0.0 Marton Pool - Developed Design - Roof Design Options

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Authoriser: **Arno Benadie, Deputy Chief Executive**

1. Reason for Report

1.1 Staff engaged CREATE Ltd to undertake the developed and detailed design works for the Marton Pool project. As more detailed investigations are completed, the design of the roof needs changes to accommodate the original outcomes and budgets.

1.2 This report presents those alternate roofing options for Council's consideration.

2. Context

2.1 The original design intent for the swim centre roof was a combination of insulated metal roofing and ETFE for the central portion. This roofing system was factored into the budget estimate that was presented initially. The original roof design is attached as Original Design in the annexures

2.2 Following the completion of the geotechnical investigations, CREATE determined that the columns along the facade facing Hereford Street require strengthening with new concrete pads. These were not allowed for in the original scope and cost plan.

2.3 Over the course of developing the design, CREATE also determined that the existing roof pitch of 3° is insufficient fall for either an insulated metal roof or the ETFE. Ideally, the roof pitch needs to be increased to 6-8° which in turn creates the need for a new subframe on top of the timber rafters.

2.4 The above developments mean that the required modifications come at a cost increase.

3. Discussion and Options Considered

3.1 The first option considered to reduce cost was to replace the insulated metal roof with ETFE, meaning only one roofing system across the entire roof. While this helps limit the weight across the whole roof it also reduces the complexity of integrating two different roofing systems. *This option is presented as Option 2 in the annexures.*

3.2 This first alternative option included the timber glulam beams as noted in the original brief. Unfortunately, the use of the glulam beams does not resolve the problems with the overall weight or additional costs. A more cost-effective and light-weight solution would be to replace the timber rafters with steel. This option further reduces the structural load placed on the concrete structure below. *This option is presented as Option 1 in the annexures.*

3.3 The option of making use of a steel frame with a full ETFE roof cover brings the cost estimates back to within the original project budget.

3.4 The introduction of ETFE roof also provides a number of additional benefits, some significant. These include:

3.4.1 Solar gain within the pool hall provides free heat to the indoor air

3.4.2 Sunlight directly on the pool surrounds warms the concourse area

3.4.3 Sunlight directly on the pool provides free heat to the pool water

3.4.4 A brighter pool hall reduces the need for artificial lighting thus saving electricity

3.5 The ETFE roof comes with some disadvantages too:

3.5.1 Reduced thermal insulation compared to traditional insulated roof

3.5.2 The relative translucency of the roof allows for "black sky radiation" which, in simpler terms, heat from the pool space escaping through the roof, thereby increasing the heating load at night. This effect, can however, be reduced by using pool covers overnight.

3.5.3 The potential to overheat the pool hall during high ambient and high daylight conditions.

3.6 In various model simulations undertaken over the last decade within New Zealand sites, all indicate that the advantages outweigh the disadvantages and show a net decrease in energy consumption with the inclusion of ETFE. These models have accounted for the use of pool covers overnight.

3.7 The ETFE roof provides a net positive effect on reducing energy consumption.

4. Financial Implications

4.1 The rough order of cost for option 1 (ETFE roof with steel frame) is estimated to be within or closer to the original estimates presented.

4.2 While Option 2 (timber glulam and full ETFE roof) seems more straightforward, it is estimated to be around $250K to $300K more expensive than Option 1.

4.3 These are only rough cost estimates and will need to be developed in detail by a qualified Quantity Surveyor.

5. Impact on Strategic Risks

5.1 There could be material impact on reputational risk if the Marton pool remains closed for an extended period of time or if the repair of the facility has an impact on rate rises and affordability.

6. Strategic Alignment

6.1 Repair of the Marton Pool facility is aligned with Council's priorities.

7. Mana Whenua Implications

7.1 There are no Mana Whenua implications.

8. Climate Change Impacts and Consideration

8.1 Therea are no climate change impact and considerations.

9. Statutory Implications

9.1 There are no statutory implications.

10. Conclusion

10.1 While Option 2 helps reduce the structural load and removes the complexity of integrating two different roofing systems, Option 1 provides a far more effective solution on both fronts, at much less cost.

11. Decision Making Process

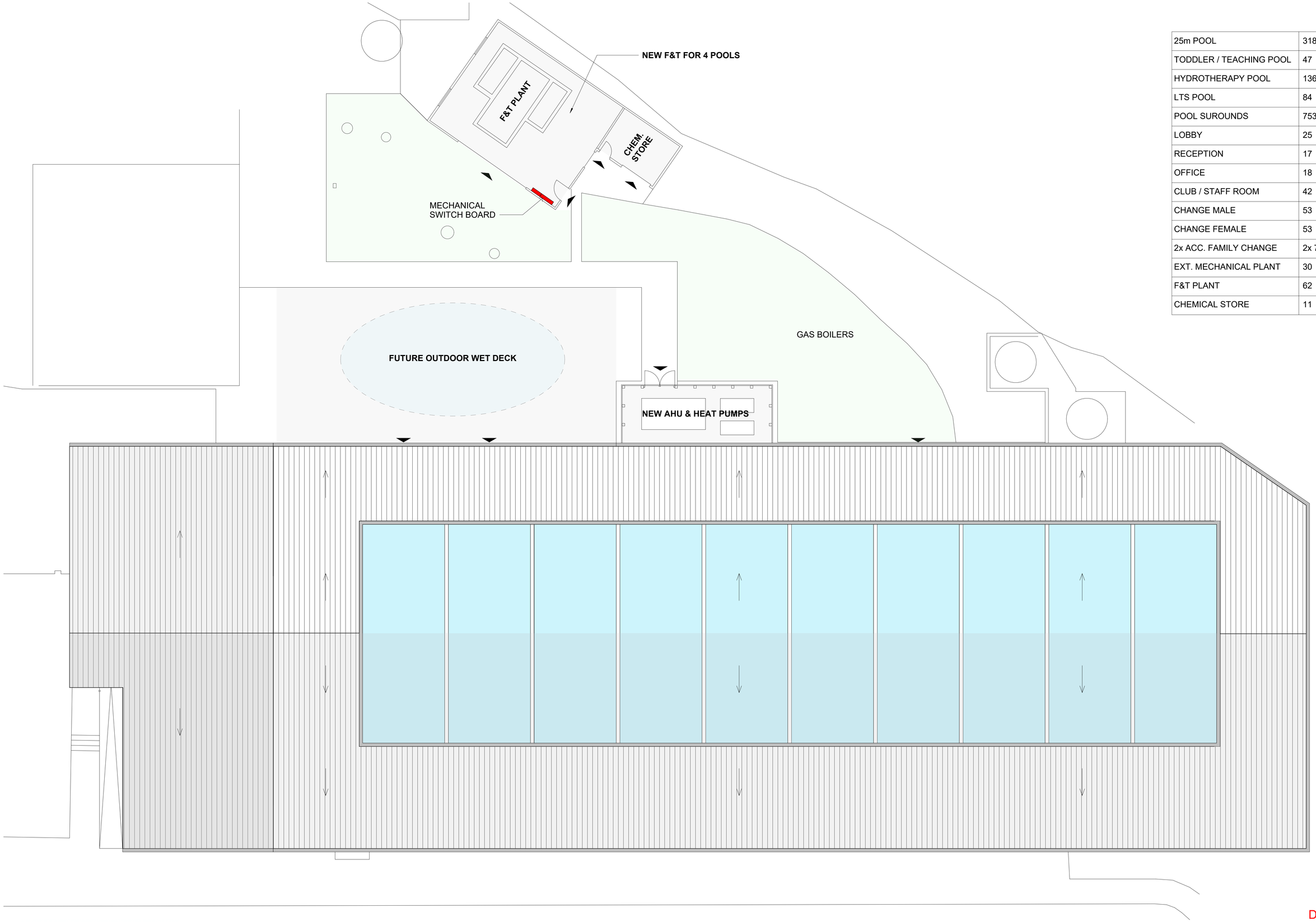
11.1 Staff would request direction from Council as to which of the presented roof design options they can proceed to develop further.

Recommendation

That the report Marton Swim Centre – Developed Design – Roof design options be received.

Recommendation 1

That the Asset/Infrastructure Committee recommend to Council that staff to proceed with Option 1 OR Option 2 [delete one] to develop the design details further.



25m POOL	318	m²
TODDLER / TEACHING POOL	47	m²
HYDROTHERAPY POOL	136	m²
LTS POOL	84	m²
POOL SUROUNDS	753	m²
LOBBY	25	m²
RECEPTION	17	m²
OFFICE	18	m²
CLUB / STAFF ROOM	42	m²
CHANGE MALE	53	m²
CHANGE FEMALE	53	m²
2x ACC. FAMILY CHANGE	2x 7	m²
EXT. MECHANICAL PLANT	30	m²
F&T PLANT	62	m²
CHEMICAL STORE	11	m²

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PROJECT TITLE
Marton Pool
25 Hereford Street, Marton 4710
Rangitikei District Council

SHEET TITLE
Roof Plan - Consolidated Floor Plan

SCALE - ORIGINAL @ A1
1 : 100

DATE

DRAWING STATUS
Preliminary

PROJECT NO.
1853

SHEET NO.
A102

REVISION

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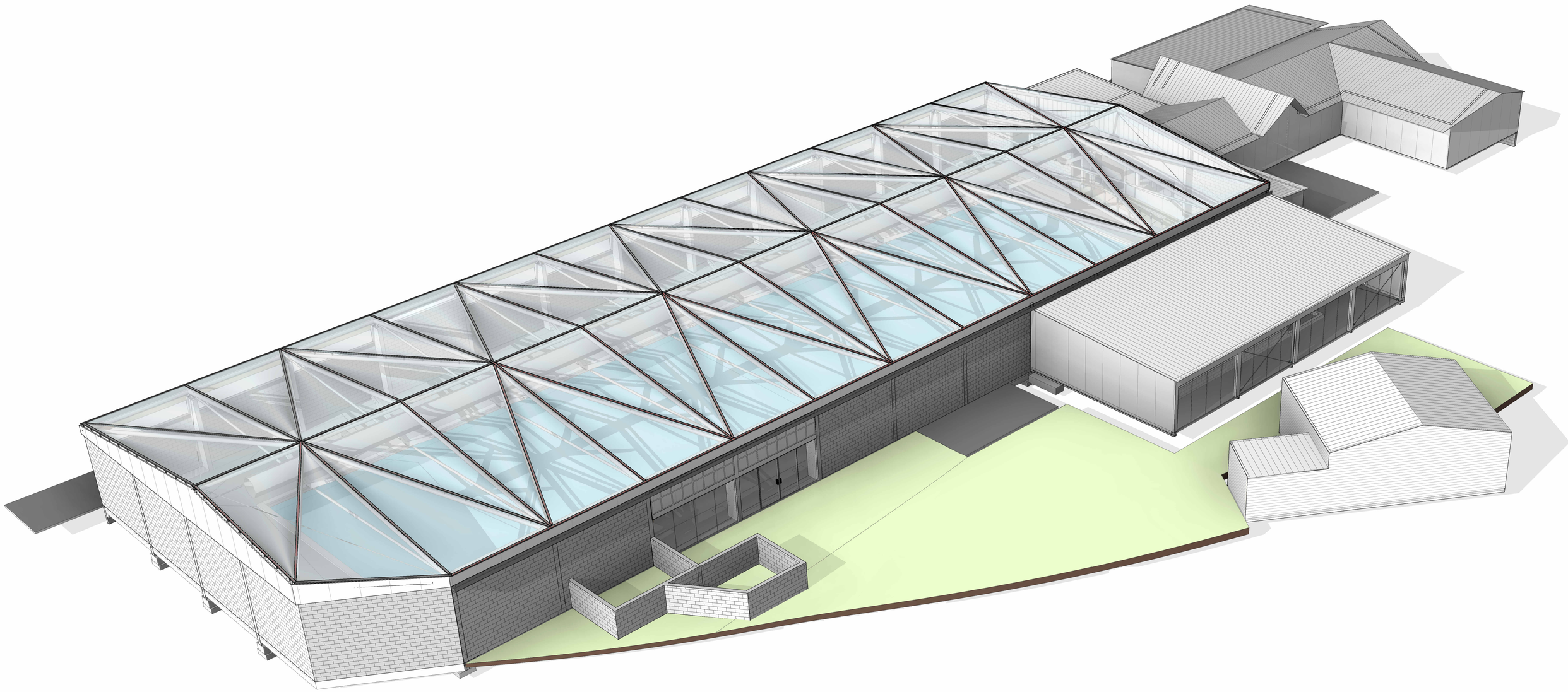
OPTION 1 - STEEL TRUSSES WITH TIMBER STRUTS, TRIANGULAR ETFE CUSHIONS

WORK - IN - PROGRESS



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PROJECT TITLE
Marton Pool
25 Hereford Street, Marton 4710
Rangitikei District Council

SHEET TITLE
Axonometry

SCALE - ORIGINAL @ A1

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DRAWING STATUS
Developed Design - WORK-IN-PROGRESS

PROJECT NO.
1853

SHEET NO.
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OPTION 1 - STEEL TRUSSES WITH TIMBER STRUTS, TRIANGULAR ETFE CUSHIONS

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SHEET TITLE
Perspective Option 1 - Camera 1

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OPTION 1 - STEEL TRUSSES WITH TIMBER STRUTS, TRIANGULAR ETFE CUSHIONS

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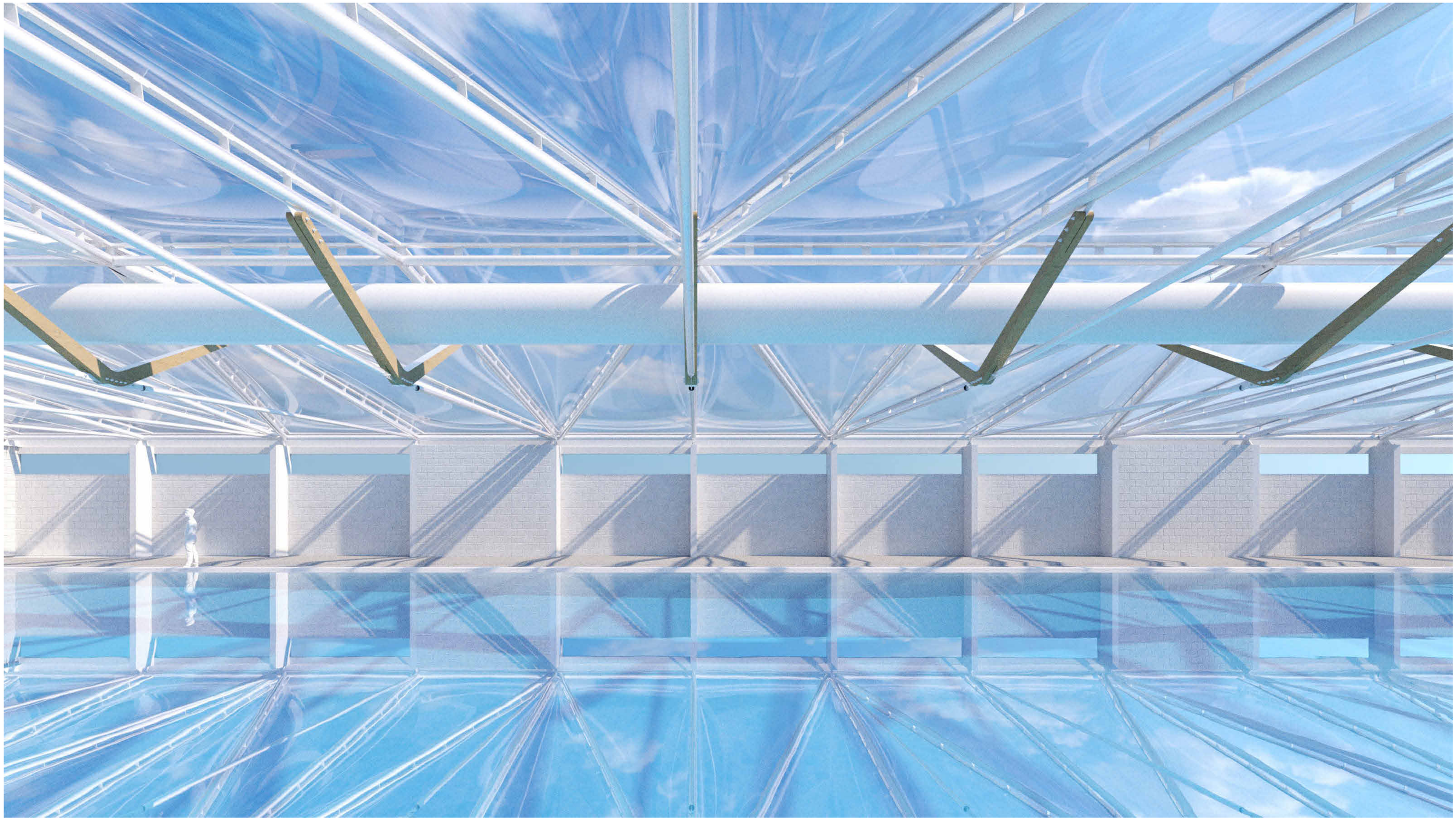

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OPTION 1 - STEEL TRUSSES WITH TIMBER STRUTS, TRIANGULAR ETFE CUSHIONS

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OPTION 2 - TIMBER RAFTERS, STEEL SUB-FRAME, RECTANGULAR ETFE CUSHIONS

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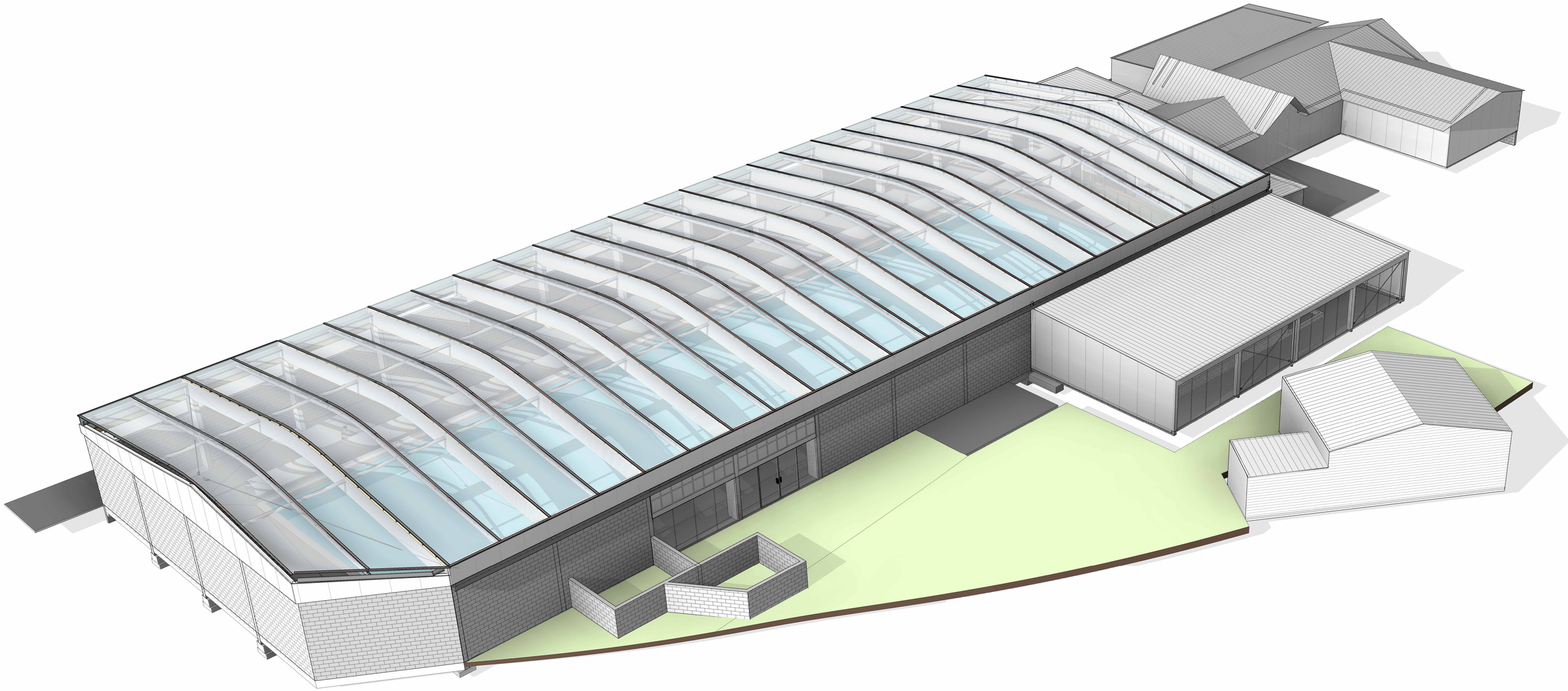

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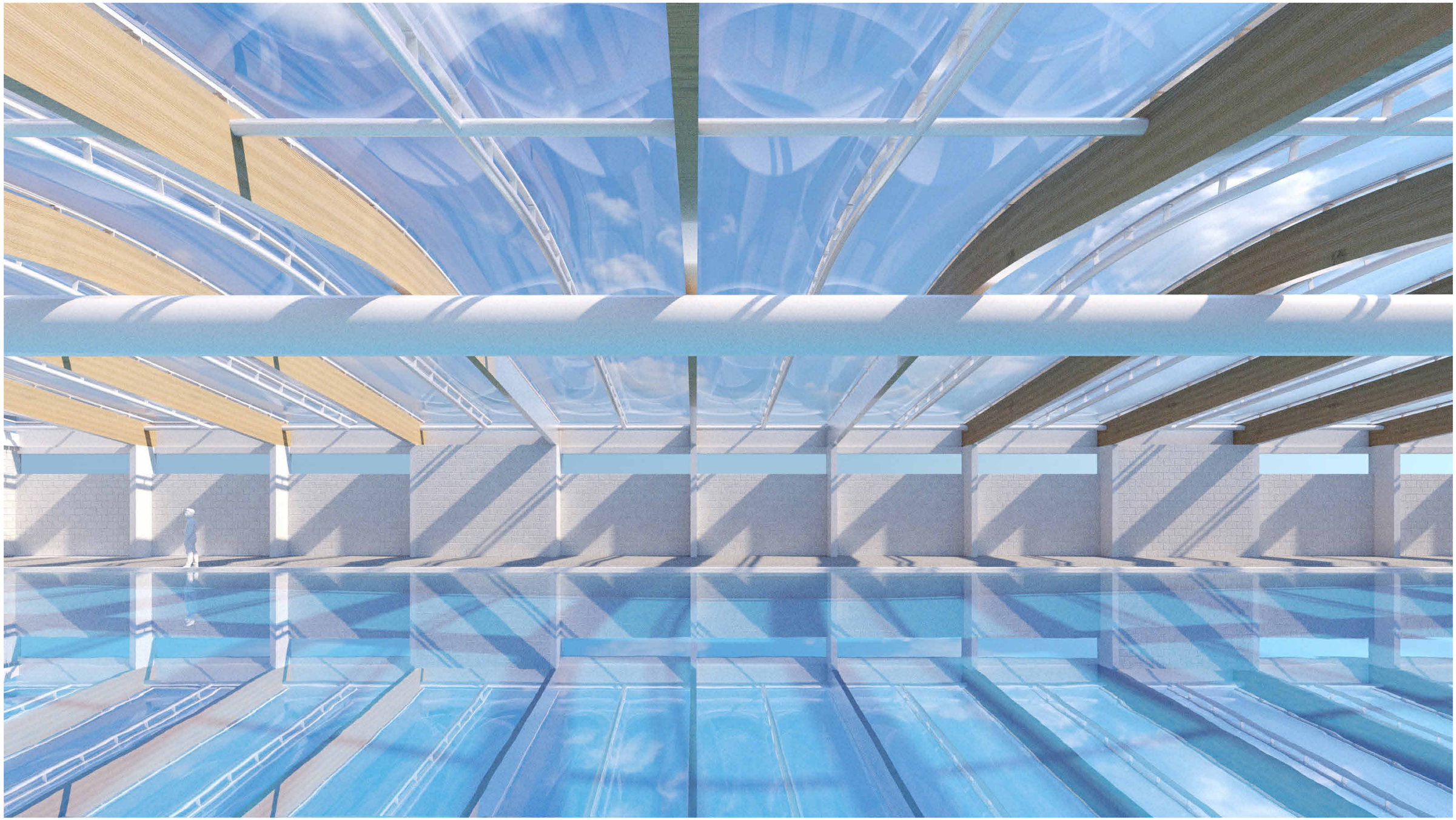

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OPTION 2 - TIMBER RAFTERS, STEEL SUB-FRAME, RECTANGULAR ETFE CUSHIONS

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