

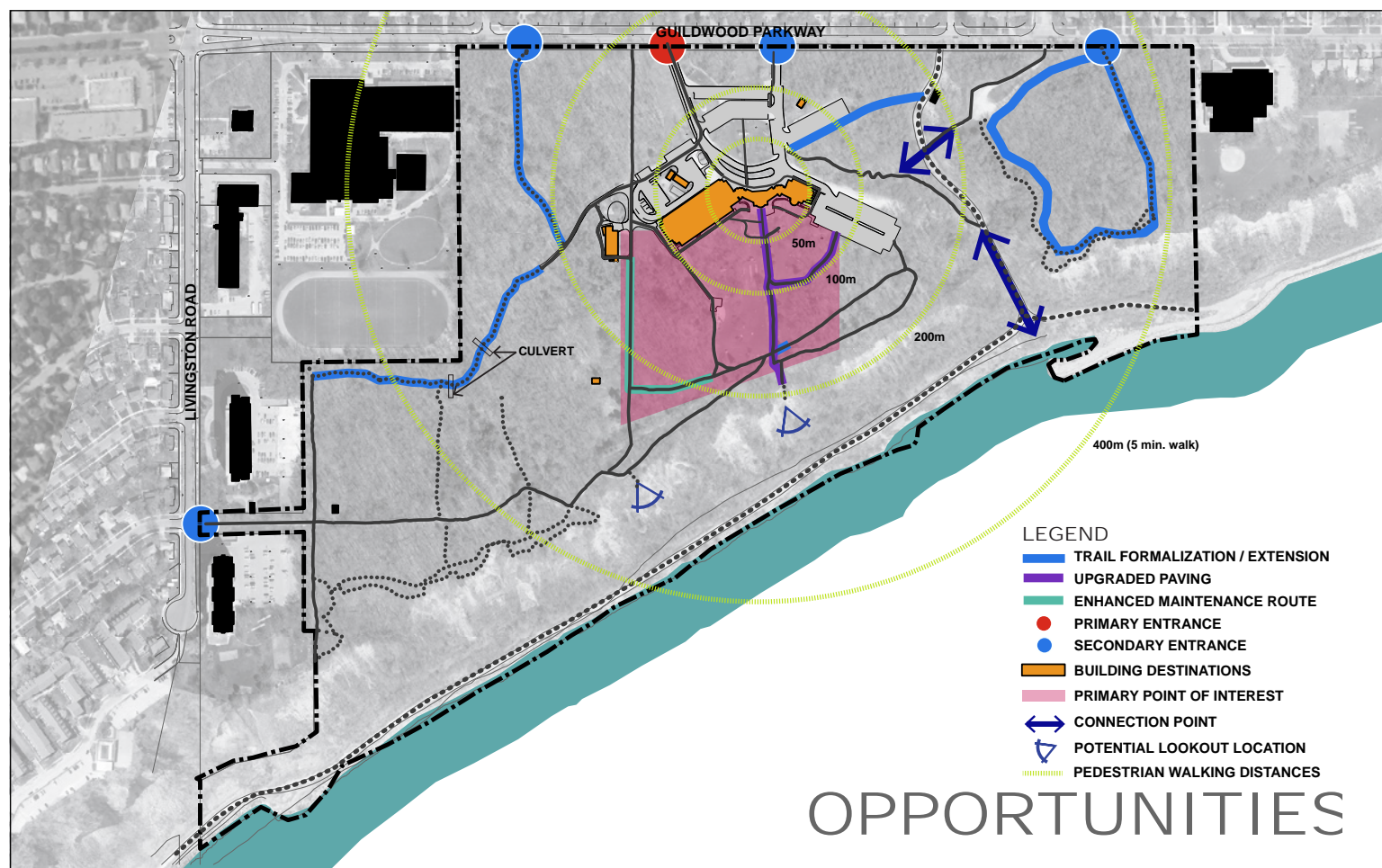
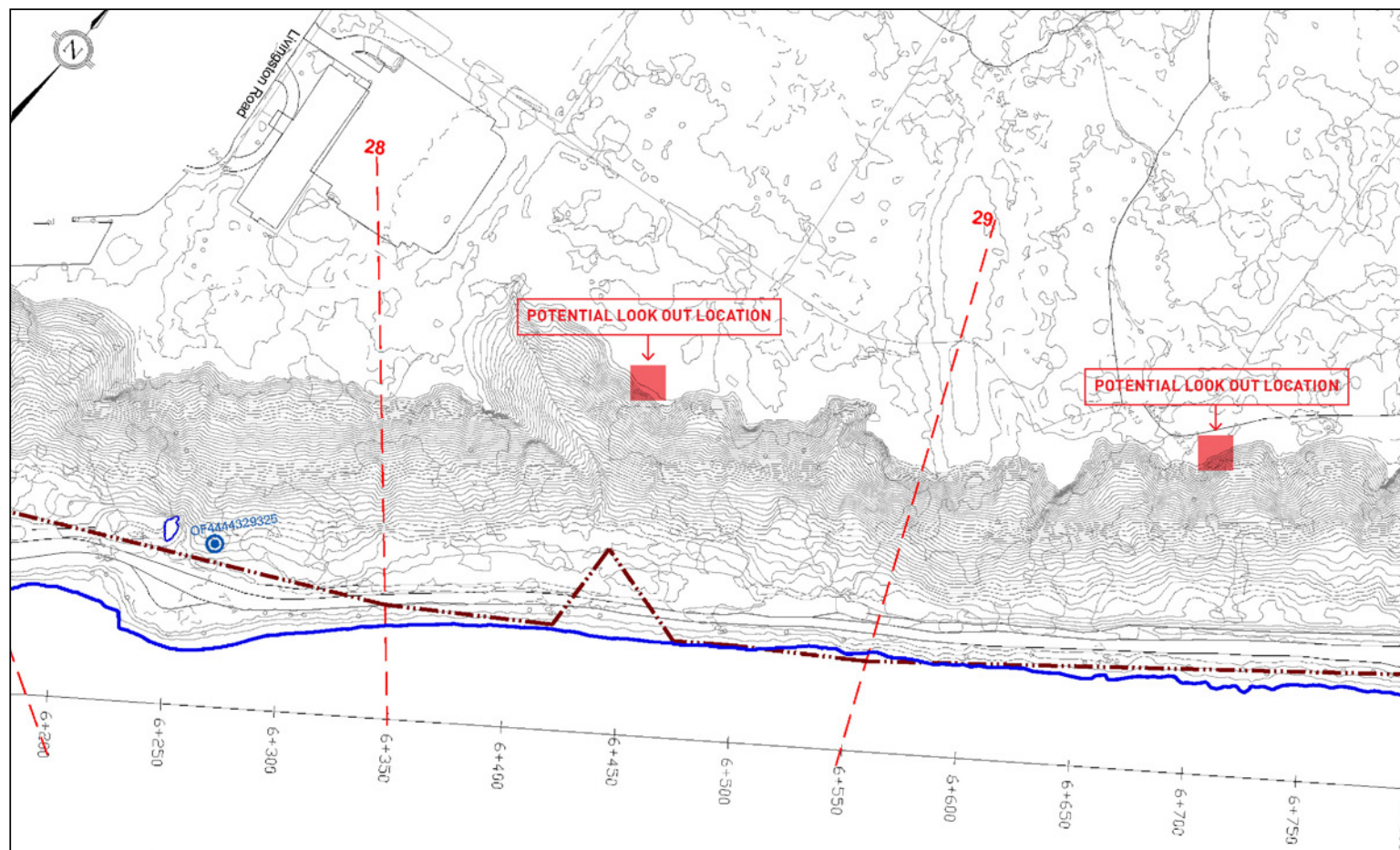


ENTUITIVE

GUILD PARK AND GARDENS: LOOK OUT

Structural Feasibility
Options Study

January 30, 2018



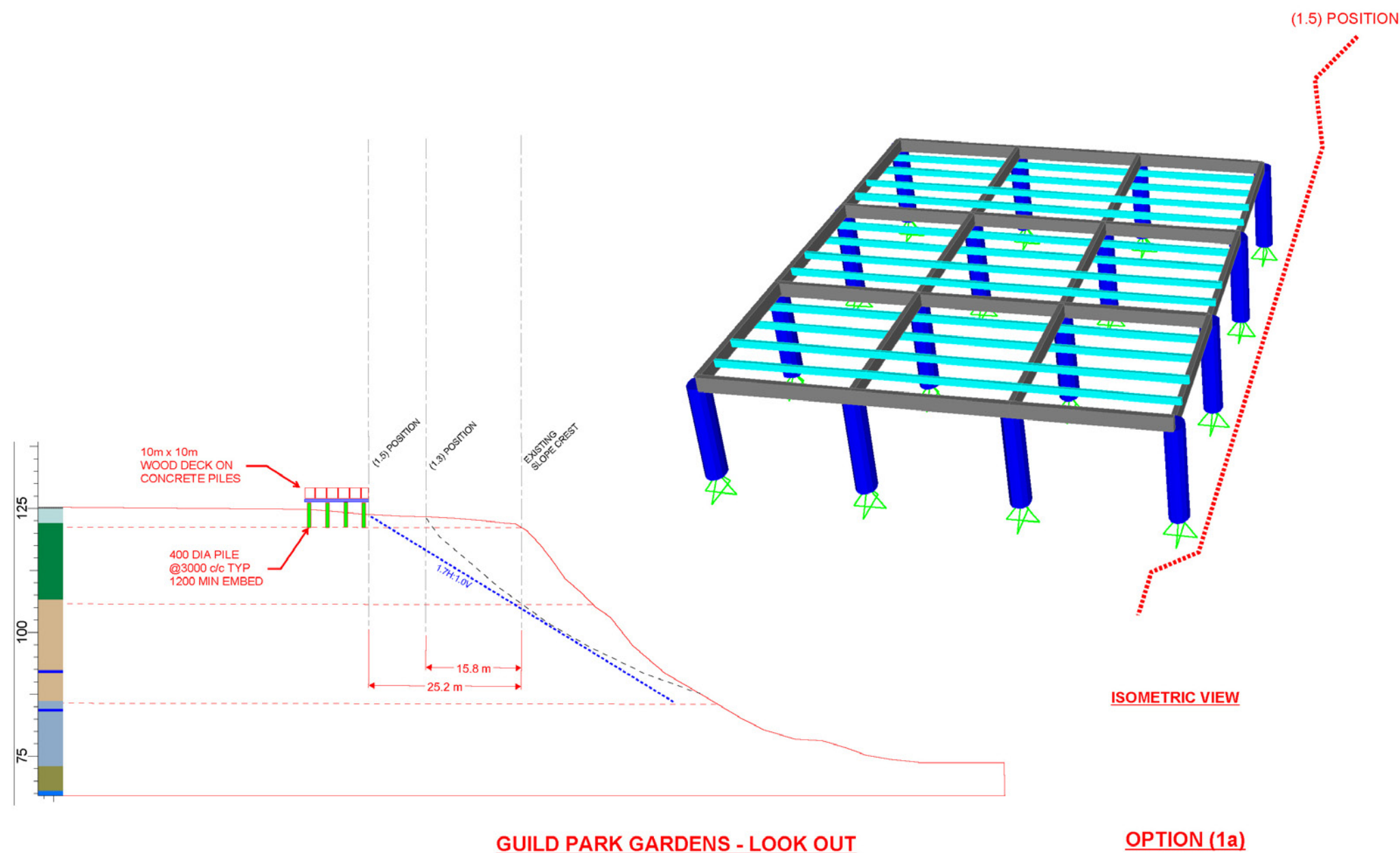
INTRODUCTION

Entuitive was retained by the Toronto and Region Conservation Authority to carry out a structural feasibility study of a look out structure in the park. Taking in to account slope stability analysis performed by Terraprobe Inc., various concepts taking in to account the future projected erosion of the bluffs has been used to develop several possible options of a structure that provides a viewing platform and aims to minimize impact to the existing environmental surroundings.

The historic Guild Inn was recently renovated and expanded opening opportunity to enhance the park and offer a new experience to users by allowing for a look out station offering natural views of the surroundings of the Scarborough Bluffs and to Lake Ontario.

The proposed look out sites are located in southern vicinity of the Guildwood Parkway overlooking the Scarborough Bluffs. Two site locations have been identified as feasible locations for the lookout as indicated on the drawing.

This feasibility report presents four, concept level, structural options of the lookout. In all cases, it is assumed that heavy construction loads will remain a minimum of 6m away from the current crest position to provide for safe working area, and minimize the need for slope stabilization during construction itself. Also presented are the advantages and disadvantages of each option based on: current surrounding impact, potential views, constructability challenges and overall order of magnitude costs.



OPTION 1A

This first option presents a simple look out structure that will be clear of the critical slope stability edge defined by the 1.5 safety factor. There are no significant cantilevers in this option. The raised platform would be supported on micro piles, sono tubes or conventional footings. The lookout structure itself, can be done in structural steel, metal deck and concrete. Or, it can be done using conventional wood framing systems. The height of this look out platform can further explored and increased based on the design intent. Although this is the most economical system, its aesthetic is quite modest, and is set back significantly from the current crest such that views to Lake Ontario may be very limiting.

Advantages:

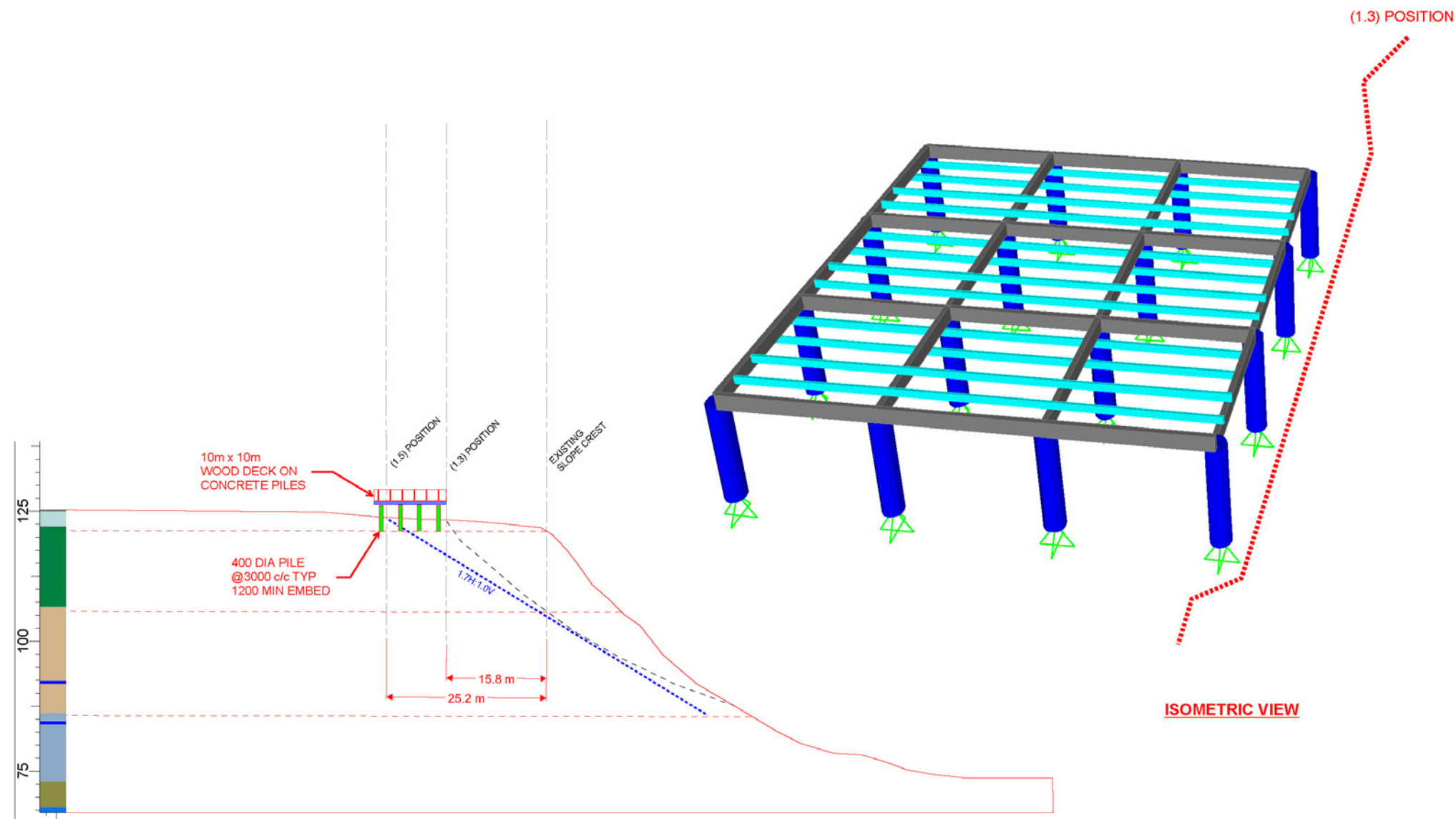
- Most economical option
- Stays clear of the critical slope stability edge.
- Least intrusive to surrounding vegetation and bluffs.
- Can be done using timber framing systems, blending aesthetically with its surroundings.
- Due to small foundation loads, there are no significant issues related to being at the crest of the slope stability crest.
- A drainage system will be designed into the structure to control storm water and ensure there is no uncontrolled discharge to the existing slope.

Disadvantages:

- It is set back significantly from the current crest, as such the views may be significantly hindered.
- Possible views to Lake Ontario may be restricted.

Order of Magnitude Cost:

- \$ 128,000 (assuming steel structure, and concrete platform)
- \$ 55,500 (assuming all wood framed structure)



GUILD PARK GARDENS - LOOK OUT

OPTION (1b)

OPTION 1B

This option is identical to Option 1A, but seeks to move the lookout structure further south towards the critical slope stability edge defined by the 1.3 safety factor. There are no significant cantilevers in this option. The raised platform would be supported on micro piles, sono tubes or conventional footings. The lookout structure itself, can be done in structural steel, metal deck and concrete. Or, it can be done using conventional wood framing systems. The height of this look out platform can further explored and increased based on the design intent. Although this is the most economical system, its aesthetic is quite modest, and is set back significantly from the current crest such that views to Lake Ontario may be very limiting.

Advantages:

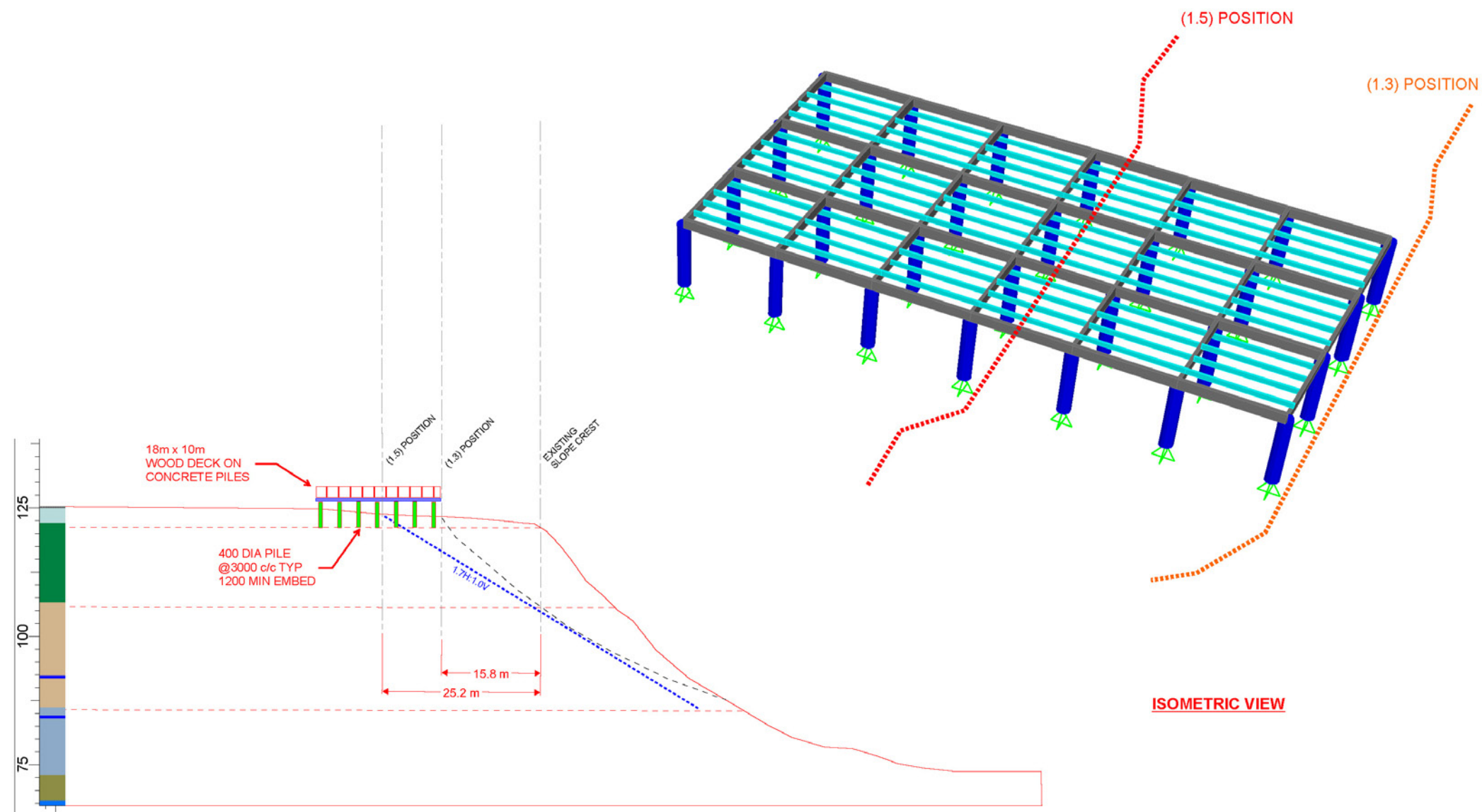
- Most economical option
- Stays clear of the critical slope stability edge.
- Least intrusive to surrounding vegetation and bluffs.
- Can be done using timber framing systems, blending aesthetically with its surroundings.
- Due to small foundation loads, there are no significant issues related to being at the crest of the slope stability crest.
- A drainage system will be designed into the structure to control storm water and ensure there is no uncontrolled discharge to the existing slope.

Disadvantages:

- It is set back significantly from the current crest, as such the views may be significantly hindered.
- Possible views to Lake Ontario may be restricted.

Order of Magnitude Cost:

- \$ 128,000 (assuming steel structure, and concrete platform)
- \$ 55,500 (assuming all wood framed structure)



GUILD PARK GARDENS - LOOK OUT

ISOMETRIC VIEW

OPTION (1c)

OPTION 1C

This option is very similar to Option 1A, B however it creates a much longer structure. As such, the lookout structure can be extended to create a 'walkway' and larger assembly area for the public. The raised platform would be supported on micro piles, sono tubes or conventional footings. The lookout structure itself, can be done in structural steel, metal deck and concrete. Or, it can be done using conventional wood framing systems. The height of this look out platform can further explored and increased based on the design intent.

Advantages:

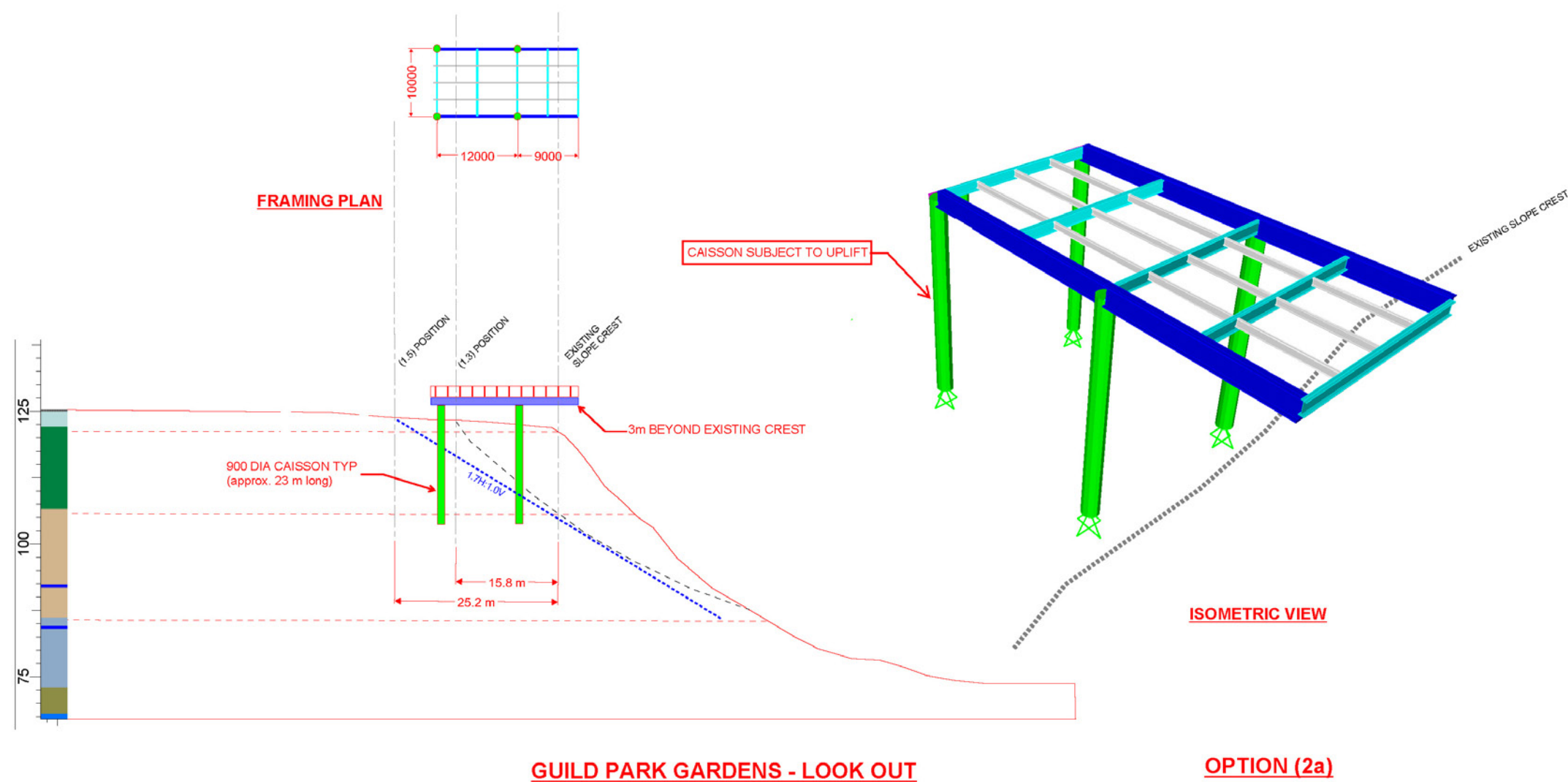
- Economical option
- Stays clear of the critical slope stability edge.
- Least intrusive to surrounding vegetation and bluffs.
- Can be done using timber framing systems, blending aesthetically with its surroundings.
- Due to small foundation loads, there are no significant issues related to being at the crest of the slope stability crest.
- A drainage system will be designed into the structure to control storm water and ensure there is no uncontrolled discharge to the existing slope.

Disadvantages:

- Set back significantly from the current crest, as such the views may be significantly hindered.
- Possible views to Lake Ontario may be restricted.

Order of Magnitude Cost:

- \$ 240,000 (assuming steel structure, and concrete platform)
- \$ 127,000 (assuming all wood framed structure)



OPTION 2A

By introducing a two span structure, and placing a select number of caissons in the slope itself (within the slope of the 1.3 and 1.5 safety factor plane), a long and significant cantilever framing system can be employed. The steel framing sizing for this option will be significant to support a 9 m long cantilever span that will allow the look out to be even closer to the crest of the slope.

Advantages:

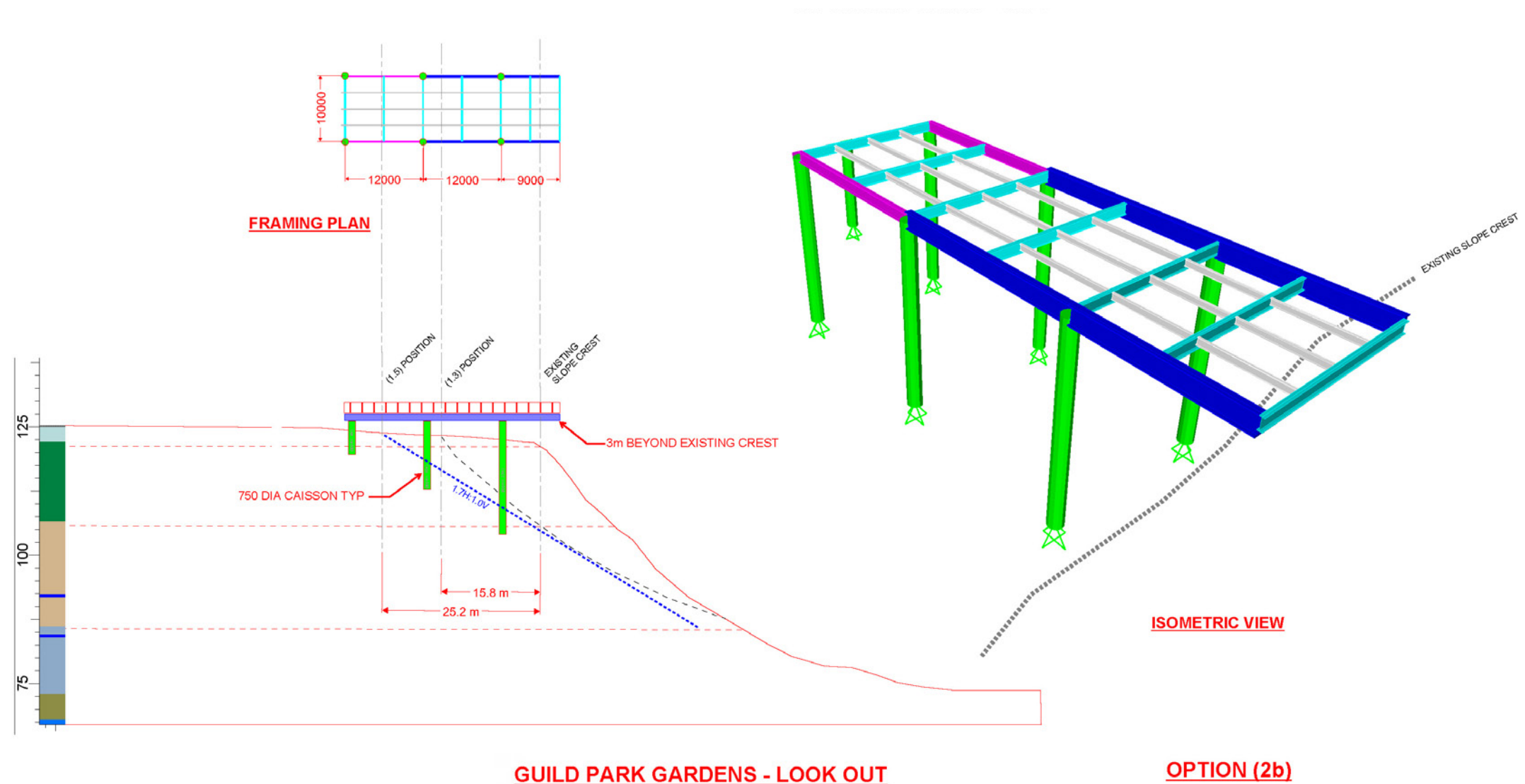
- Allow for dramatic cantilever spans of 9 m (ie. 30 ft).
- Back caissons (ie. in tension) stay clear of the critical slope stability edge (SF 1.3).
- Can be done using timber deck/floor framing systems, blending aesthetically with its surroundings.
- A drainage system will be designed into the structure to control storm water and ensure there is no uncontrolled discharge to the existing slope.

Disadvantages:

- Significant uplift/tension forces in the back caissons may require additional tie down to resist possible uplift forces.
- May be intrusive to surrounding existing vegetation along the present crest and bluffs.
- Some select caisson/piles may be required in the slope (SF 1.5).

Order of Magnitude Cost:

- \$ 750,000 (assuming steel structure, and concrete platform)



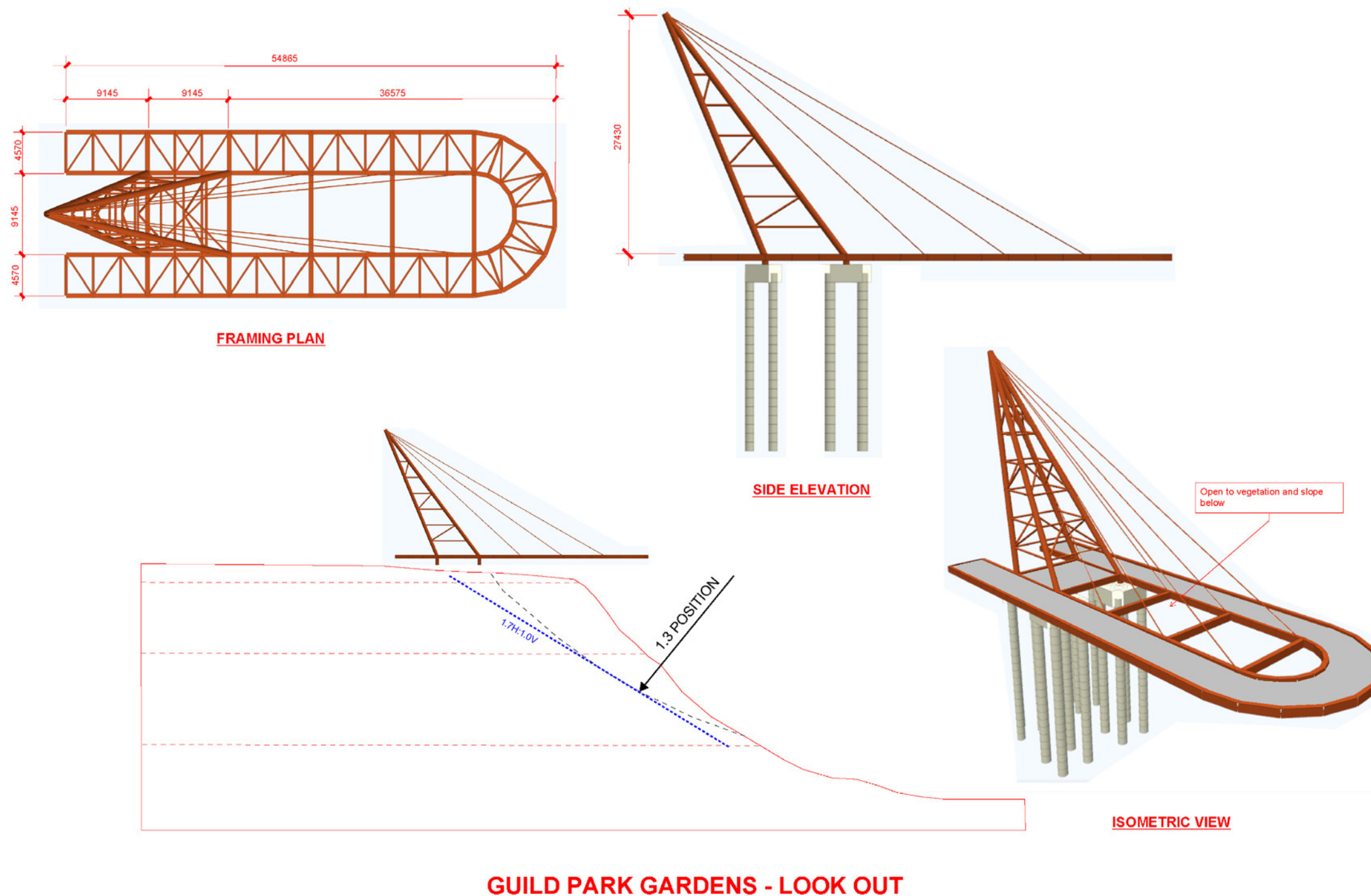
OPTION 2B

By introducing an additional span (ie. more caissons), and placing a select number of caissons in the slope itself (within the slope of the 1.3 and 1.5 safety factor plane), a long and significant cantilever framing system can be employed. This longer structure assists in distributing forces to the caissons and decreases the uplift/tension forces, thereby reducing the need for tie downs. The steel framing sizing for this option will be significant to support a 9m long cantilever span that will allow the look out to be even closer to the crest of the slope.

- Advantages:**
- Allow for dramatic cantilever spans of 9 m (ie. 30 ft).
 - Back caissons (ie. in tension) stay clear of the critical slope stability edge (SF 1.3).
 - Additional span reduces tension uplift forces in the back caissons, and decreases the requirement for tie downs.
 - Can be done using timber deck/floor framing systems, blending aesthetically with its surroundings.
 - A drainage system will be designed into the structure to control storm water and ensure there is no uncontrolled discharge to the existing slope.

- Disadvantages:**
- Significant uplift/tension forces in the back caissons may require additional tie down to resist possible uplift forces.
 - may be intrusive to surrounding existing vegetation along the present crest and bluffs.
 - Some select caisson/piles may be required in the slope (SF 1.5).

- Order of Magnitude Cost:**
- \$ 815,000 (assuming steel structure, and concrete platform)



OPTION 3

This option presents an elaborate cable suspended structural system that allows for much longer unsupported free spans. The proposed structure provides a platform well out over the bluffs, which cantilevers approximately 35 m from the 1.3 slope stability crest, and approximately 10 m from the current existing crest. The structure in itself, is a feature which could prove to attract people and increase the popularity of the site, and could potentially generate other areas of regeneration of this area. The leaning tower has been angled to match the future slope of the escarpment, such that it blends in with its surroundings. The walkway can be designed with a glass balustrade, and other features such a glass floor panel can be investigated too.

Advantages:

- Elaborate structural system can be an aesthetic feature and offer a key identity to the project and lookout park.
- Long spans allow for the look out to provide views to Lake Ontario (and its surrounds) in the current state of the slope as well as the future (eroded) slope.
- A drainage system will be designed into the structure to control storm water and ensure there is no uncontrolled discharge to the existing slope.
- The open middle section allows for natural light to vegetation below.

Disadvantages:

- Most expensive of the options presented.
- May require speciality steel erector due to the complex nature of the structure and erection sequencing.
- Issue concerning safety and climbing hazards would need to be investigated in detail by the designer and client.
- The aesthetic of the structure may not necessarily merge well with the natural surroundings of the park.

Order of Magnitude Cost:

- \$ 6,500,000



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