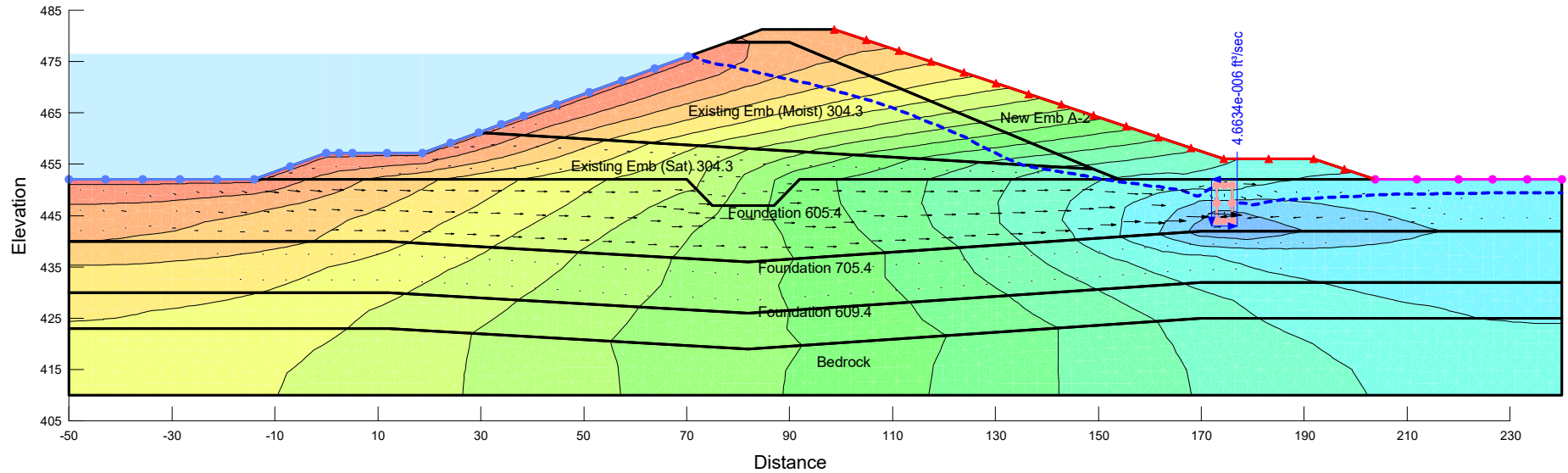
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated		0.05	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Light Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Green	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Dark Green	New Emb A-2	Saturated / Unsaturated		0.05	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: A-2
 Existing Emb: 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.913113e-006 ft³/sec
 ~ 1.24 gallon/day



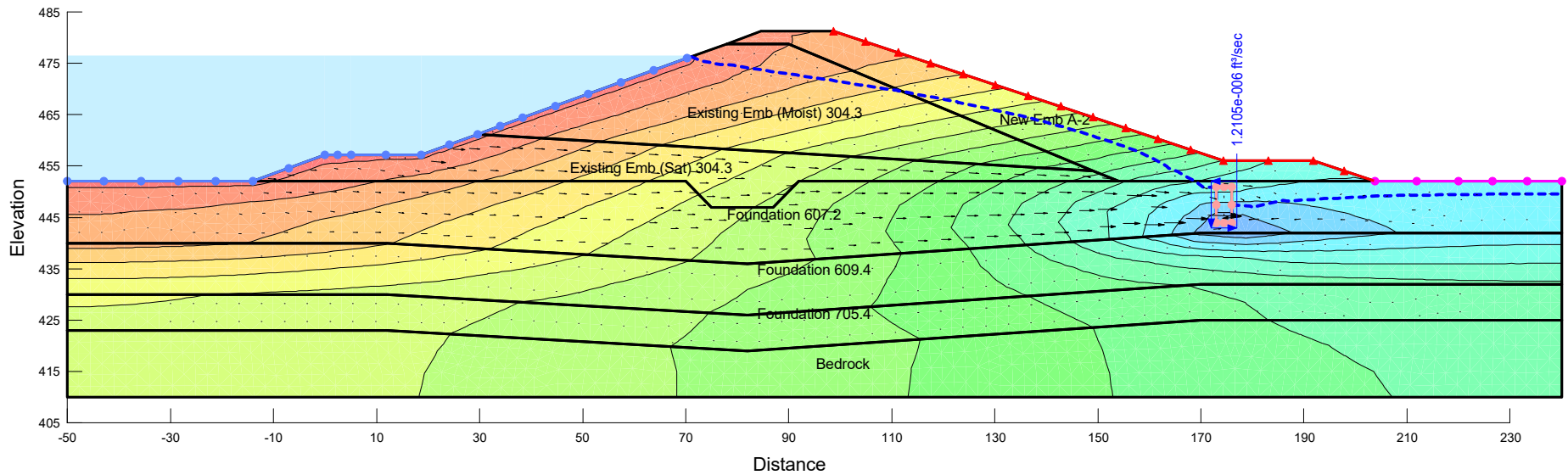
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated		0.05	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Green	New Emb A-2	Saturated / Unsaturated		0.05	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: A-2
 Existing Emb: 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 4.6634489e-006 ft³/sec
 ~ 3.0 gallon/day



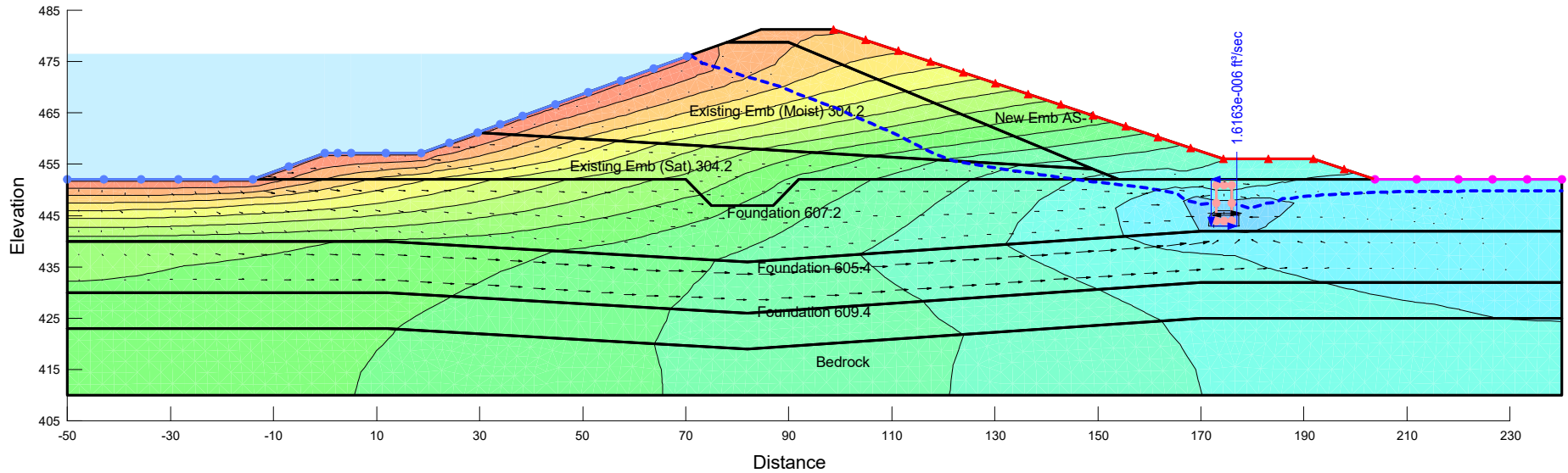
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated		0.05	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Green	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Light Green	New Emb A-2	Saturated / Unsaturated		0.05	0	A-2 HCF	A-2 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: A-2
 Existing Emb: 304.3
 Foundation: 607.2, 609.4, 705.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.2104943e-006 ft³/sec
 ~ 0.78 gallon/day



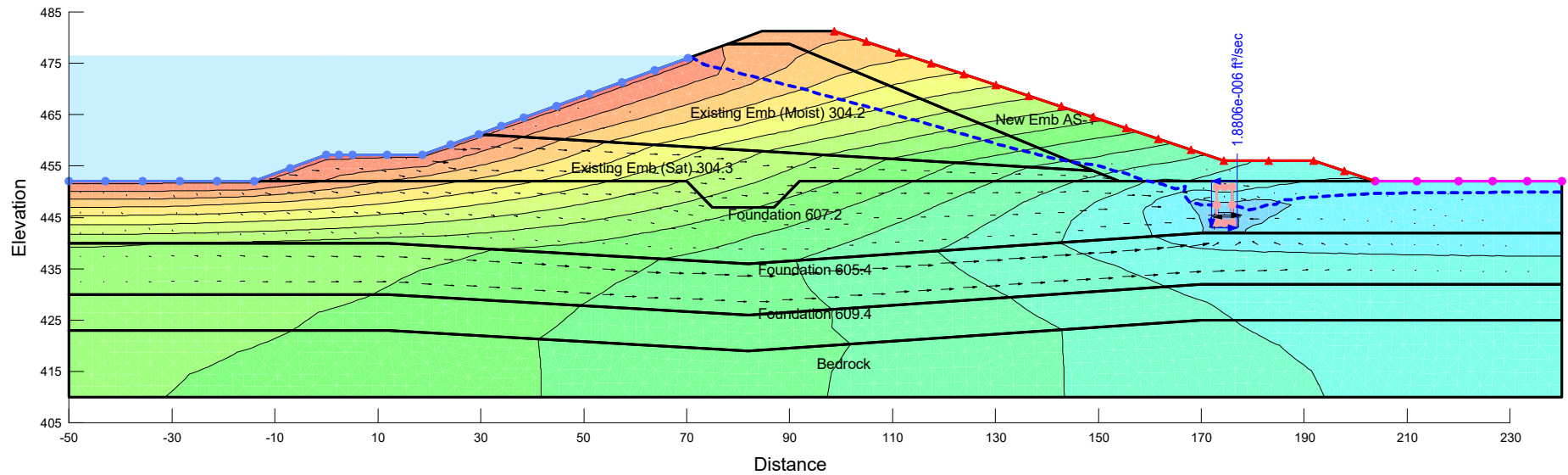
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Yellow-Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Dark Green	Existing Emb (Sat) 304.2	Saturated Only	1.2e-007	0.033	0.188		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Orange	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.05	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: AS-1
 Existing Emb: 304.2
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.6162794e-006 ft³/sec
 ~ 1.05 gallon/day



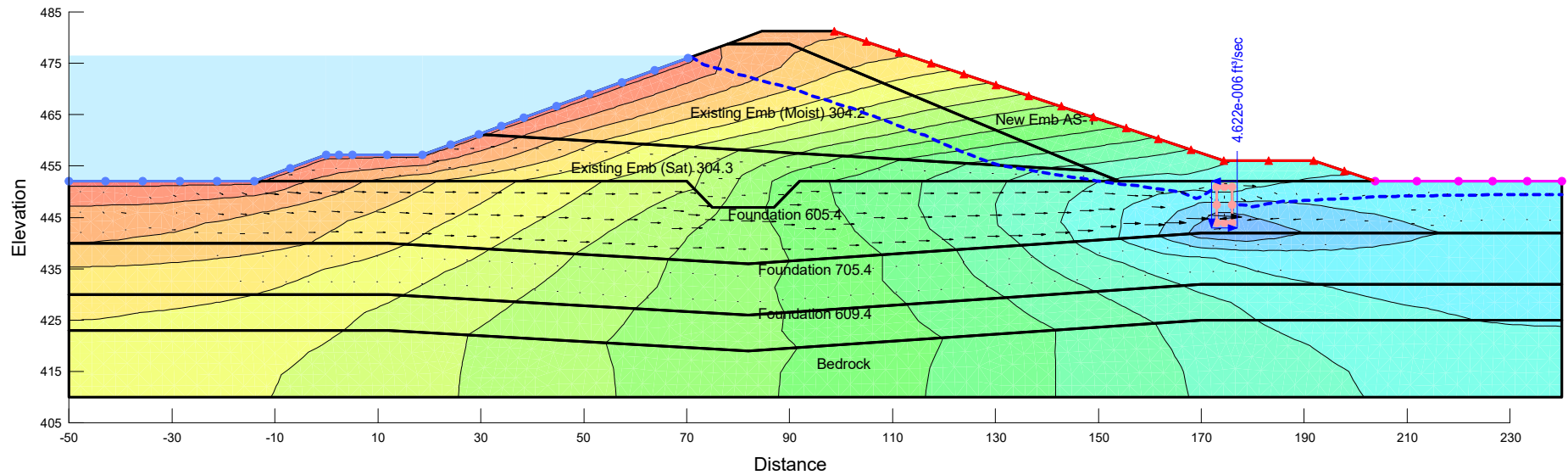
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Dark Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Light Blue	New Emb AS-1	Saturated / Unsaturated		0.05	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: AS-1
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.8806181e-006 ft³/sec
 ~ 1.22 gallon/day



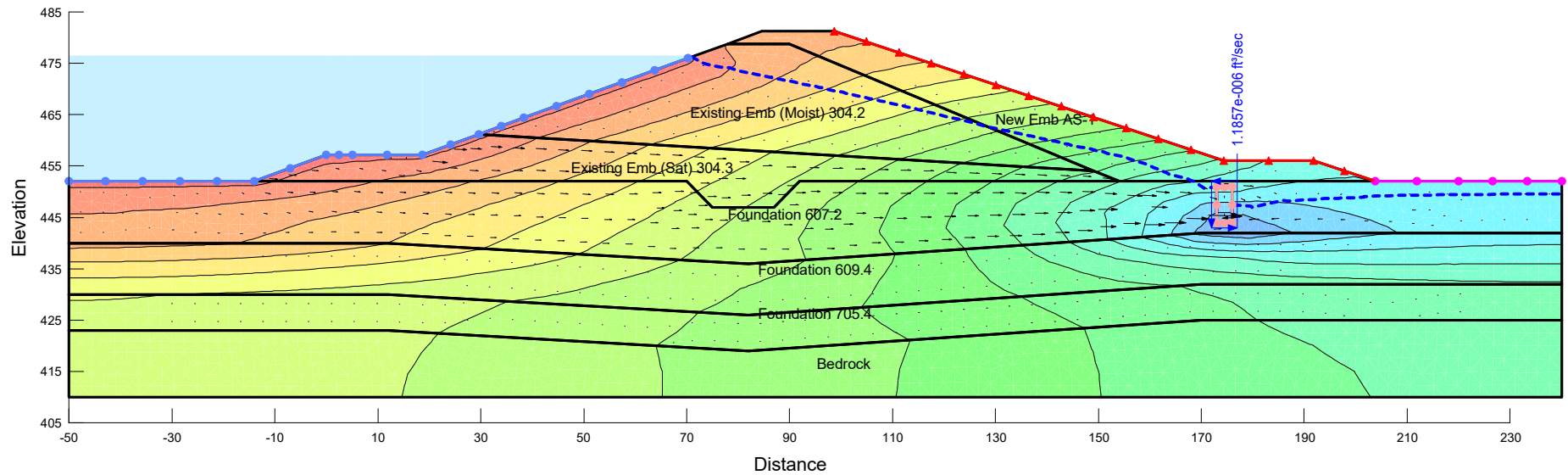
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.05	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: AS-1
 Existing Emb: 304.2, 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 4.6220192e-006 ft³/sec
 ~ 3.0 gallon/day



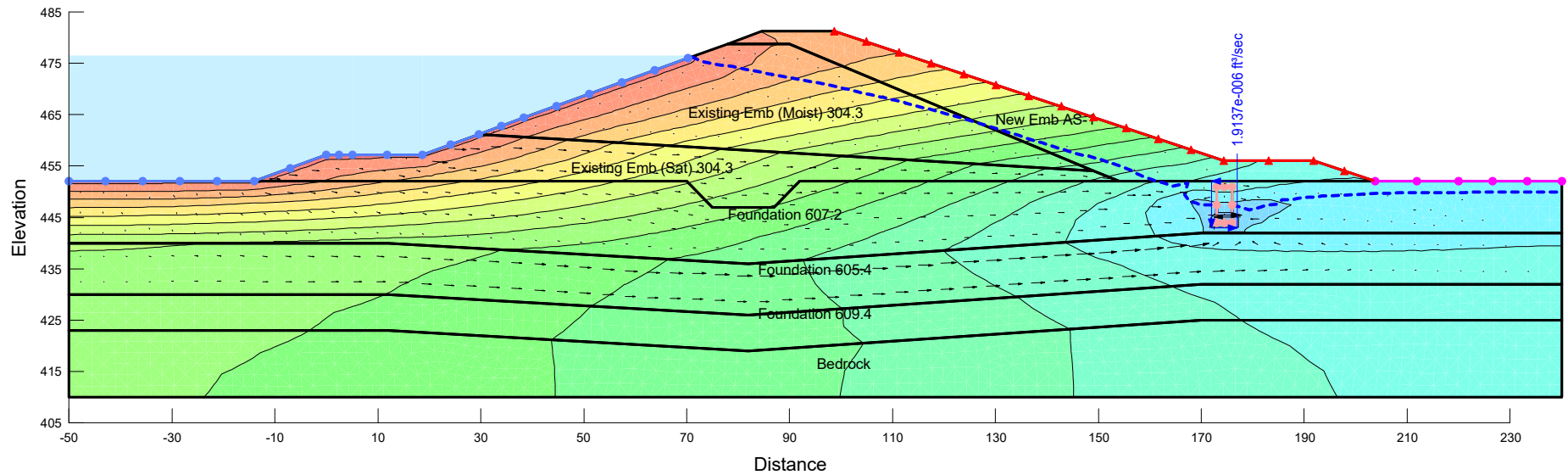
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Yellow-Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Light Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Light Yellow	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.05	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: AS-1
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 609.4, 705.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.1856899e-006 ft³/sec
 ~ 0.77 gallon/day



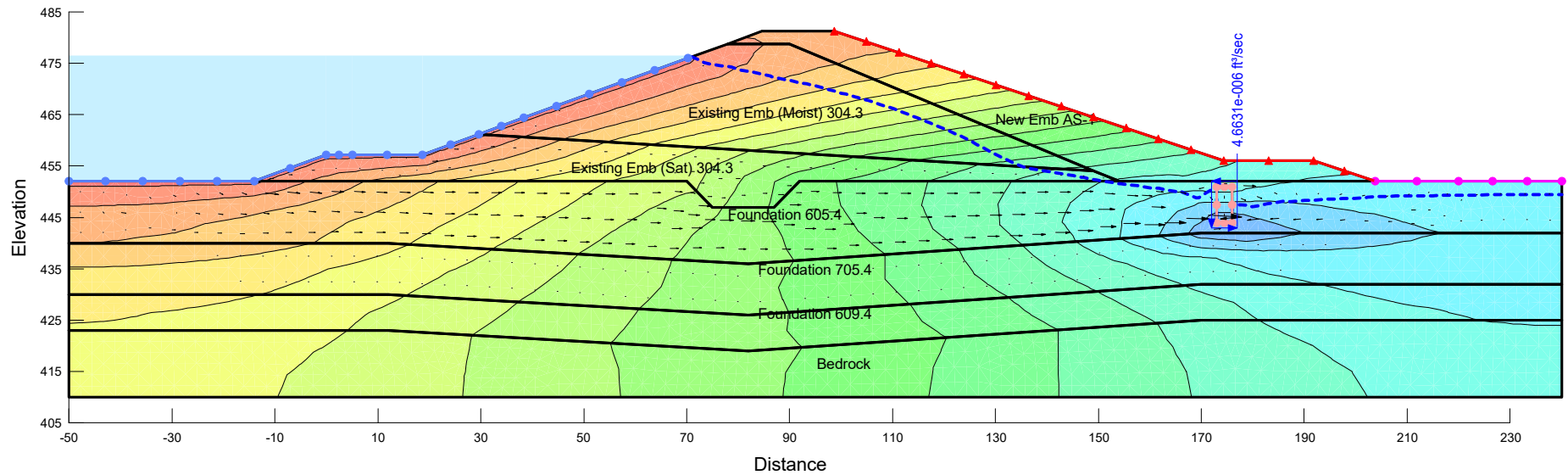
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated		0.05	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Light Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Dark Green	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Light Blue	New Emb AS-1	Saturated / Unsaturated		0.05	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: AS-1
 Existing Emb: 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.9136789e-006 ft³/sec
 ~ 1.24 gallon/day



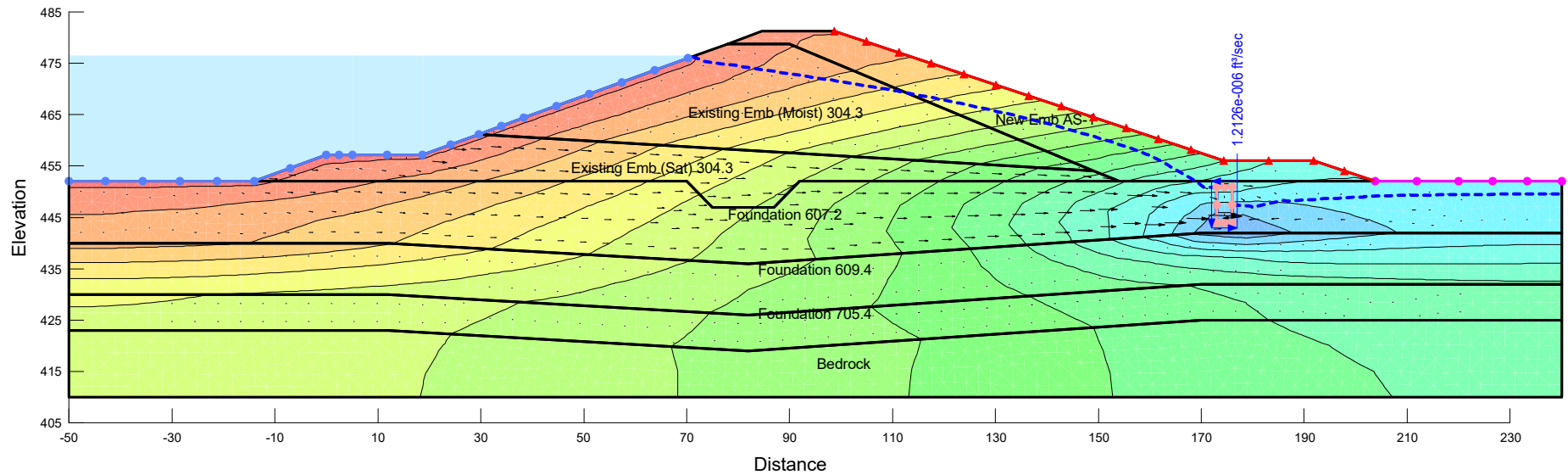
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated		0.05	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.05	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: AS-1
 Existing Emb: 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 4.663102e-006 ft³/sec
 ~ 3.0 gallon/day



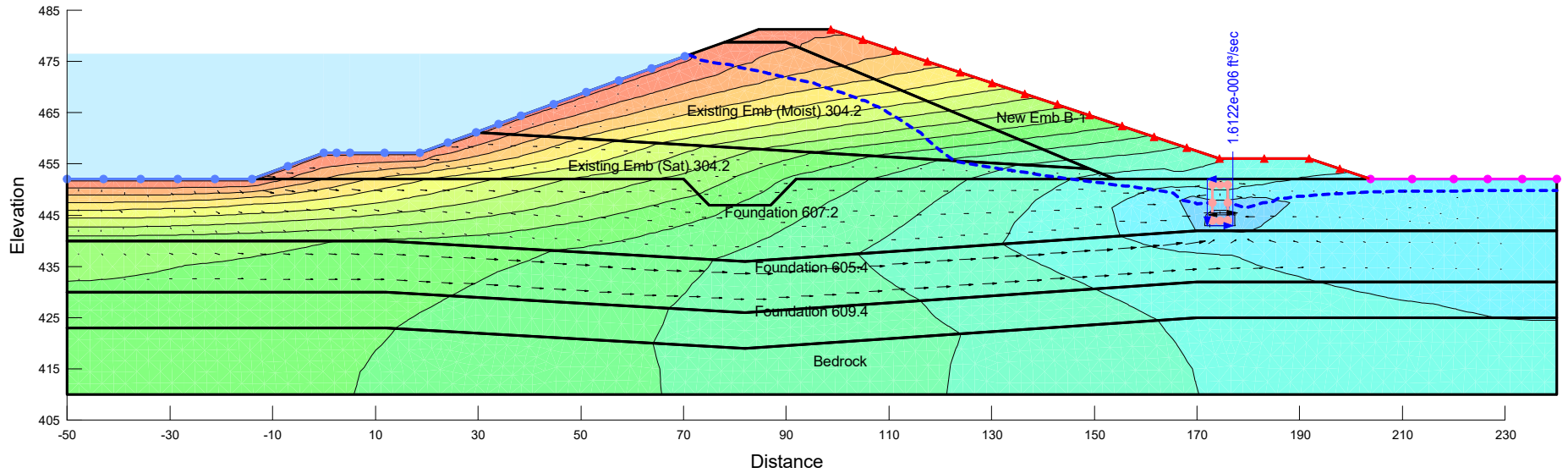
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated		0.05	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Yellow	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Light Green	New Emb AS-1	Saturated / Unsaturated		0.05	0	AS-1 HCF	AS-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: AS-1
 Existing Emb: 304.3
 Foundation: 607.2, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.2125578e-006 ft³/sec
 ~ 0.78 gallon/day



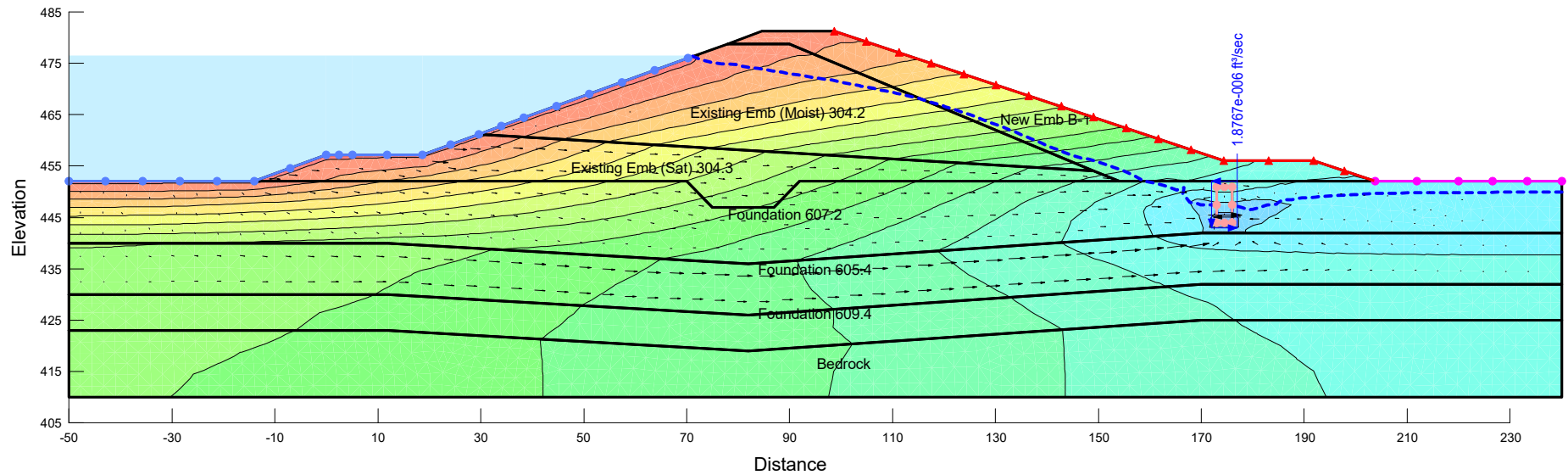
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Dark Green	Existing Emb (Sat) 304.2	Saturated Only	1.2e-007	0.033	0.188		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Light Brown	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Dark Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	New Emb B-1	Saturated / Unsaturated		0.05	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: B-1
 Existing Emb: 304.2
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.6122201e-006 ft³/sec
 ~ 1.04 gallon/day



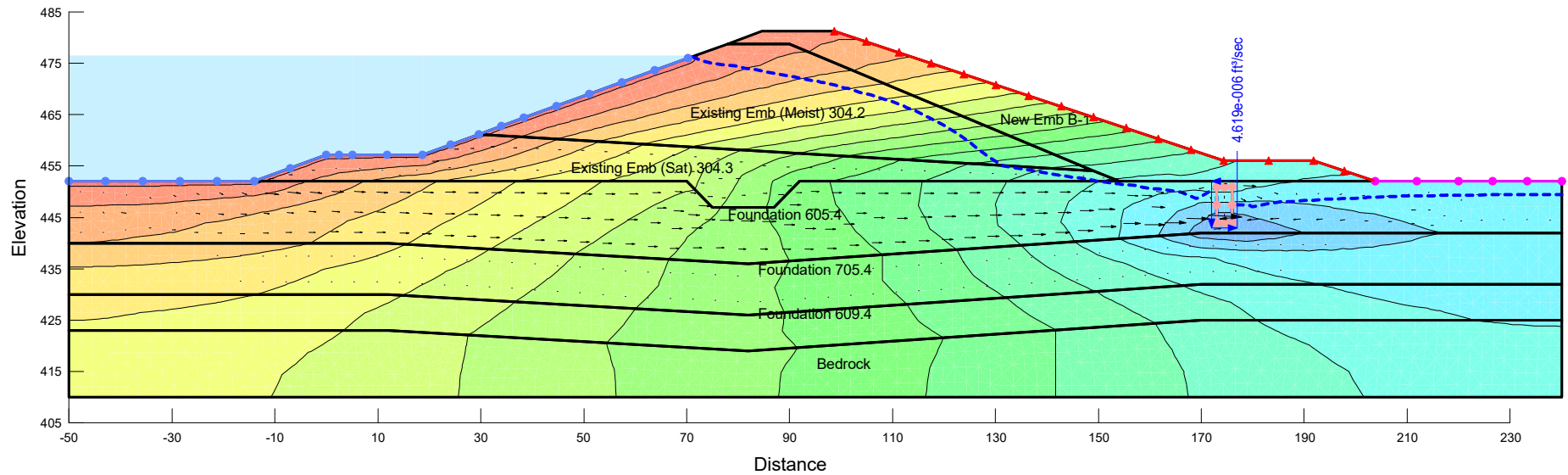
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Light Brown	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Dark Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Green	New Emb B-1	Saturated / Unsaturated		0.05	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: B-1
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.87673e-006 ft³/sec
 ~ 1.22 gallon/day



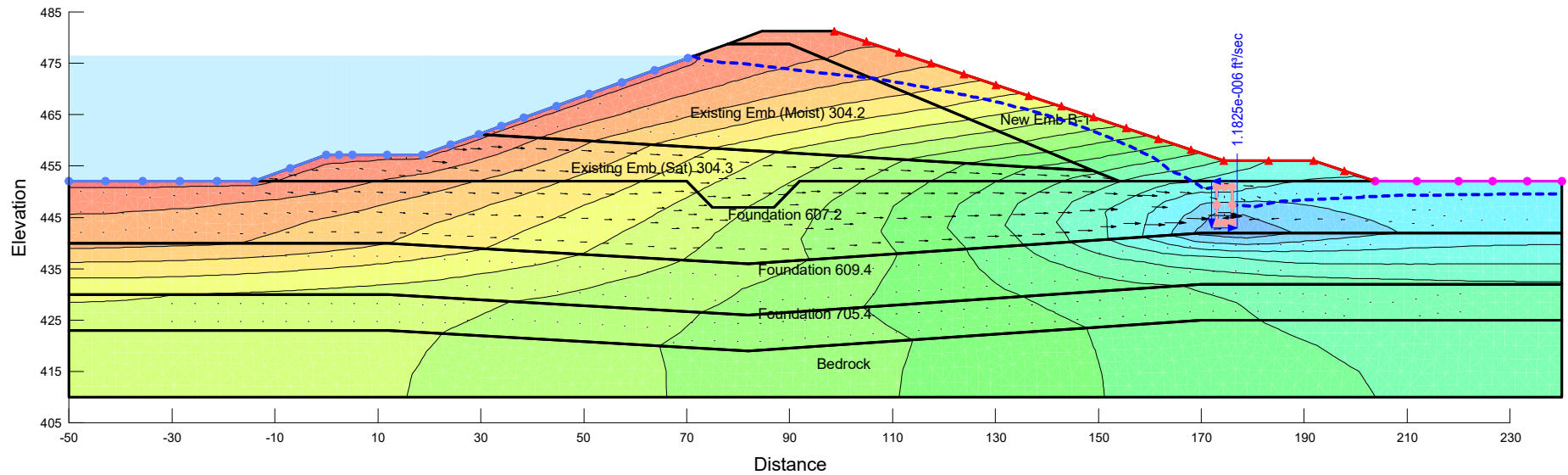
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Green	New Emb B-1	Saturated / Unsaturated		0.05	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: B-1
 Existing Emb: 304.2, 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 4.6189657e-006 ft³/sec
 ~ 3.0 gallon/day



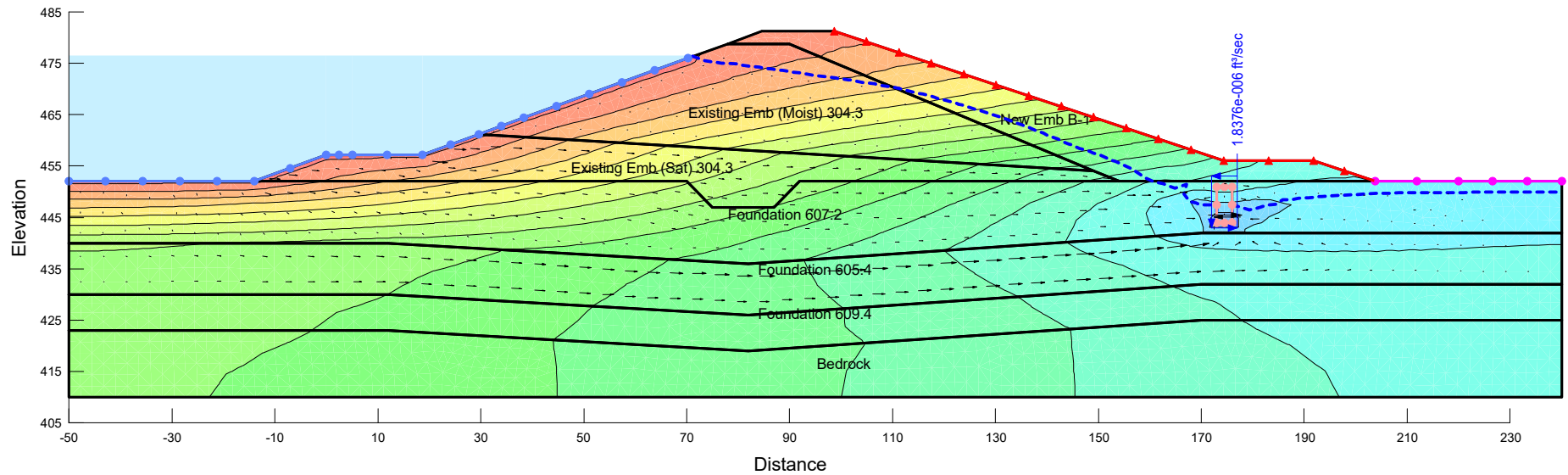
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Green	Existing Emb (Moist) 304.2	Saturated / Unsaturated		0.05	0	304.2 HCF	304.2 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Green	New Emb B-1	Saturated / Unsaturated		0.05	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: B-1
 Existing Emb: 304.2, 304.3
 Foundation: 607.2, 609.4, 705.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.1824679e-006 ft³/sec
 ~ 0.77 gallon/day



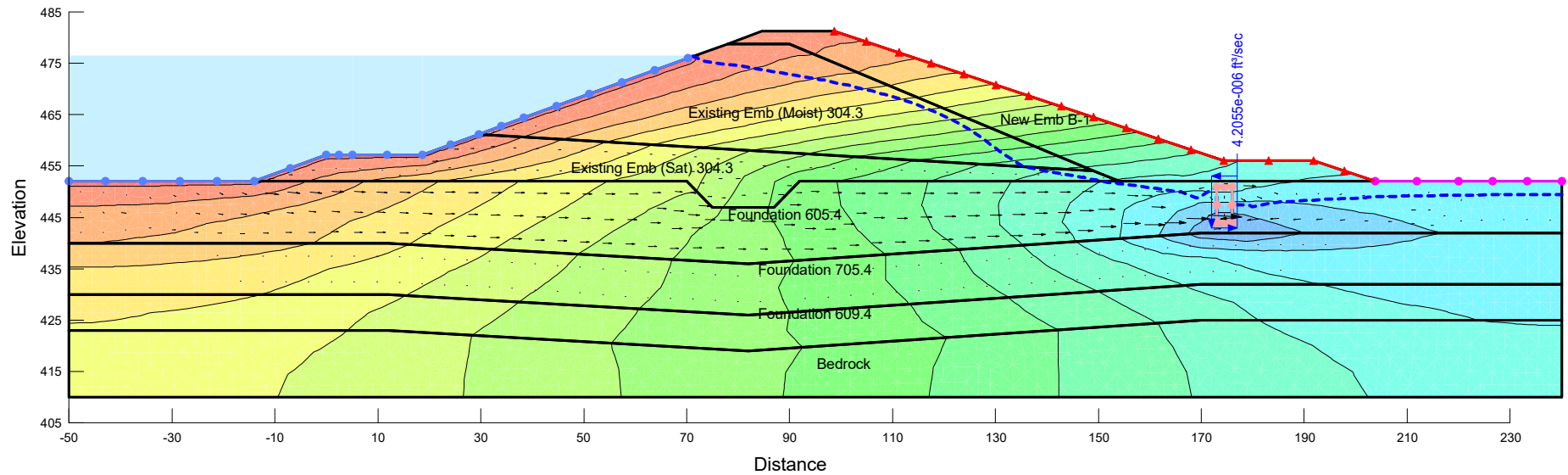
Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated		0.05	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Light Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Green	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Dark Green	New Emb B-1	Saturated / Unsaturated		0.05	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: B-1
 Existing Emb: 304.3
 Foundation: 607.2, 605.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.8376378e-006 ft³/sec
 ~ 1.2 gallon/day



Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated		0.05	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow	Foundation 605.4	Saturated Only	1.7e-006	0.033	0.184		
Brown	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Green	New Emb B-1	Saturated / Unsaturated		0.05	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: B-1
 Existing Emb: 304.3
 Foundation: 605.4, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 4.2054937e-006 ft³/sec
 ~ 2.72 gallon/day



Color	Name	Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio	Volumetric Water Content (ft ³ /ft ³)	K-Function	Vol. WC. Function
Grey	Bedrock	Saturated Only	1e-009	0.1	0.15		
Light Orange	Existing Emb (Moist) 304.3	Saturated / Unsaturated		0.05	0	304.3 HCF	304.3 VWC
Orange	Existing Emb (Sat) 304.3	Saturated Only	3.2e-007	0.033	0.196		
Yellow-Green	Foundation 607.2	Saturated Only	3.2e-007	0.033	0.224		
Green	Foundation 609.4	Saturated Only	3.4e-008	0.033	0.167		
Red	Foundation 705.4	Saturated Only	1.4e-007	0.033	0.288		
Light Green	New Emb B-1	Saturated / Unsaturated		0.05	0	B-1 HCF	B-1 VWC

Lower Plum Creek Site 28, TX
 Seepage at BH 610
 ~ cL Sta. 15+50
 Water at Aux. Spillway Elevation
 New Foundation Drain System
 10x Foundation K-rate
 New Emb Fill: B-1
 Existing Emb: 304.3
 Foundation: 607.2, 705.4, 609.4
 SEEP/W 8.16.2.14053
 Method: Steady-State
 Water Flux: 1.1232397e-006 ft³/sec
 ~ 0.73 gallon/day

