Kevin Eastman

91 Matawanakee Trail

978 486-9284

This is a continuation of the initial meeting held on November 26, 2024. Additional information not discussed previously is the fact the door above the deck on the second floor was to be used as an emergency egress. The door is off the master bedroom and would provide a second route of escape if the stairway to the first floor was blocked.

The description of the proposed work to be done is listed below.

1. Replace existing 12 foot by 12 foot deck with a 12 foot by 12 foot deck that is compliant with current building codes.
2. Replace existing 5 foot by 4.5 foot stair deck and stairs with a 5 foot by 4.5 foot stair deck and stairs that is compliant with current building codes.
3. Add a second floor 12 foot by 12 foot deck directly above the new first floor deck with railing that is code compliant. This deck would be water resistant and pitched to shed water away from the concrete block wall and into a gutter and downspout to below the first floor deck Figures 5 and 6).
4. Add screen/glass panels to “screen-in” the first-floor deck area and add an entrance door at the top of the stairs leading to the lower level.

During the last meeting I was tasked to define areas of improvements that would either retain or retard the flow of water into the wetlands.

Actions for improvement, see figures 1-6:

1. Cap and bury the existing water intake drain under the deck. This will allow the retention of water under the deck and further away from the wetlands.
2. Remove the six stacked concrete blocks adjacent to the concrete retaining wall.
3. Remove soil to create shallow swale or trench that is 1.5 feet deep in the center, 8 feet long and 3 feet wide. Add extension from the gutter downspout to direct second floor water to this trench.
4. Remove the concrete pavers noted in figure 4 and fill with ¾ inch pea stone.

I believe these improvements will provide retention and infiltration of water in an area that is the furthest from the wetlands.

Sources:

1 Massachusetts Home Inspection website, homeinspectionmassachusetts.com

2 New Hampshire Homeowner’s guide to stormwater management, NHLAKES.org/dry-well

Calculate runoff volume associated with the new deck roof:

Most storms in New England produce one inch or less of rain, so designing for a one-inch storm would be appropriate. One inch of rain will produce about 62 gallons of runoff for every 100 SQ FT for drainage area (2). The proposed deck roof is 12 feet by 12 feet or 144 SQ FT. Scale 62 gallons per 100 SQ FT to 144 SQ FT:

62 gallons x 1.44 **= 89.3 gallons of runoff associated with the 12 foot by 12 foot deck roof.**

Design of a water runoff retention area under the deck:

The area under the deck is not suitable for the construction of a dry well. Dry wells should be a minimum of 10 feet from the house (1). A shallow swale or trench would be appropriate for water retention in this area. As defined in figure 5, the trench is centered between the concrete block wall and the internal railroad tie wall under the deck. The dimensions are 8 feet long (pushed to the outside of the deck away from the house foundation), 3 feet wide and 1.5 feet deep in the center of the trench. To calculate the volume of the trench, a box of 6 feet long by 2 feet wide and 1 foot deep is used as an approximation:

6 feet x 2 feet x 1 foot = 12 CU FT

To calculate the volume of water retained, multiple the CU FT by 1cubic foot = 7.481 US gallons (google)

12 CU FT x 7.841 = 89.8 gallons

Therefore, the proposed shallow swale or trench of the dimensions stated above will enable the retention of a 1 inch storm water runoff associated with the addition of the 12 feet by 12 feet roof deck.

Further improvements:

To provide additional water retention in the advent of a downpour exceeding a 1-inch rain event causing the water to flow over the concrete retaining wall, the concrete pavers as noted in figure 4 could be removed an filled with ¾ inch pea stone. This would permit additional water runoff retention and allow water immersion into the sand paver base. As noted in figures 4 and 6, this area would allow access to the basement doorway and does not interfere with the structural integrity of the base of the wooden stairs. To calculate the volume for water retention, use an average width of 2 feet and a length of 10 feet. The depth of the concrete pavers is 0.2 feet thick.

Volume = 2 feet x 10 feet x 0.2 feet = 4 CU FT

Water retained = 4 CU FT x 7.481 US gallons = 29.9 gallons

This area will be filled with pea stone and the gallons should be reduced by 40% (2)

Water retained = 4 CU FT x 7.481 US gallons = 29.9 gallons x .40 = 11.96 gallons.

Conclusion:

Total water retention for both areas of improvements is 89.8 + 11.96 = 101.8 or 102 gallons which exceed the rain runoff of 89 gallons associated with the 12 by 12 feet deck roof by 15%. Water immersion in these areas will also provide additional reduction of water runoff towards the wetlands.

Figure 1. Existing back view and side view

Figure 2. Existing concrete retaining wall and view from above

Figure 3. Area under the existing deck.

Figure 4. Concrete pavers to be removed.

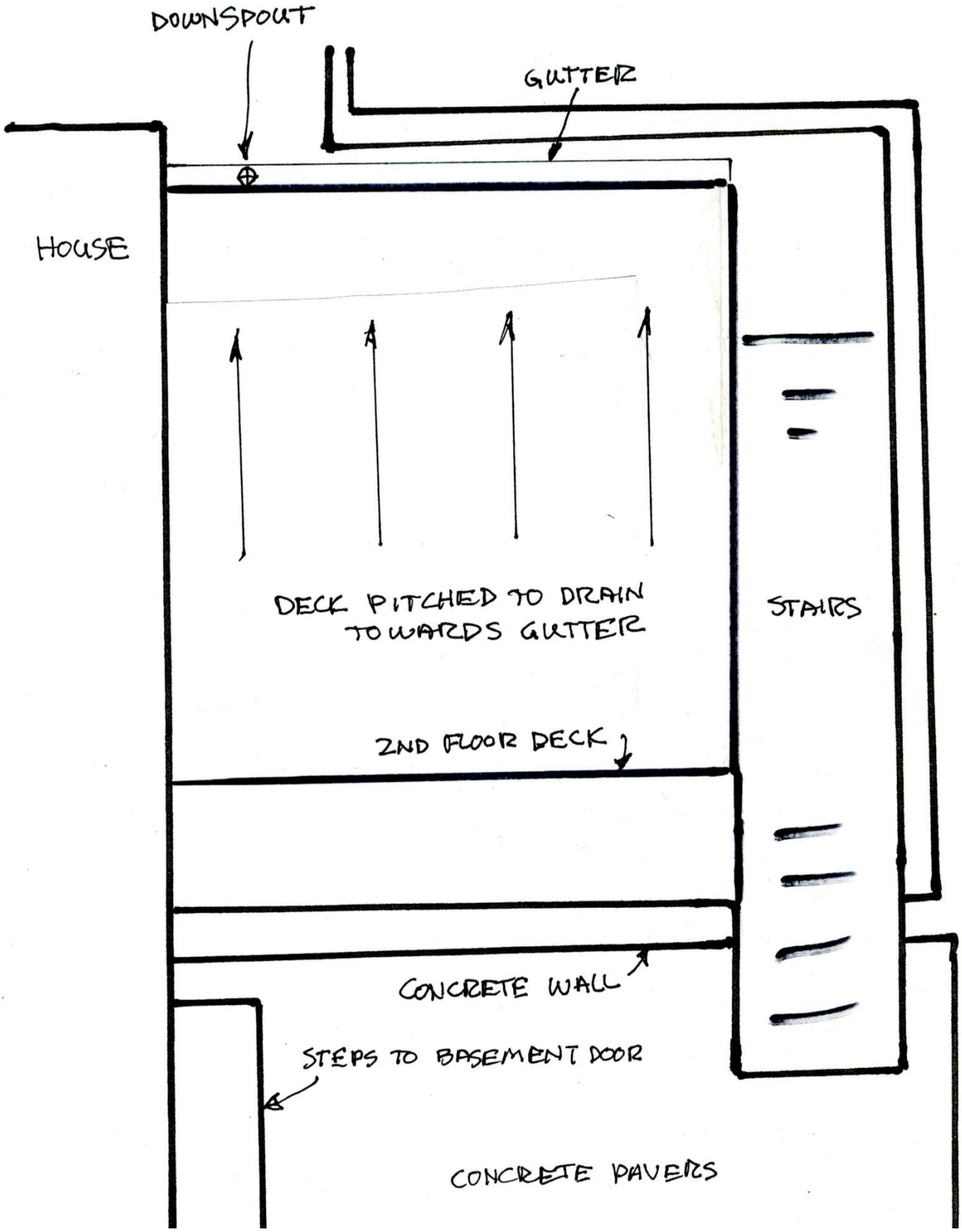

Figure 5. Second floor roof deck with indicated pitch and gutter/downspout location.

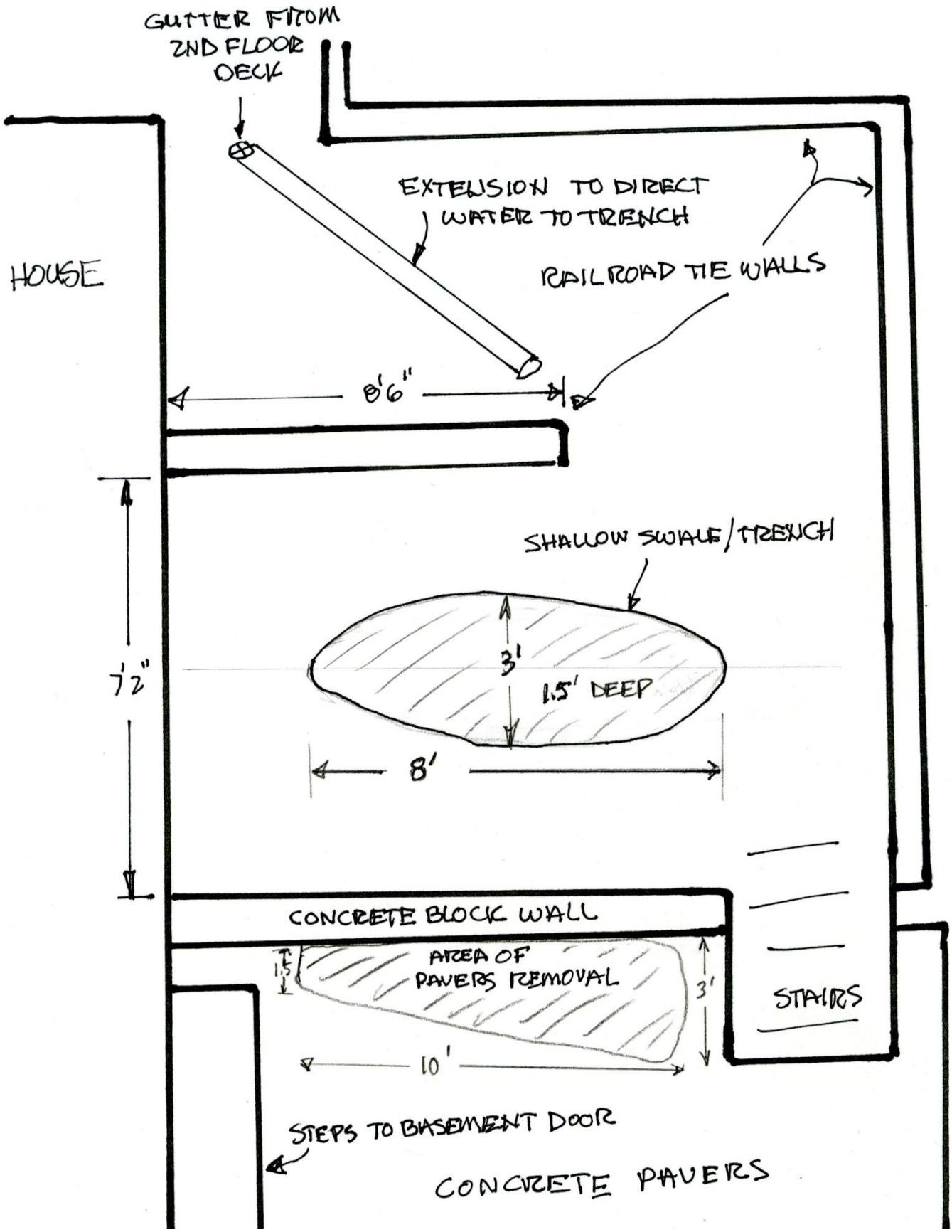

Figure 6. Areas under the first floor deck for retention of runoff water.