



Work Plans Undercliff- 3.1

January 11, 2017

Prepared For
OPRHP, Hudson Highlands State Park

Prepared By
New York-New Jersey Trail Conference



Annual Project Work Plan - Trails Form

Submit to Park Manager for review and approval prior to commencing work: for ALL trail work beyond standard maintenance practices (blazing, clearing brush from treadway/tree pruning, maintenance of erosion control structures) on existing designated trails.

State Park Name: Hudson Highlands Year: 2017

Organization: The New York-New Jersey Trail Conference

Contact Name: Erik Mickelson

Contact Address: 600 Ramapo Valley Rd.

Contact Phone #: 760-893-9331

Contact Email Address: emickelson@nynjtc.org

Trail Name: Undercliff (~1624 ft from green trailhead to beginning of this plan)
Description of location of trail section to be worked on (if applicable): see map

GPS coordinates if available. Format: Decimal Degrees; Datum (circle one): NAD27, 83 or WGS84 (preferred)
(Lat/Long): 41.44477 N, 73.97008 W, to slide 35 41.44517 N, 73.97060 W

Type of work (check all that apply):

- Re-alignment/relocation of trail section
- New trail development (includes designating new trails)
- Tread upgrades including installation of water management structures
- Bridge construction/replacement
- Trail Closure/Restoration
- Other: _____

Scope of work included in Trails Plan: Yes No (If no, requires additional review of proposal)

Description of work: (be specific including rock moving, tree cutting, trail work within 100 ft. of a water body/wetland, bridge work (*may require DEC permit*), construction of switchbacks or retaining walls, culvert and turnpike installation, etc.): Repairs and slight realignments, including sidehilling, and step installation

Work Scheduled: 4/17 until completed

Attached map depicting area of work (required). Digital photo (before) Digital photo (after).

Submitted by (print): Erik Mickelson Signature: Erik Mickelson

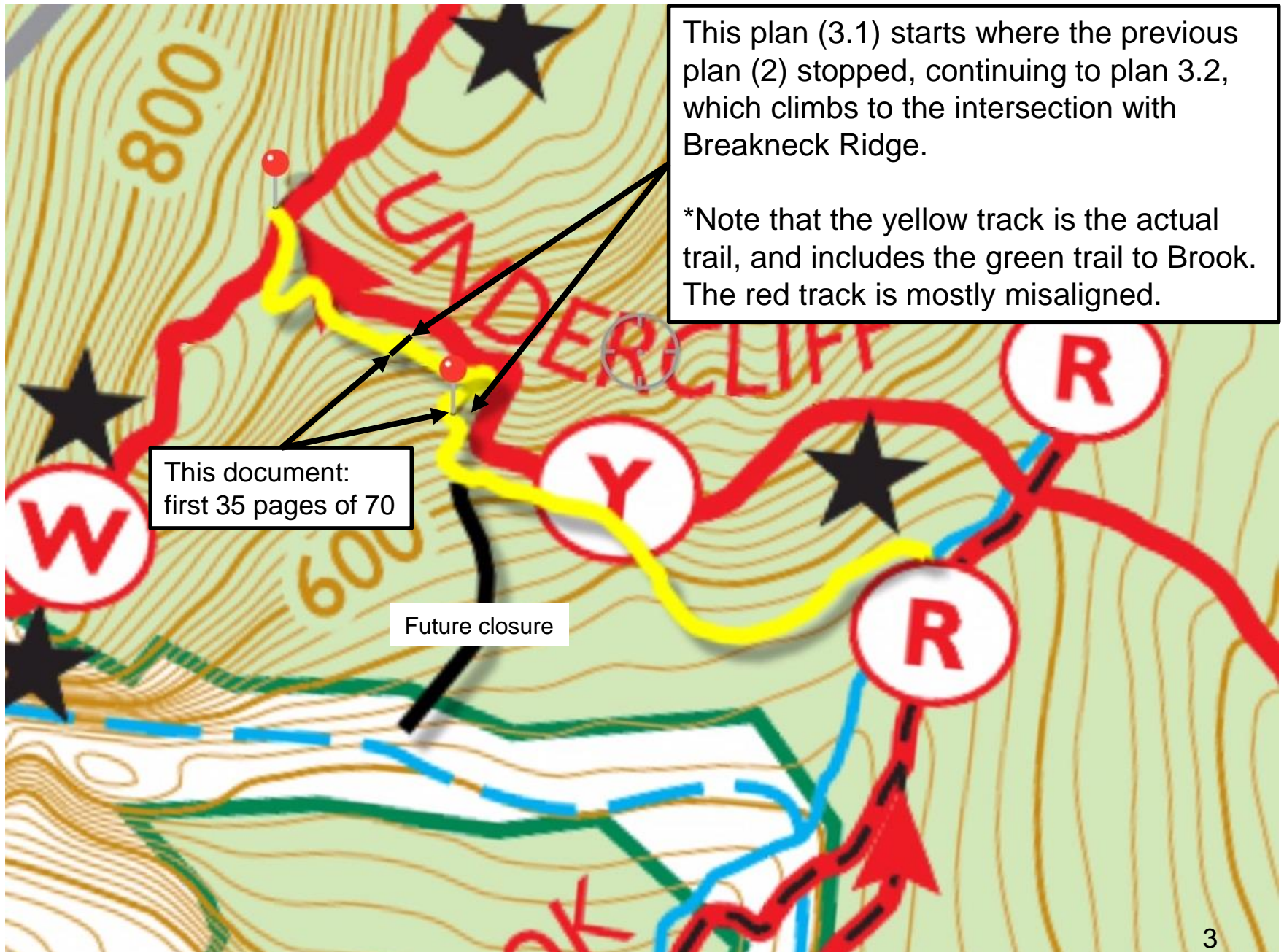
Date: 1/15/17

Approved by Park Manager (print): _____ Signature: _____

Date: _____

-Forward copy to Regional Natural Resource Steward and Capital Facilities Manager.

-Also forward copy to Trails Planning Unit if scope is not part of a Trails Plan.





Work Log Item Summary

The following table contains an approximate list of the major trail construction items which will be required for this section of trail. There are other minor items which are not listed here but described in the trail construction work log below.

Item	Unit	Quantity
Trail Length	In. ft.	~450
Sidehill	In. ft.	~185
Stone Steps	each	141-157
Stone Cribbing	sq. ft.	17-34
Stepping Stones	each	
Stone Paving	sq. ft.	
Turnpike/Causeway	In. ft.	
Drainage Structures	each	9
Bridges	each	
Crush Fill	cu. ft.	
Surfacing	cu. ft.	

* Work Log Item Summary is for construction estimate purposes only. Actual project accomplishments may vary.

General Trail Construction Notes

1.NYNJTC Trail Development Level: 3 (<http://tinyurl.com/h8tv4dy>)

- Trail Use Type: **Foot Travel Only**
- Trail Tread Width Range: **18" - 36"**, tread should be natural surfacing where possible. **Where necessary, tread definition, filling, and removal of loose rock will be performed to keep hikers on trail and remove safety hazards.**
- Running Grade Range: **0-15%, Grades above 15% will have steps installed.**
- Corridor: **4'x8'**, all cuts should be flush to tree or ground. **Stumps within treadway should be removed.**
- **Deviations from Trail Development Level Standards:**

- 2.The trail layout/existing trail improvement follows the general principles of sustainable trail design with the added objective of creating an interesting, scenic, and low maintenance route.
- 3.All local stone harvesting/splitting/shaping must be done away from the trail as to not significantly alter the appearance of the surrounding area from the trail.
- 4.Safeguards should be made to protect trailside vegetation including the use of "tree bumpers."
- 5.All trailside impacted areas must be renovated with leaves, logs, and other on-site organic debris.
- 6.Visible drill holes on stone should be minimized to the extent possible with cut/split faces mixed in with natural faces.
- 7.Organic materials/duff must be removed from the ground surface before trail construction commences. These materials must be stockpiled for finishing work and trail closure purposes.
- 8.Backfill materials may be stone up to 3". To ensure proper drainage, mineral soil should not be used.
9. **Site Specific Notes: This trail is a high traffic area with steep slopes that might require trail closures to ensure safer conditions while moving rocks for stair construction. Some area are close to unstable cliffs that could fall onto trail work sites.**

Safety Notes

- 1.Each day will begin with a safety tailgate meeting outlining environmental, flora, fauna, work, communication, site, and tool related hazards and mitigation practices.
- 2.Proper personal protective equipment must be worn by all trail workers while on the worksite including long pants, closed-toe shoes, work gloves, eye protection, and hard hats. Ear protection must be worn around power equipment. Dust masks/respirators must be worn when drilling rock.

slide #	rise inches	run in	run ft	step # low	step # high	s-hill in	s-hill ft	other
1	32	150		4	4	86		drain
2	43	100		5	6			
3	75	150		6	7			and ramp
4	57	200		3	3			drain
5	83	200		8	10			
6	69	200		8	8			drain
7			39					
8	74	250		9	9		42	drain
9	46	150		5	6	54		drain
10	38	150		5	5	70		drain
11	40	150		5	5			
12	42	100		5	5			
13	32	100		2	3			
14	63	150		6	8			
15	100	147		10	12			
16								
17	13	58		2	2			
18								
19	14	57		2	2			
20								
21	78	130		10	10			
22	3	100				100		crib?, drain
23	10	87				87		
24			13				13	
25			5				5	
26		150				150		
27	32	86		4	4			
28	57	200		7	7	88		drain
29	112	250		14	14			
30			46				46	drain
31								
32	114	350		9	11		25	
33	104	200		10	13			potential reroute
34	20	50		2	3			
35			18					
total			447.25	141	157		184	



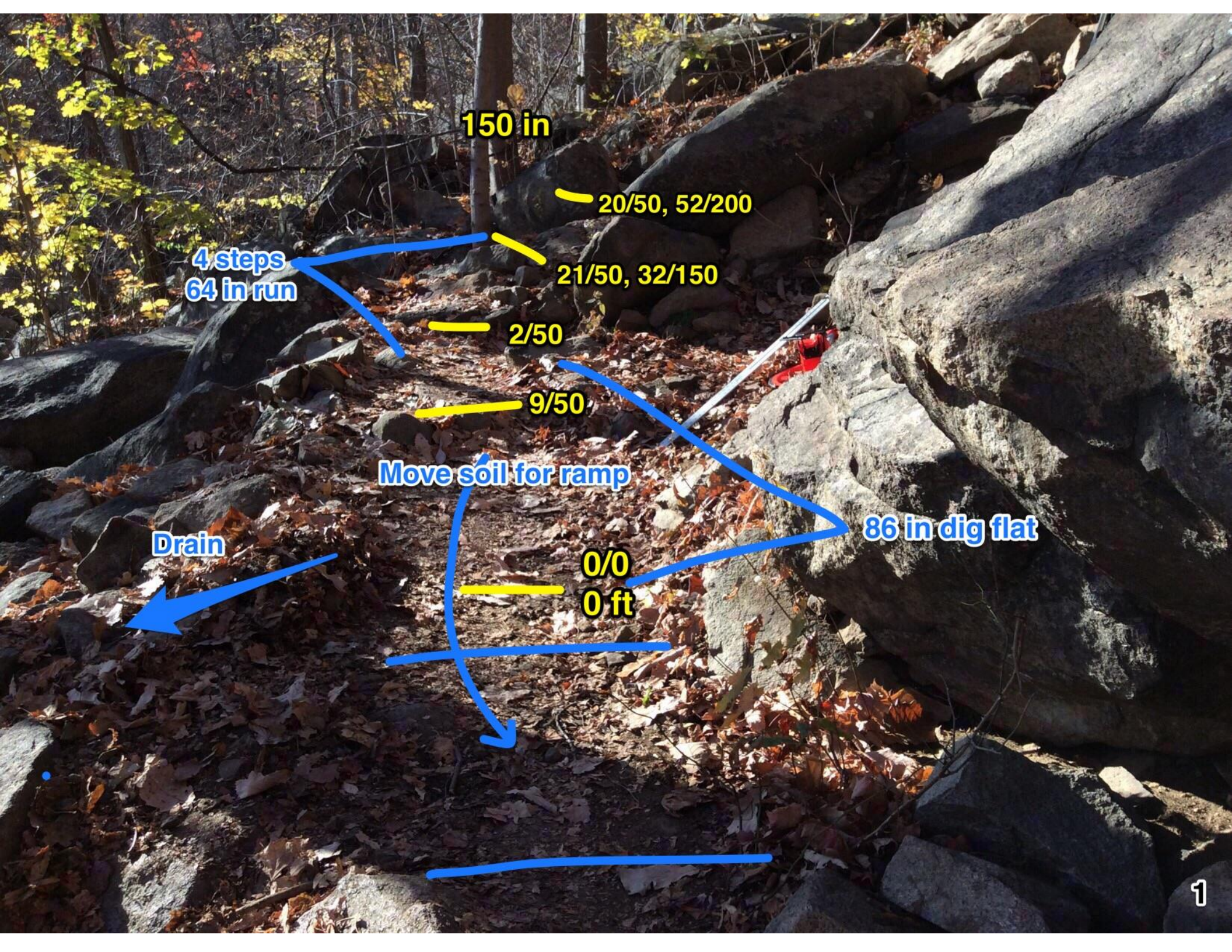
These photo references indicate the location of major work items as well as the trail centerline indicated by a solid yellow line shown in each photo.

To effectively use this trail construction work log, place yourself approximately where the photographer stood, note the trees, boulders, or other features in the photo and that will help you reference where the trail is to built/improved. Remember you are looking at photos which are in two dimensions and the field situation is in three dimensions. In addition, expect the view to change over time given more vegetation, downed trees, etc.

Arrows point to the approximate location of the work needed, or the location of a singular structure, such as a drainage structure. Two arrows or lines show the approximate start and finish of on-going structures or types of work, such as stone cribbing, stairs, and sidehill.

Each section to be built will be field staked or pin-flagged where needed by the trail designer prior to construction.

Note: Trail routing assumes a 50 foot corridor on either side of the centerline in which to move or realign the trail. For example, a trail might need to be realigned around a seep, large boulder, or bedrock. If the trail needs to be moved outside of the 50ft corridor due to unforeseen construction constraints, it will be brought to the land manager's attention for approval. A new work log photo with proper proof of approvals will be inserted into this document (at the end as an addendum to the slide/s in question).



150 in

20/50, 52/200

21/50, 32/150

2/50

9/50

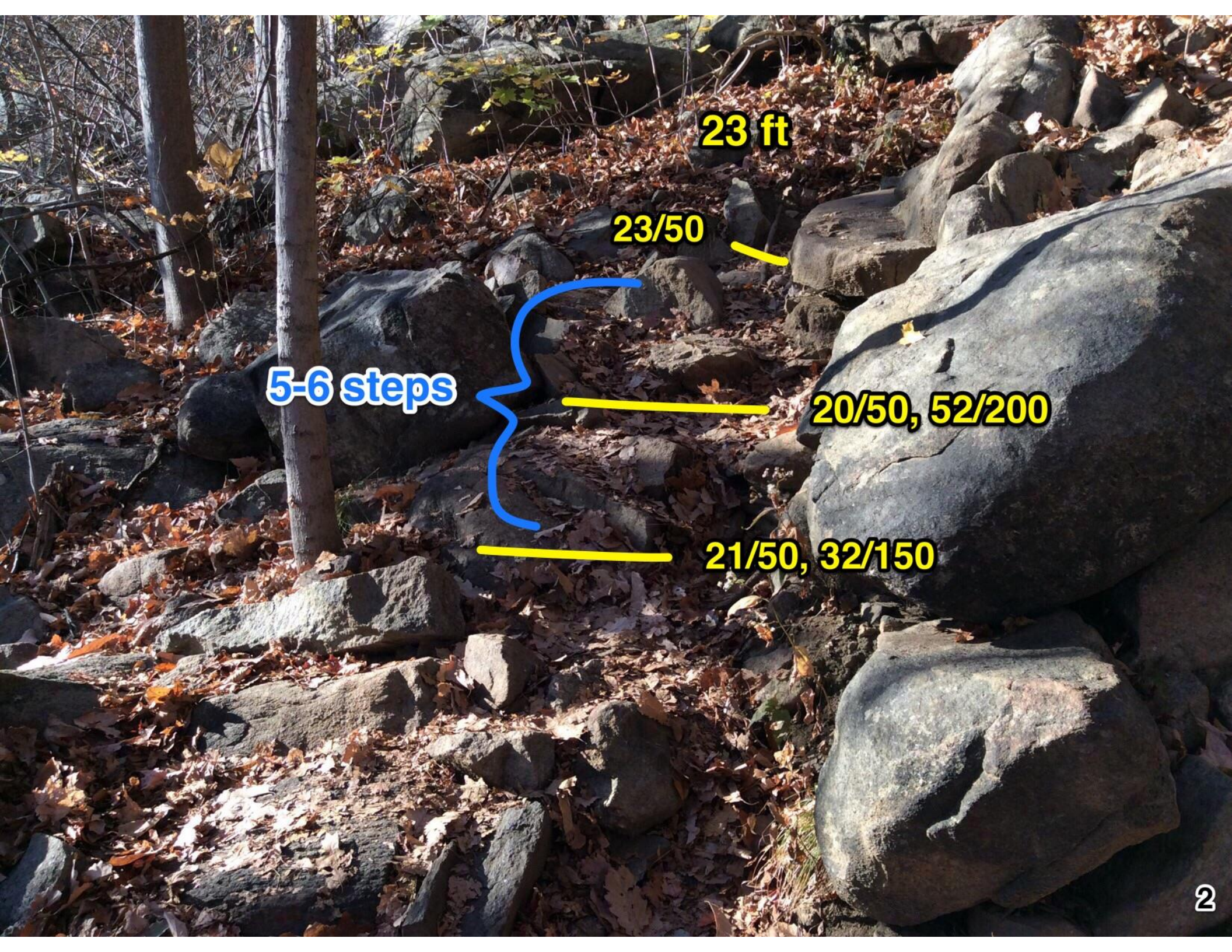
4 steps
64 in run

Move soil for ramp

0/0
0 ft

86 in dig flat

Drain



23 ft

23/50

5-6 steps

20/50, 52/200

21/50, 32/150

51/100, 150/400

Paved ramp

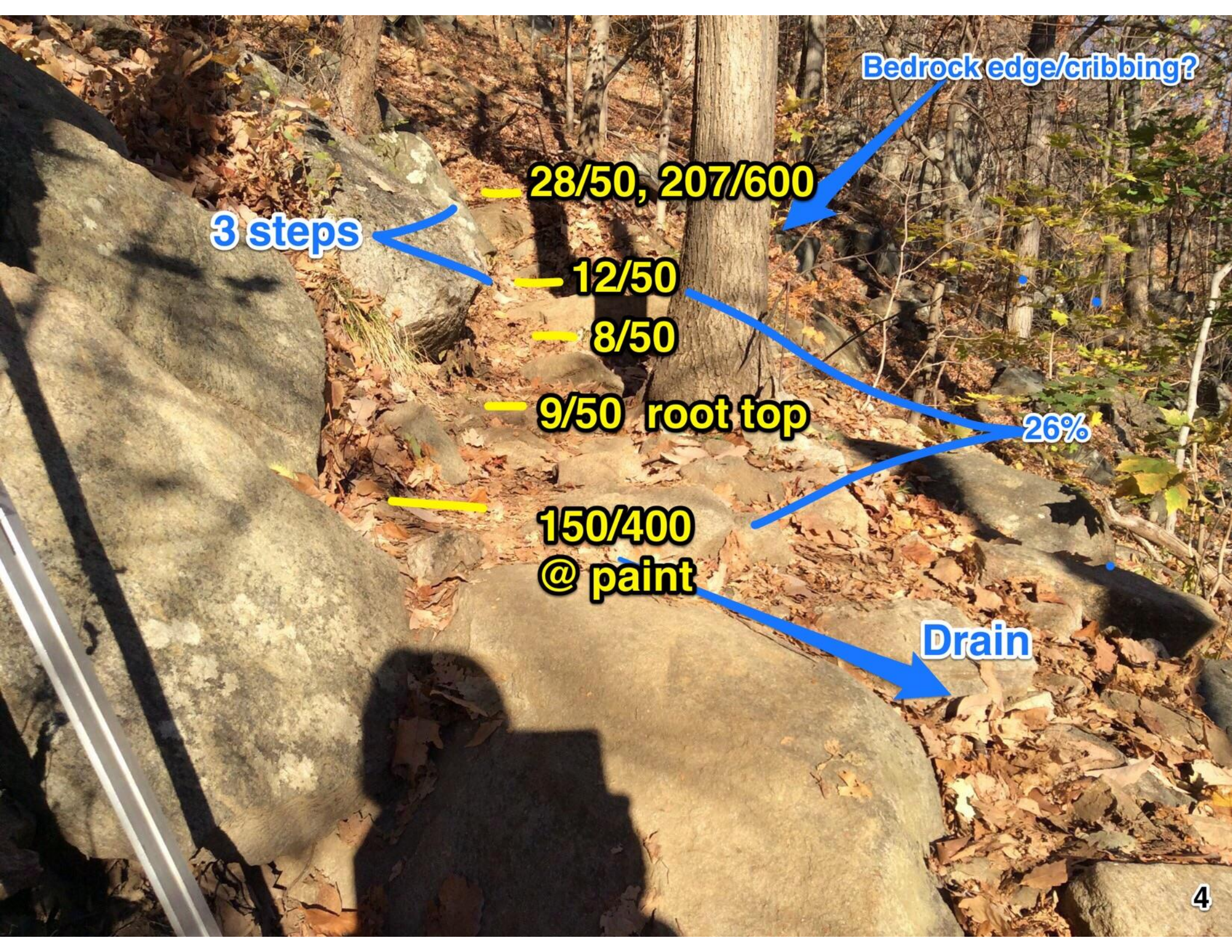
3-4 steps

24/50, 99/300

3 step

23/50, 75/250

23 ft



3 steps

28/50, 207/600

12/50

8/50

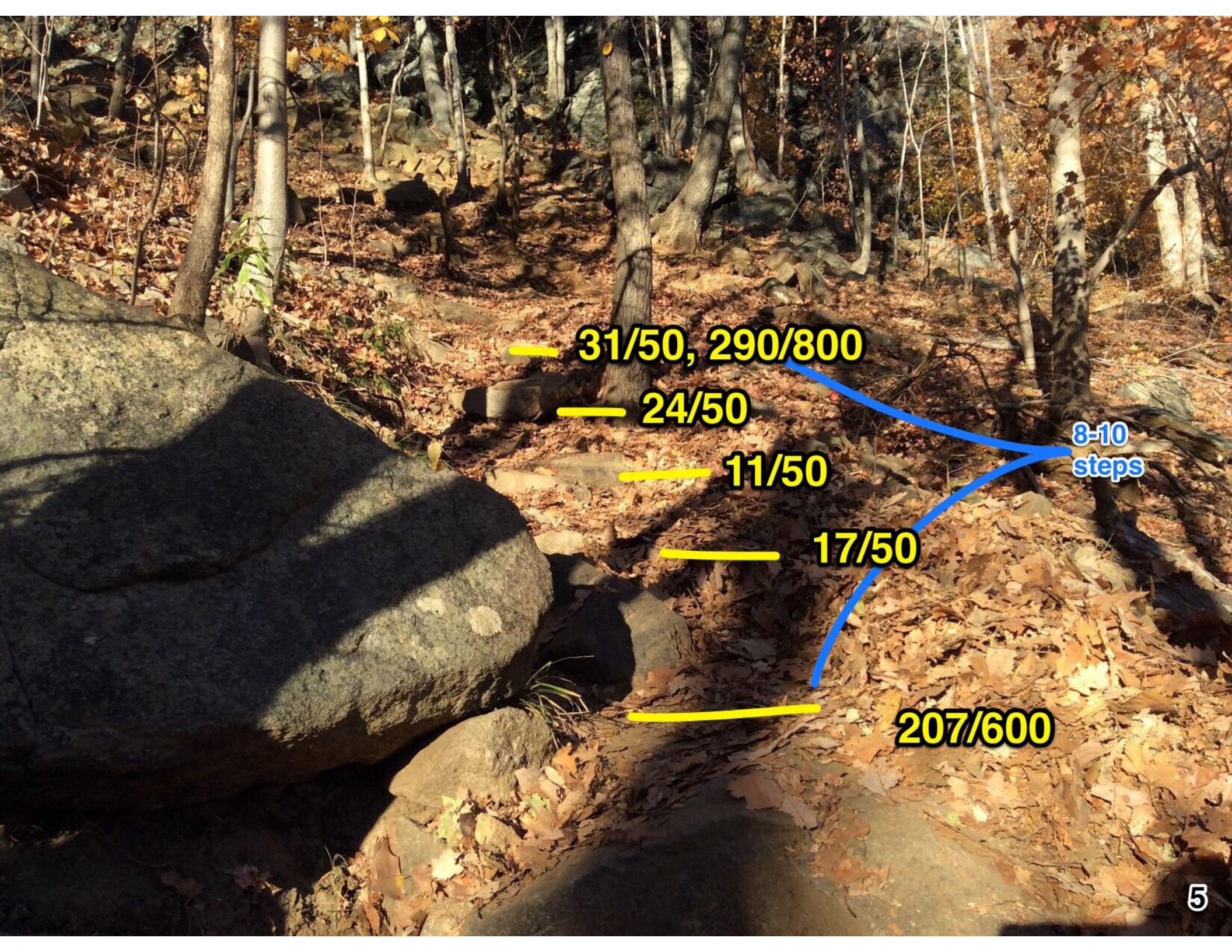
9/50 root top

**150/400
@ paint**

Bedrock edge/cribbing?

26%

Drain



— **31/50, 290/800**

— **24/50**

— **11/50**

— **17/50**

— **207/600**

**8-10
steps**

Heavy rock garden
to dissuade shortcuts

34+ steps and paved
ramps to here

34/100, 359/1000

Crest

Drain

8 steps

20/50

15/50

290/800

16 ft

48 ft

30 ft

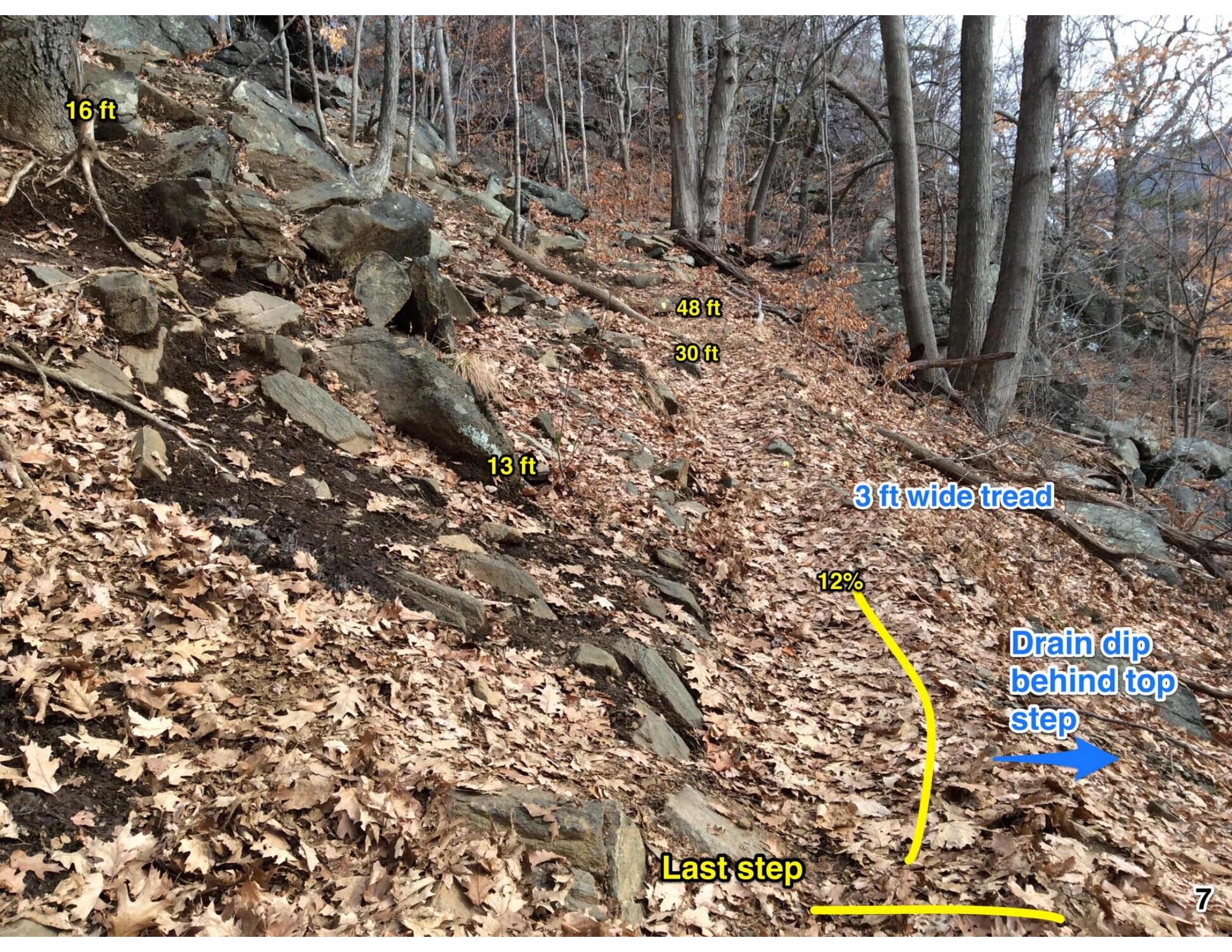
13 ft

3 ft wide tread

12%

Drain dip
behind top
step

Last step



39 ft

250 in
26/100, 74/250

3 steps

16/50, 48/150

2 steps

32/100

4 steps

48 ft

Drain

48

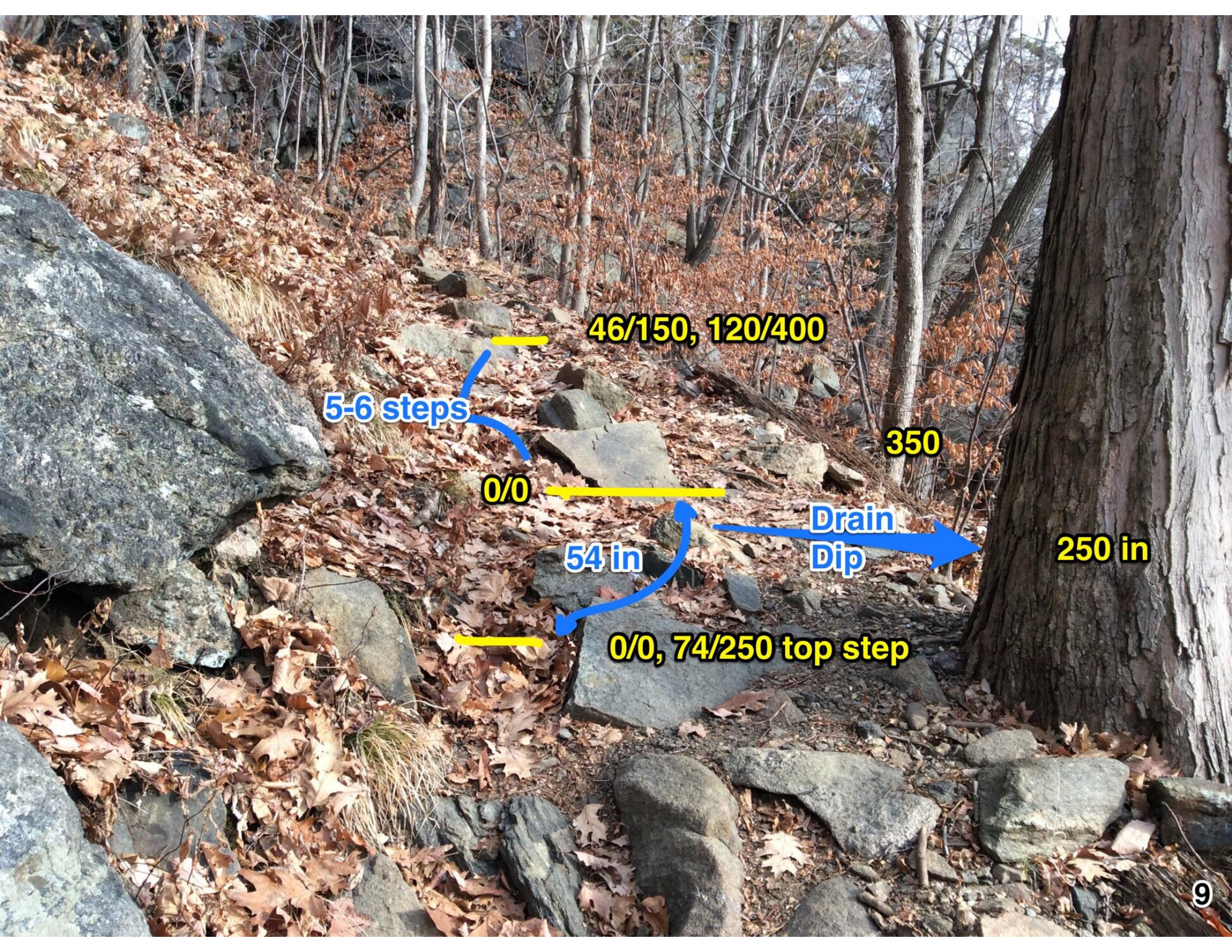
Dig flat 3 ft

0/0 @ 39 ft

Ramp

**Harvest step rock from
some stone removal above**

30 ft



46/150, 120/400

5-6 steps

350

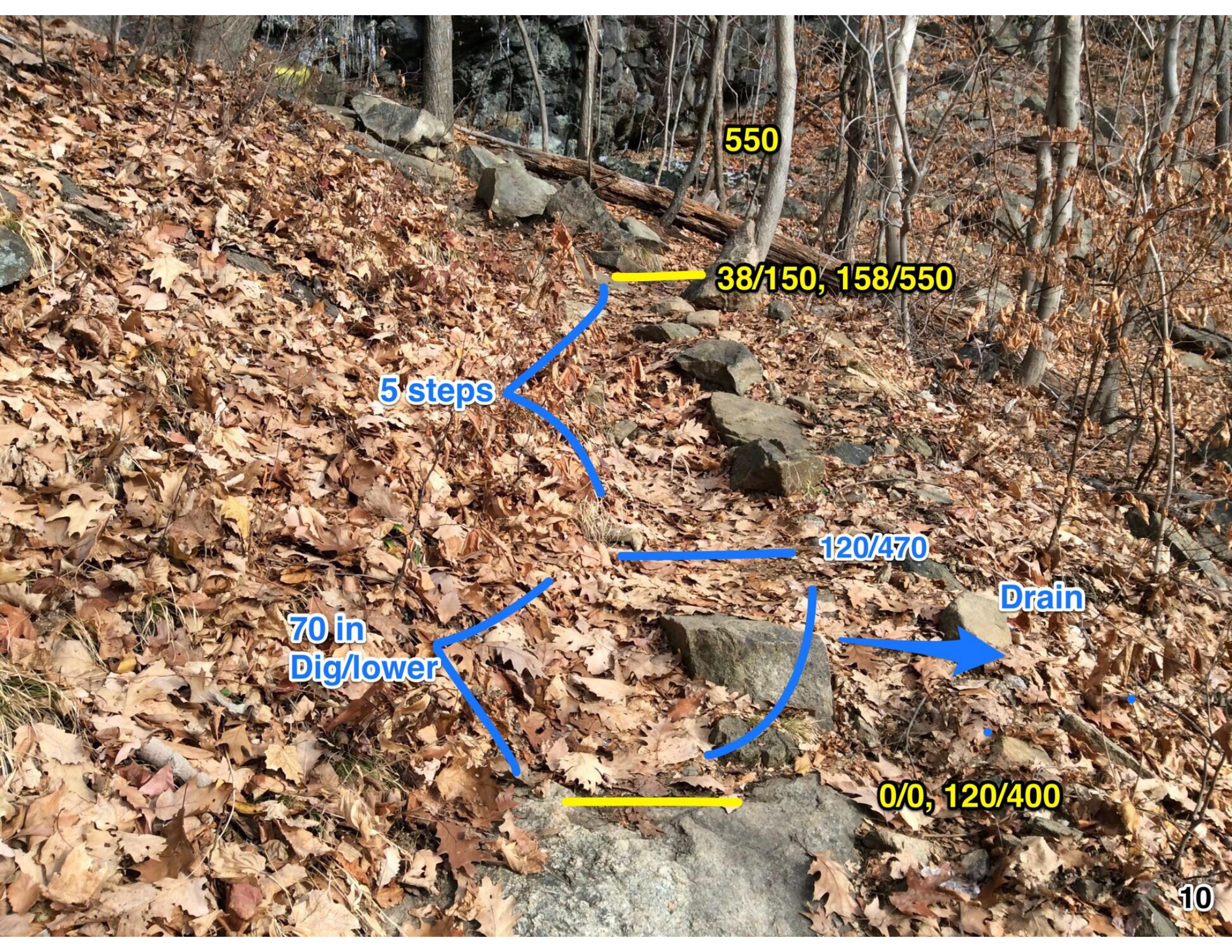
0/0

**Drain
Dip**

250 in

54 in

0/0, 74/250 top step



550

38/150, 158/550

5 steps

120/470

Drain

**70 in
Dig/lower**

0/0, 120/400

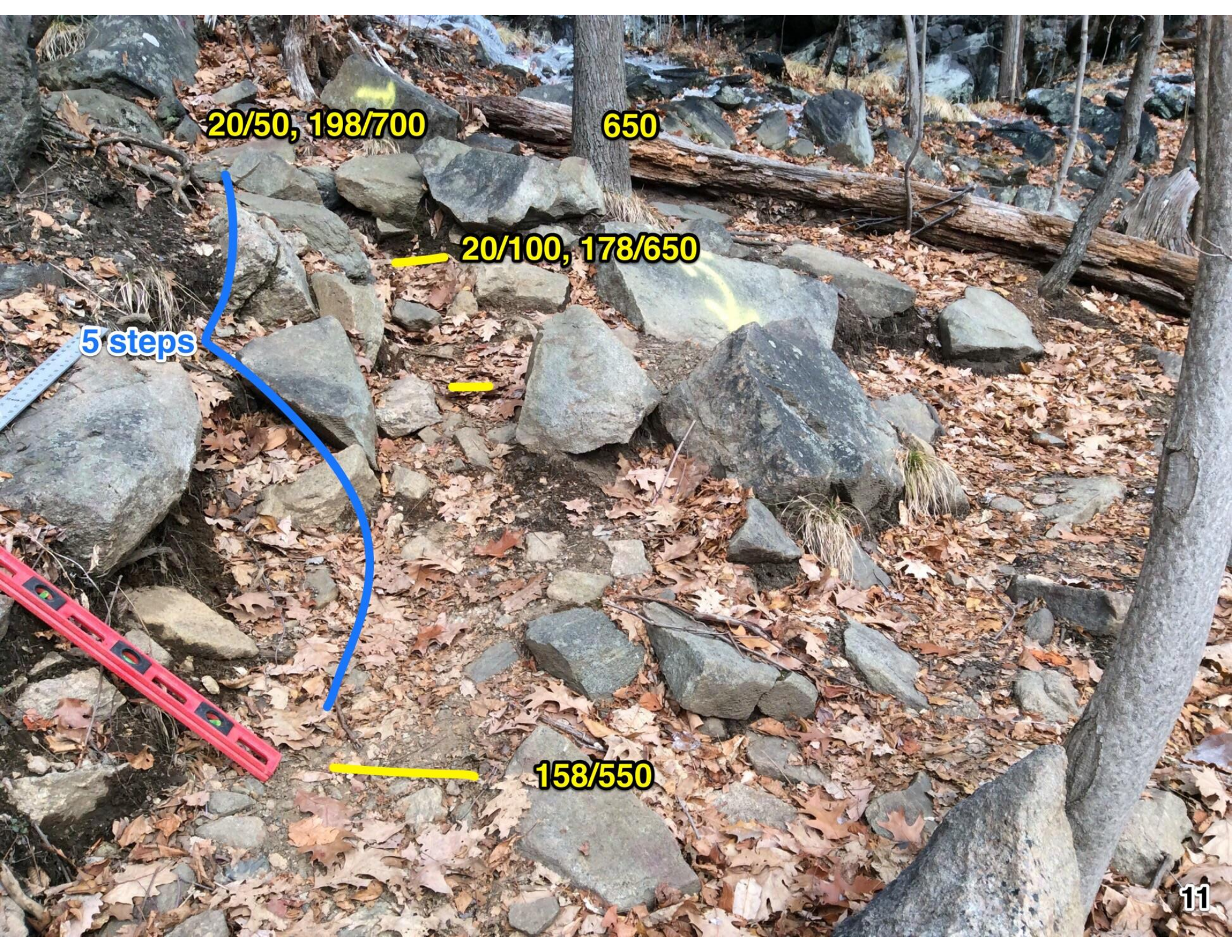
20/50, 198/700

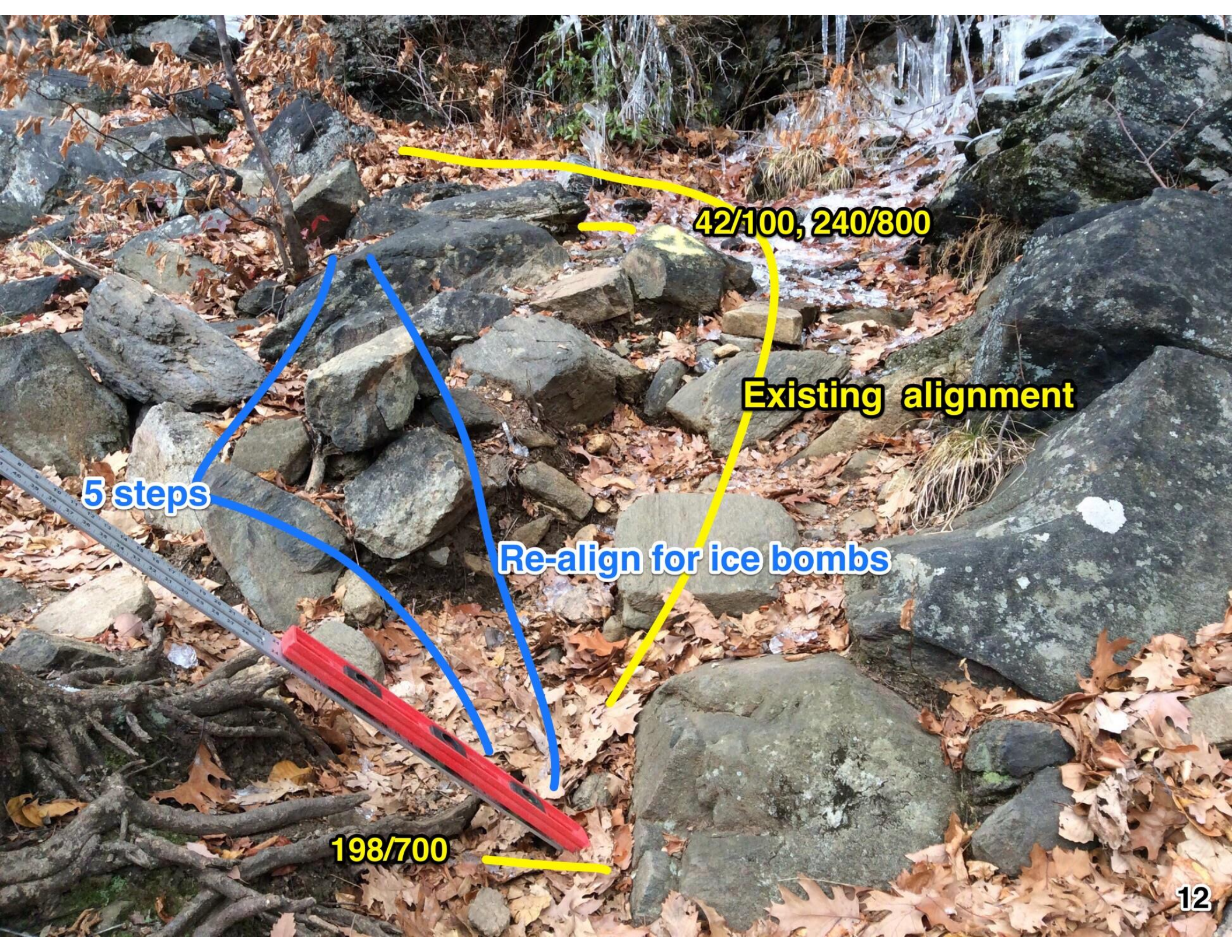
650

20/100, 178/650

5 steps

158/550





5 steps

Re-align for ice bombs

42/100, 240/800

Existing alignment

198/700

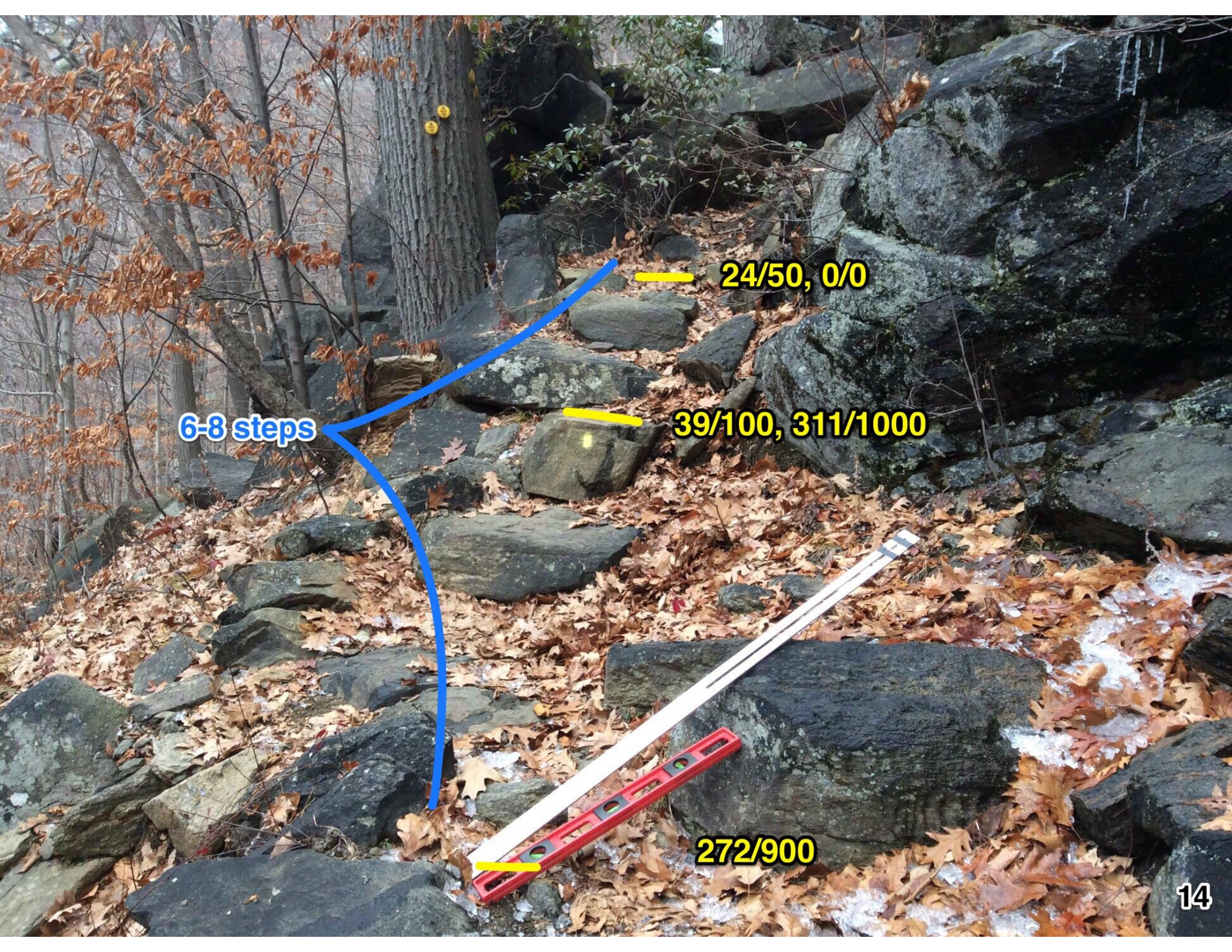
272/900

2-3 steps

240/800





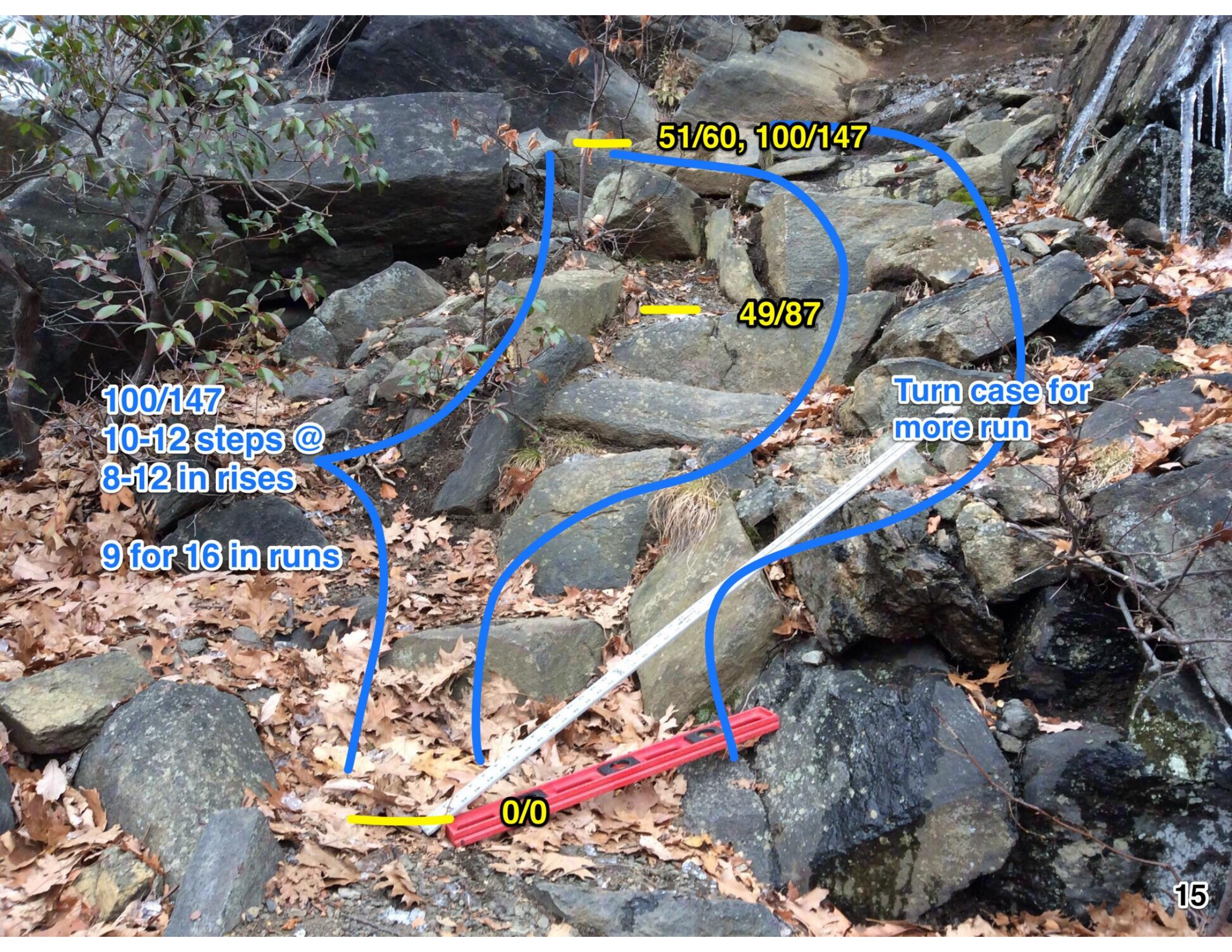


6-8 steps

24/50, 0/0

39/100, 311/1000

272/900



100/147
10-12 steps @
8-12 in rises
9 for 16 in runs

51/60, 100/147

49/87

Turn case for
more run

0/0



19/40, 51/60 (this slide)

32/20

49/87

Top 16

13/58, 163/255

**2 steps
In front of root
Crib in w gargoyles**

19/40, 150/197



Remove rock/lower

13/58



**7 or 4/28 from zero/13/58
in back**

**2 steps?
14/28+29**

**18/29 top of root, from rock
from above 7/28
So 14 lower than top in back**

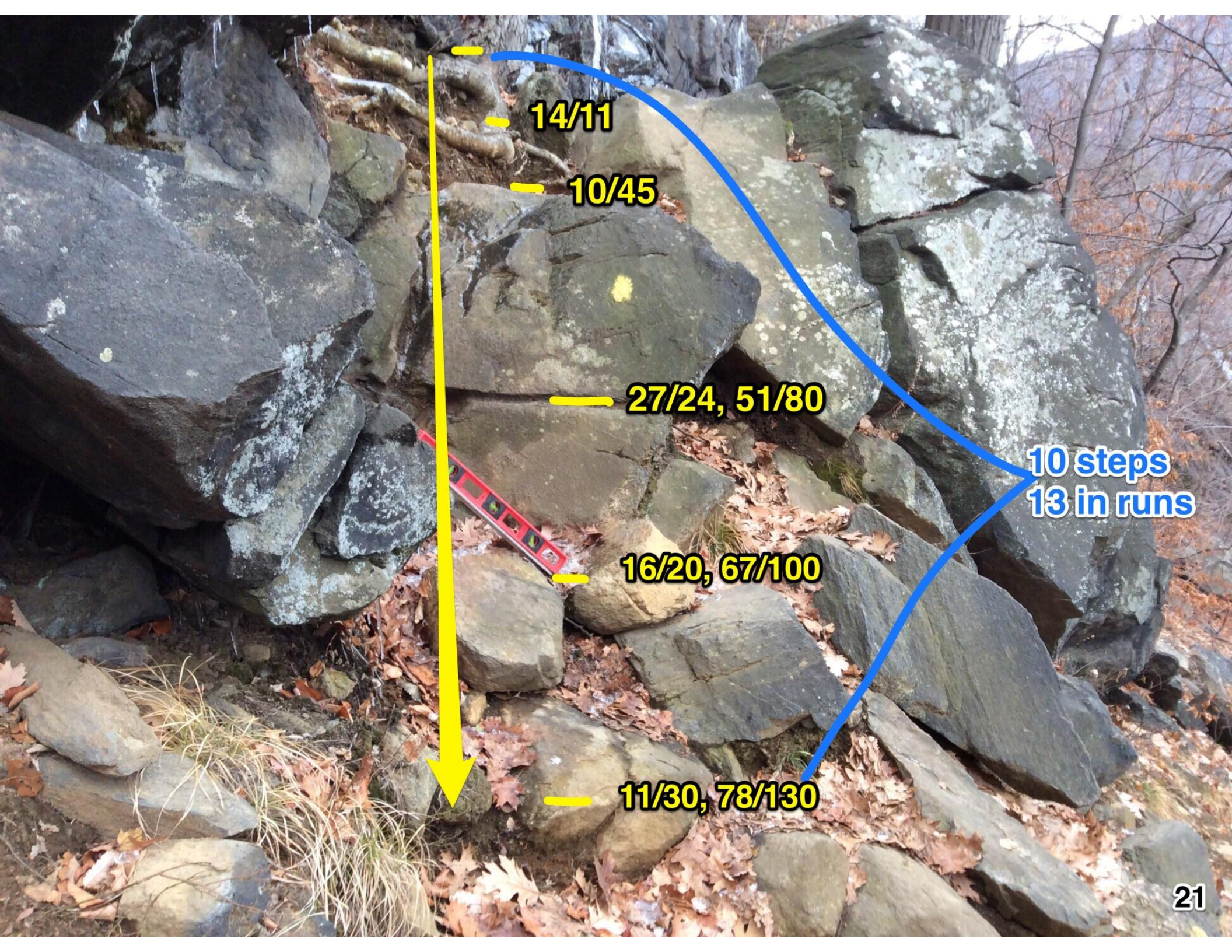


14/11

10/45

**~5 10 in high steps
w 16 in runs**

27/24, 51/80



14/11

10/45

27/24, 51/80

16/20, 67/100

11/30, 78/130

10 steps
13 in runs

Cribbing/coping

Tread/trail alignment

3/50

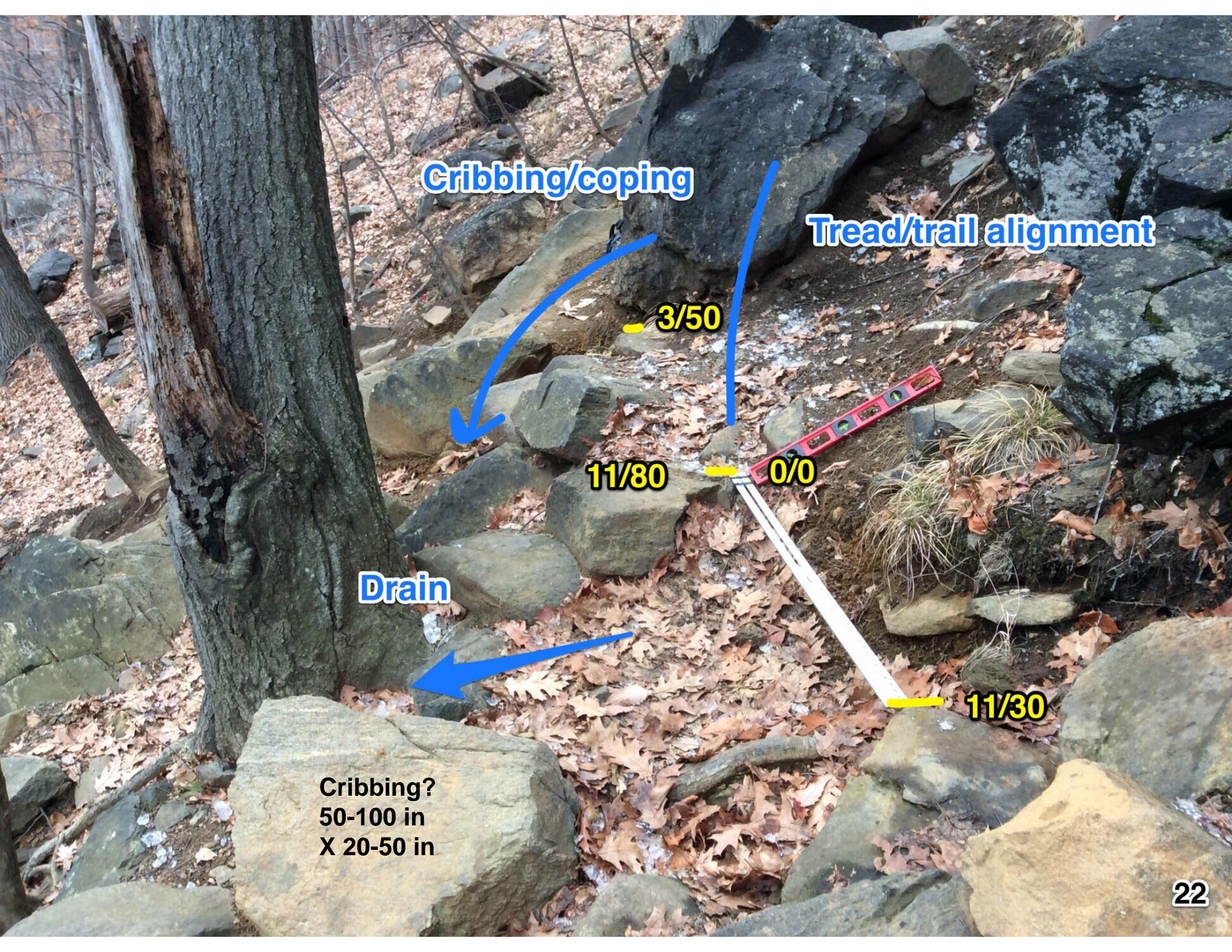
11/80

0/0

11/30

Drain

**Cribbing?
50-100 in
X 20-50 in**



Use below
near Sidehill
segment

Move back for
cribbing in back
by tree

10/87
From
3/50

New alignment

13 ft

Tread

0

24



Remove

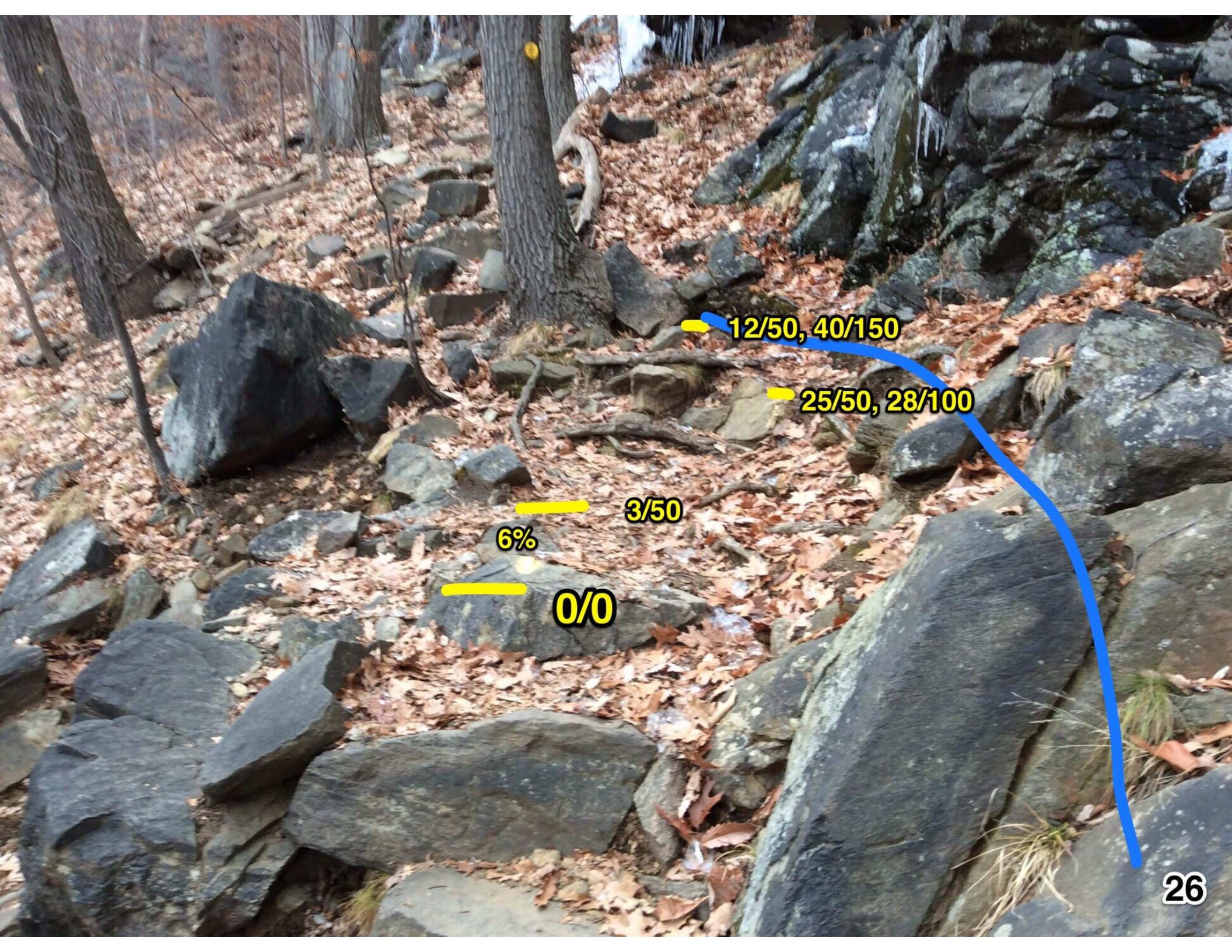
18 ft 0 ht

Realignment

Use for steps

13 ft





12/50, 40/150

25/50, 28/100

3/50

6%

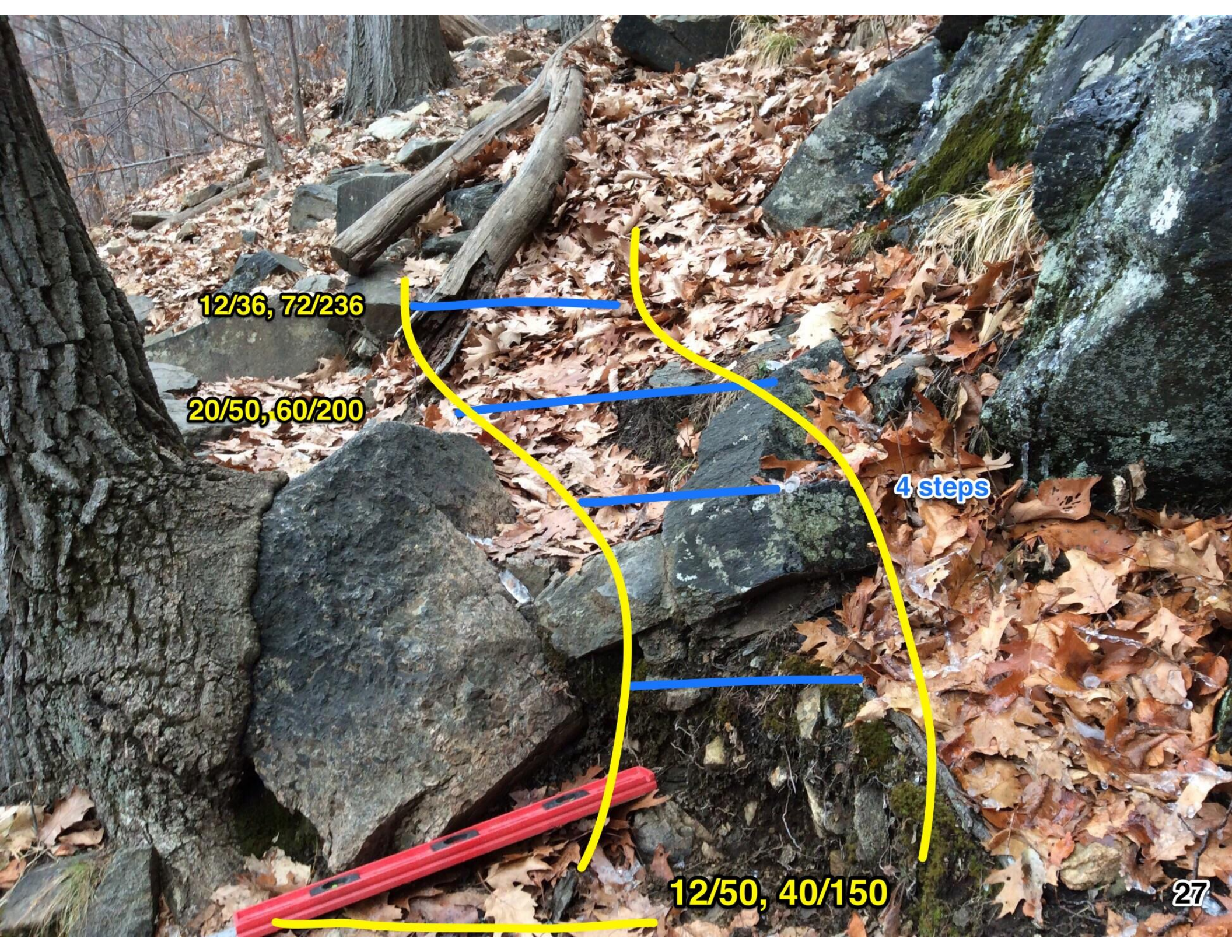
0/0

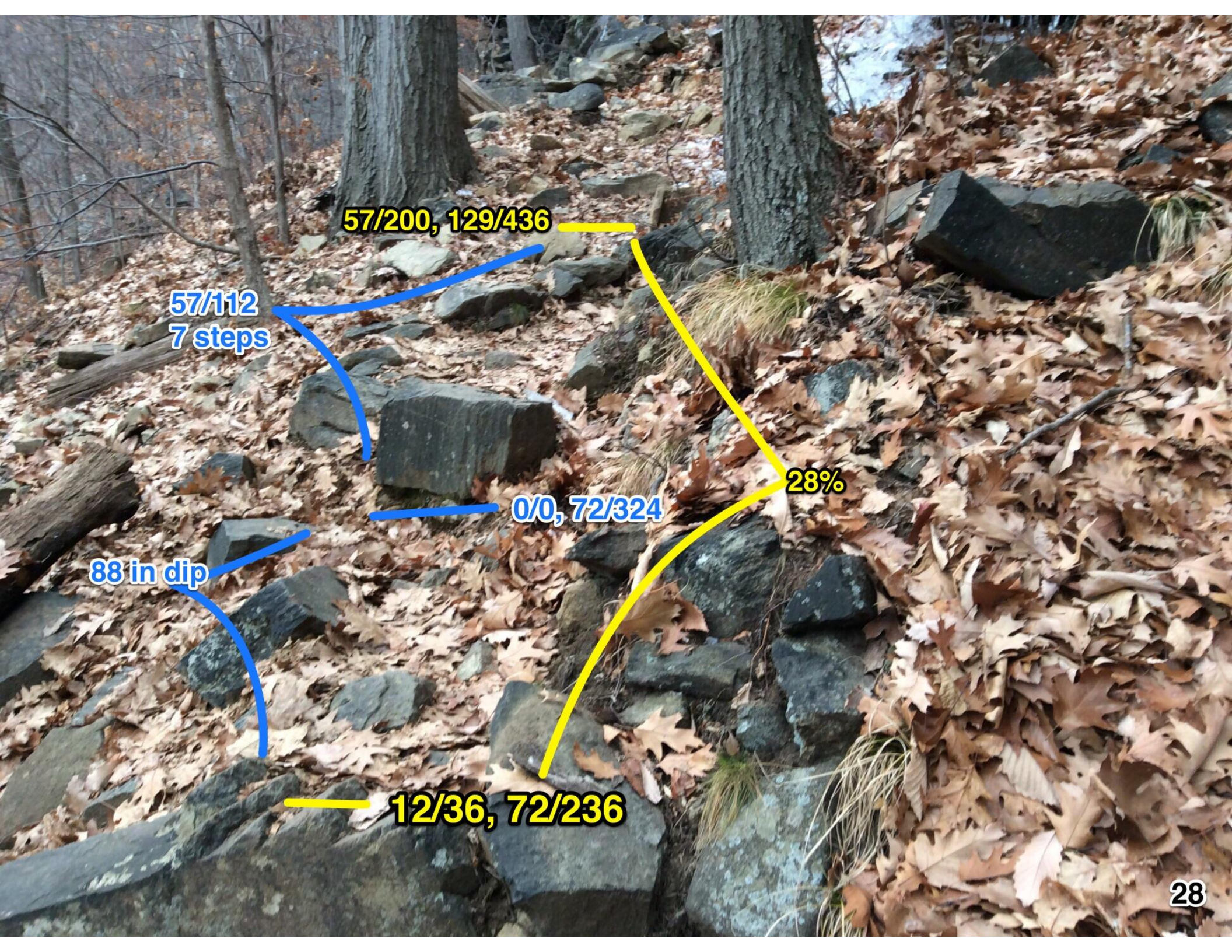
12/36, 72/236

20/50, 60/200

4 steps

12/50, 40/150





57/200, 129/436

57/112
7 steps

0/0, 72/324

28%

88 in dip

12/36, 72/236

90/200, 169/686

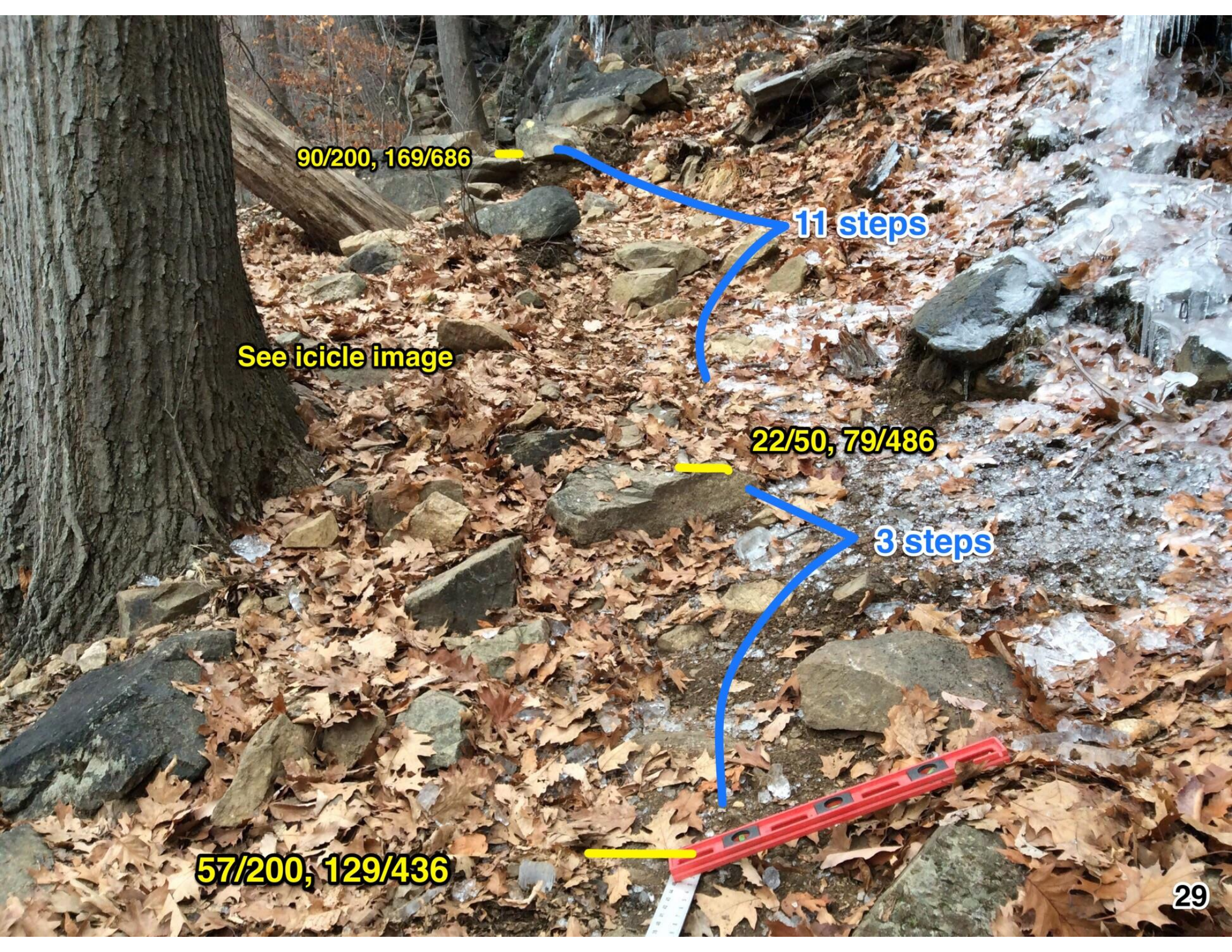
11 steps

See icicle image

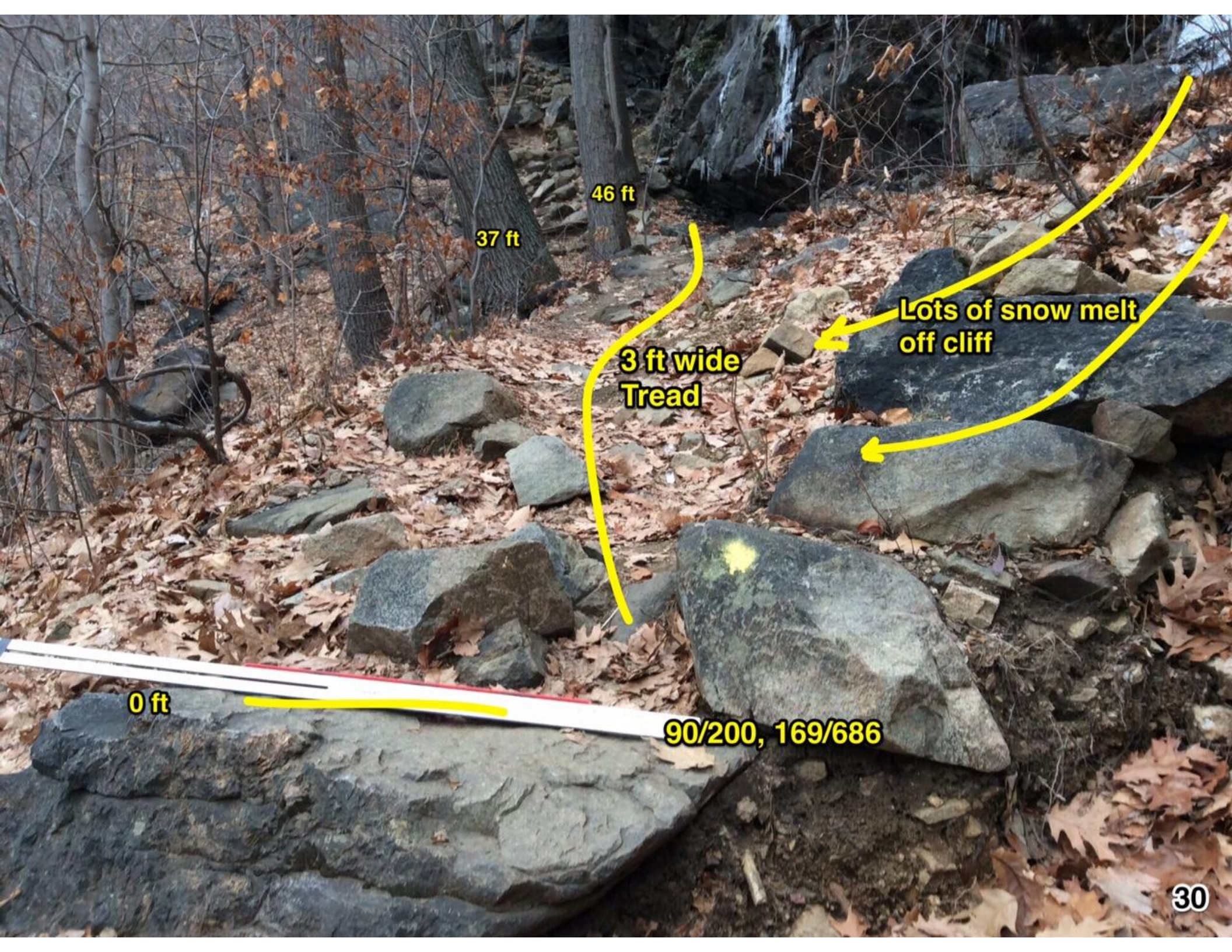
22/50, 79/486

3 steps

57/200, 129/436







46 ft

37 ft

3 ft wide
Tread

Lots of snow melt
off cliff

0 ft

90/200, 169/686



37

46 crest

Dip

31

10-13 steps
Next slide

30/50, 114/350

89/250
9-11 steps

18/50, 84/300

18/50, 66/250

8/50, 48/200

75 ft

15/50, 40/150

17/50, 25/100

71 ft

8/50

0/0

62.5 ft

104/200
10-13
steps

29/50, 218/550

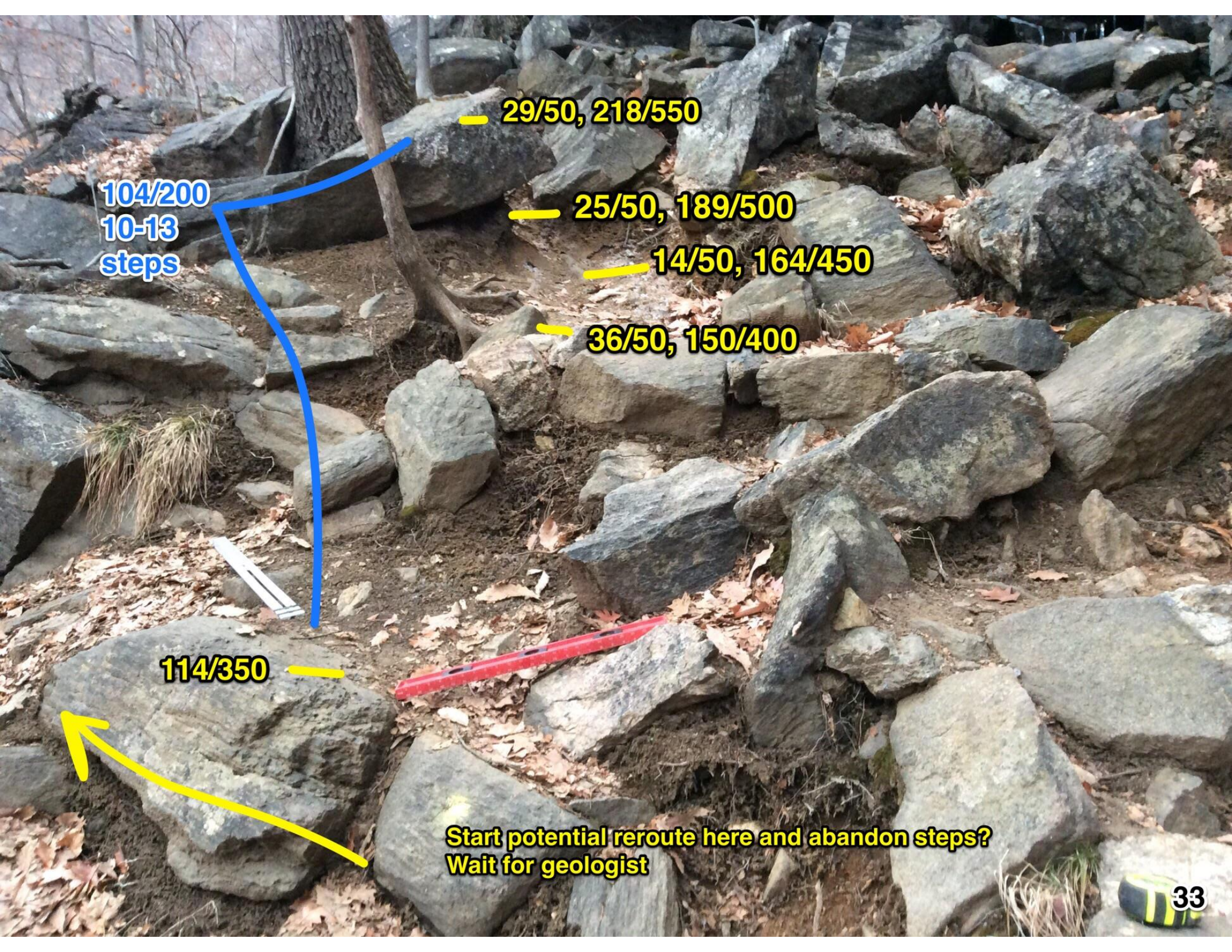
25/50, 189/500

14/50, 164/450

36/50, 150/400

114/350

Start potential reroute here and abandon steps?
Wait for geologist





Top of 21-27 step flight

20/50

2-3 steps

29/50

10-13 steps below

25/50

18 ft

**This plan pp 1-35:
~450 ft trail
141-157 steps**

No steps

0 ft

20/50 top step

