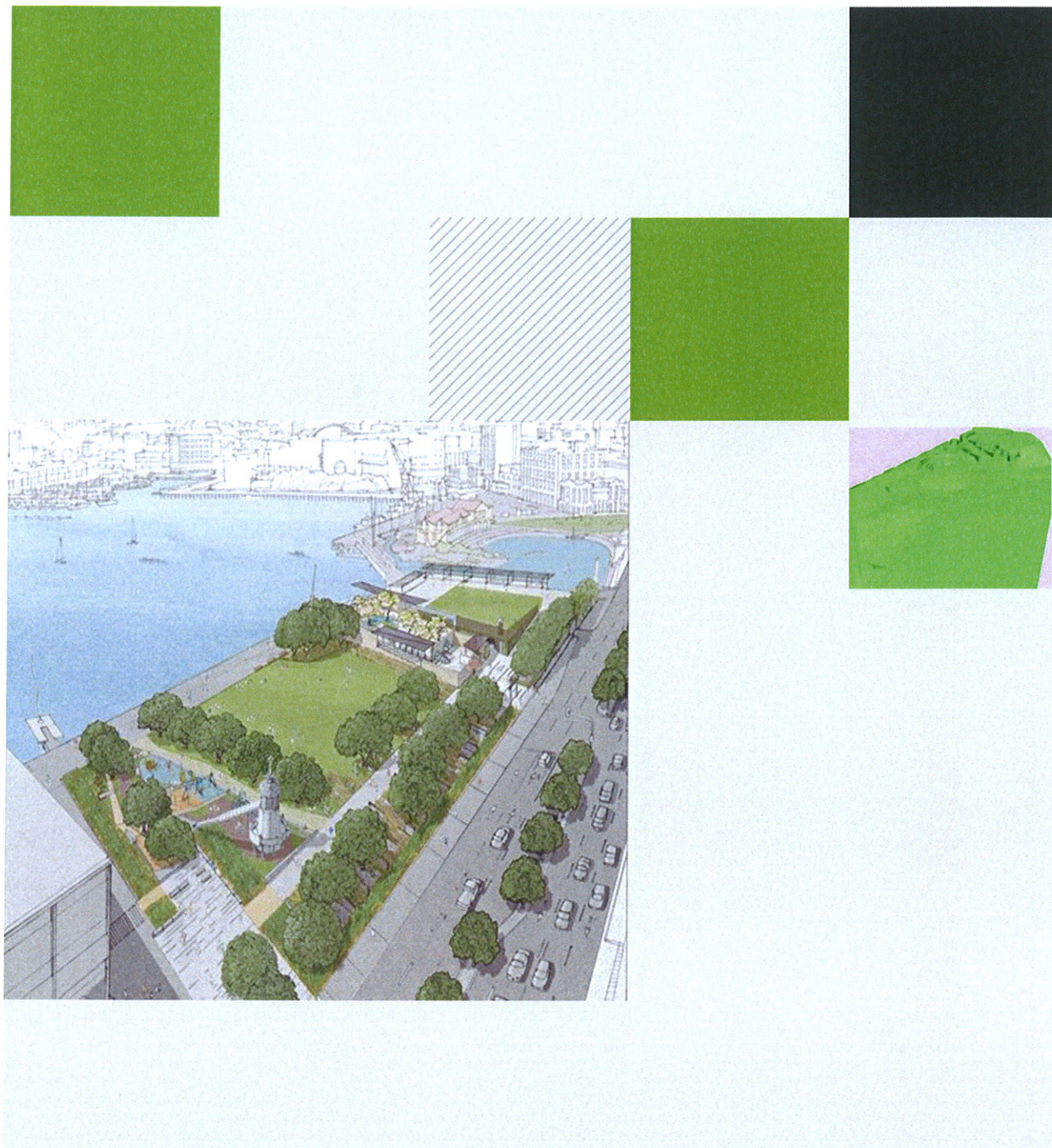


APPENDIX 9

EARTHWORKS AND EROSION AND SEDIMENT CONTROL MEASURES



Frank Kitts Park
 Earthworks and
 Erosion & Sediment Control Measures
Wellington City Council (City Shaper)

2 May 2016
 Revision: 2
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| | | | | | | |
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| Approval | | | |
|------------------|---|--------------------|---|
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| Title | Civil Engineer | Title | Project Leader |



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Appendices

Appendix A

Erosion & Sediment Control Plan Layout

Appendix B

Related Drawings

Figures

Figure 1: Artist impression of redeveloped Frank Kitts Park

Figure 2: Pre-development Site

Figure 3: Post-development site

Figure 4: Indicative E&SC layout

1 Project Description

Frank Kitts Park is located on the Wellington harbour waterfront. The proposed development site is defined by the existing park extents from the Lagoon and Harbour to the east and south, Jervois Quay to the west and the building and service areas of the TSB Bank Arena to the north.

The vision and strategic aims for the project are to "skilfully retain the integrity of the existing park, respond to the new presence of Waitangi Park as a venue for events and fully integrate a Chinese Garden that expresses a contemporary view of being Chinese in New Zealand" and "to remain a major green open space, complementing the new larger green space of Waitangi Park."

Essentially the proposed design includes:

- Contemporary Chinese Garden ~1,500 m²
- Grassed Park Area ~4,500 m²
- Maintains the existing promenade
- Improved pedestrian walkways, paths and sitting areas
- Shifted and improved playground area



Figure 1: An artist impression of redeveloped Frank Kitts Park

The existing site is largely a green space containing mid to large size trees with multiple paved pedestrian pathways. The site also contains an amphitheatre and curved, monolithic concrete walls along the interface with the promenade. There is also an underground carpark under the site which is to be maintained.

Aurecon New Zealand has been engaged to assess indicative earthwork volumes and development of an indicative erosion and sediment control methodology.



2 Demolition

A number of existing landscaping features in the existing park that will be demolished as part of the proposed works. The site will be ring-fenced at start-up and a detailed sequencing and safety plan established by the contractor. A plan detailing the scope of demolition works is included in Appendix B.

The Contractor shall take out all necessary permits required by Statutory and Local Authorities, shall pay the necessary fees and comply with all relevant regulations and by-laws.

The Contractor shall review available plans of the structure to be demolished including those held by the local authority along with other information held by the Local authority (e.g. PIMs, LIMs) to identify any existing site conditions, services, hazardous materials, underground pits and pipes that may be within the available information. The Contractor shall also undertake field inspections of the structure to identify the condition of the structure and any apparent hazardous materials and appurtenances that may impact on the method and cost of the demolition work.

Should unknown hazardous materials be found during the demolition works, the Contractor shall immediately notify the Engineer and cease work pending agreement on a remediation strategy.

Demolition shall be done in a careful manner in small sections to reduce noise and dust nuisance. All falling materials shall be dropped and contained within the site during demolition and prior to removal. Blasting will not be permitted. Removal of hazardous materials shall be done in a manner appropriate to worker and public safety, under the oversight of a person with recognised qualifications in hazardous substance planning. The hazardous area shall be shrouded and air management facilities provided as necessary to achieve such safety.

During the works the Contractor shall meet all environmental obligations that apply either from a project specific Resource Consent or as a minimum, from the default standards of the Local Authority. Without limiting the Contractor's obligations such standards are expected to apply to dust, noise, vibration and stormwater runoff, in addition to the hazardous materials management covered elsewhere in this specification.

The Contractor shall provide all necessary stormwater runoff controls to ensure that runoff from the site is free of hazardous substances and other unacceptable suspended products. Similarly vibration, dust and particulate control measures shall be in place to protect both the surrounding environment and worker safety.

3 Bulk Earthworks

The complete site extent is in the order of ~13,500 m². All of which will be exposed to some sort of landscaping activity as part of the proposed development. Grassed areas of the site comprise approximately 6,750 m², assuming a topsoil depth of around 150 mm across the site stripping will yield around 1,000 m³ for on-site stockpiling and respreading as part of the project. It is envisaged that all of the topsoil stripped will be able to be respread.

Indicative estimates for earthworks volumes (less topsoil, pavers and concrete – solid measure) are in the order of:

- *Topsoil Cut to Stockpile/Respread* = 1,000m³
- *Cut to Fill* = 2,610 m³
- *Imported Fill* = 910 m³

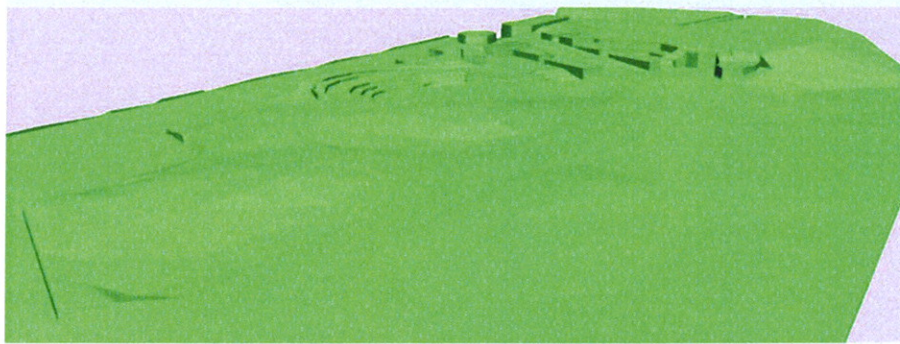


Figure 2: Pre-development Site

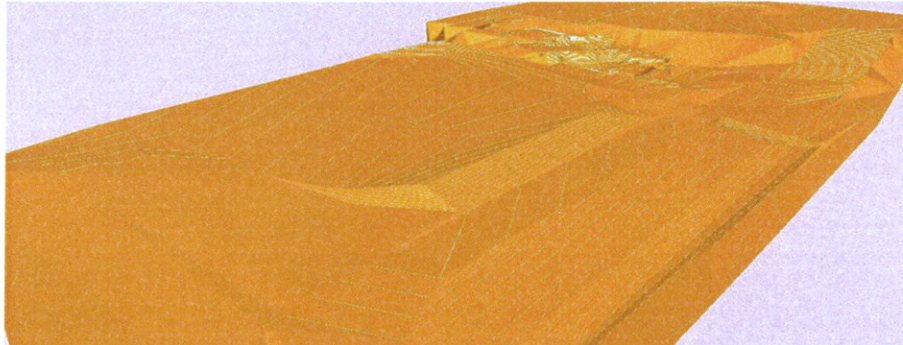


Figure 3: Post-development site

Depending on the suitability of the cut materials, they may be able to be used as fill where required on the site. No allowance has been made for undercut and removal of unsuitable/soft soils. As the area is generally pedestrian and not subject to large loads, it is unlikely that significant undercut will be required.

There will be on-site testing of existing soils throughout the earthworks stage to confirm soils are suitable for re-use. Should any contaminated materials be established this would provisionally be cut to waste to an approved disposal site, with the difference made up of imported clean-fill.

4 Principles for minimising sediment discharges

The principles of this erosion and sediment control plan are to:

- **Minimise disturbance** – only work areas that require landscape changes
- **Stage construction** – only open up areas that are intended to be worked on within reasonable timeframes, complete and close areas before moving to next
- **Protect steep slopes** – avoid steep slopes, divert runoff away from slopes with bunds, cut off drains etc
- **Protect waterbodies** – prevent runoff direction toward harbour, installation of containment devices to stormwater catchpits and drains
- **Stabilise exposed areas rapidly** – planting, mulching and grassing of finished or exposed areas as soon as possible
- **Install perimeter controls** – installation of silt fences, drains and bunds to trap/divert runoff and suspended sediment
- **Employ detention devices** – construct ponding area to allow for larger storm events
- **Make sure the plan evolves** – erosion & sediment control plan to be reviewed at project meetings throughout construction
- **Inspect** – control devices to be inspected weekly by a competent person and the Engineer during any site visits

5 Erosion control and sediment control methods

A number of erosion and sediment control measures will be put in place including, but not limited to:

5.1 Silt fences

Installation of silt fences will be carried out to contain specific areas and the site as a whole. Perimeter fencing will be installed to prevent runoff leaving the site and entering drainage channels and the harbour nearby. Stockpile areas for bulk earthworks material and topsoil will also be contained within silt fences.

Due to the site being so close to the harbour, the fences will act to contain the whole site as much as possible and prevent overland flows.

5.2 Cut off drains/bunds

Channels or drains may be required to be cut into the ground to convey runoff to the designated ponding areas. These drains will be of a nominal width and fall and formed by the excavator on site. These drains will intercept the runoff before they reach the silt trap fencing.

Bunds may also be constructed to contain areas and direct runoff towards ponding areas. Bunds will typically be 0.5 – 1.0 m high with 3:1 side slopes.

5.3 Ponding areas

Storage of stormwater is to be provided by constructing designated ponding areas. Given the small catchment area these ponds would likely take the form of decant earth bunds (DEB) with controlled decant outlet structures.

These will essentially be large depressions constructed at localised low points on the site. In large rainfall events these depressions will store water and allow for soakage and a decant release. Final locations and geometries will be confirmed by the preferred Contractor.

5.4 Filter traps for stormwater inlets

Filter bunds or filter traps will be installed on the local stormwater drainage inlets near the site. These will trap sediments and rubbish and prevent discharge into the stormwater network and ultimately the waterways. These devices will require regular monitoring and inspection and appropriate maintenance when required.

5.5 Indicative Layout

An indicative layout has been established for the proposed site. Exact locations and geometries will be confirmed on-site. Indicative pond sizes have been established in line with Wellington Regional Council guidelines. Silt fences and perimeter cut-off drains will be established where possible diverting flows to the proposed ponds.

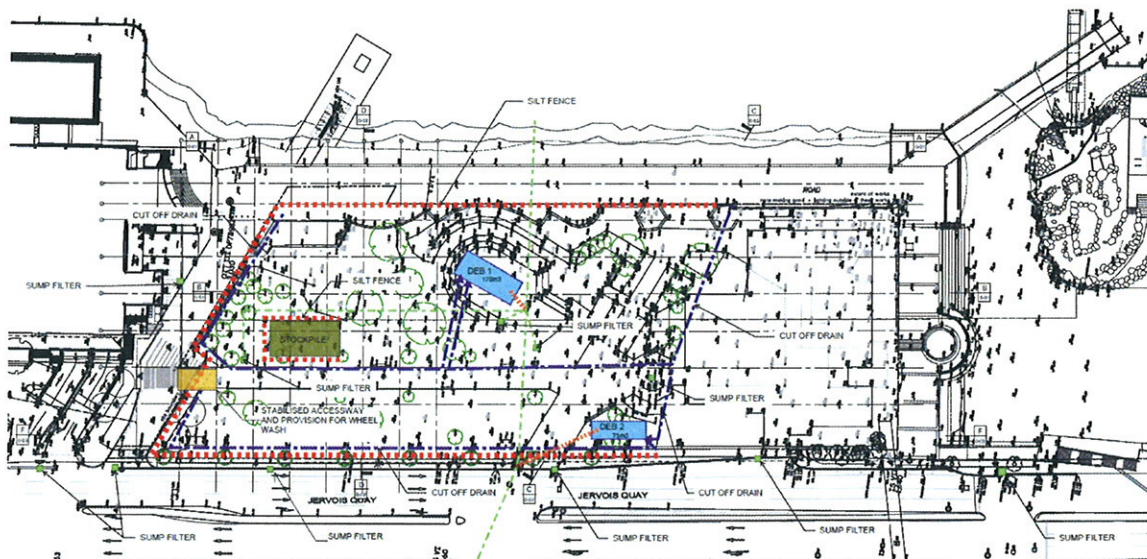


Figure 4: Indicative E&SC layout

All control measures shall apply best practises and be in general accordance with *Erosion and Sediment Control Guidelines for the Wellington Region, Greater Wellington Regional Council, September 2002*.

6 Site stabilisation

6.1 Access

Access to the site shall be provided via rock/granular vehicle crossing to minimise the tracking of earth material off site. Truck and plant routes on site shall be stabilised with granular material where practicable. A filter cloth material shall be placed under these stabilised areas. Provision will be made for a truck wash at the site entrance.



6.2 Revegetation

Areas to be landscaped shall only be stripped of their upper surface layers or cleared of vegetation immediately prior to when work is programmed for that area. No areas shall be exposed and left open for unreasonable lengths of time. Once an area is complete, topsoil is to be respread and planting, grassing and/or mulching shall be carried out as soon as possible to prevent erosion due to rainfall events. Hydro-seeding of the topsoil stockpile will be considered, provisional on Contractor programme.

7 Maintenance, monitoring and reporting

Erosion and Sediment control devices will require maintenance over the course of the project. Along with erosion and sediment control forming part of the site induction process, weekly inspections of all control measures will be carried out to ensure the proper function of the plan. Any issues shall be recorded on the inspection sheet and repaired as required.

Environmental management will form part of the site meetings in which any issues or required maintenance will be discussed and recorded. A section in the monthly report shall also address environmental management and erosion & sediment control.

8 Heavy rainfall response and contingency measures

Weather forecast monitoring will be an important part of the project. The forecast shall be regularly checked and when large rainfall events are predicted, the appropriate precautions should be carried out and all control measures checked.

If a significant rainfall event is predicted over the weekend or a public holiday, the Site Manager is responsible for checking the site to ensure all controls are in place and working properly. Checks should occur at least every 4 hours in long duration events.

9 Reviewing and changing the E&SC plan

As the works progress, the erosion and sediment controls will have to adapt to the exposure of new working areas. As part of the environment management of the site, the erosion and sediment control plan shall be updated accordingly.


The plan shall be discussed at the regular site meetings and any changes or amendments can be agreed and updated on the plan. If changes or amendments are required, these will need to be approved by a Wellington City Council (WCC) representative.

10 Site responsibilities

The responsibility to report any issues or faults within the erosion and sediment control system sits with everybody that enters the site. This will be outlined as part of the site induction process.

It is the responsibility of the Environmental Manager to gain approval of the plan from WCC and ensure that the site complies with the measures set out therein. They will be responsible for ensuring inspections are carried out and reporting is filed.

The Site Manager or their delegate shall be responsible for carrying out the inspections of erosion and sediment controls and any follow up maintenance required. They are also responsible for monitoring the



site as a whole in significant rainfall events inside and outside of normal working hours as discussed above.

11 Construction timeline

The project is proposed to be carried out over one earthworks season. Timing the project to line up with an earthworks season minimises the risk of exposure to rainfall events and the resulting runoff erosion and sediment transfer.

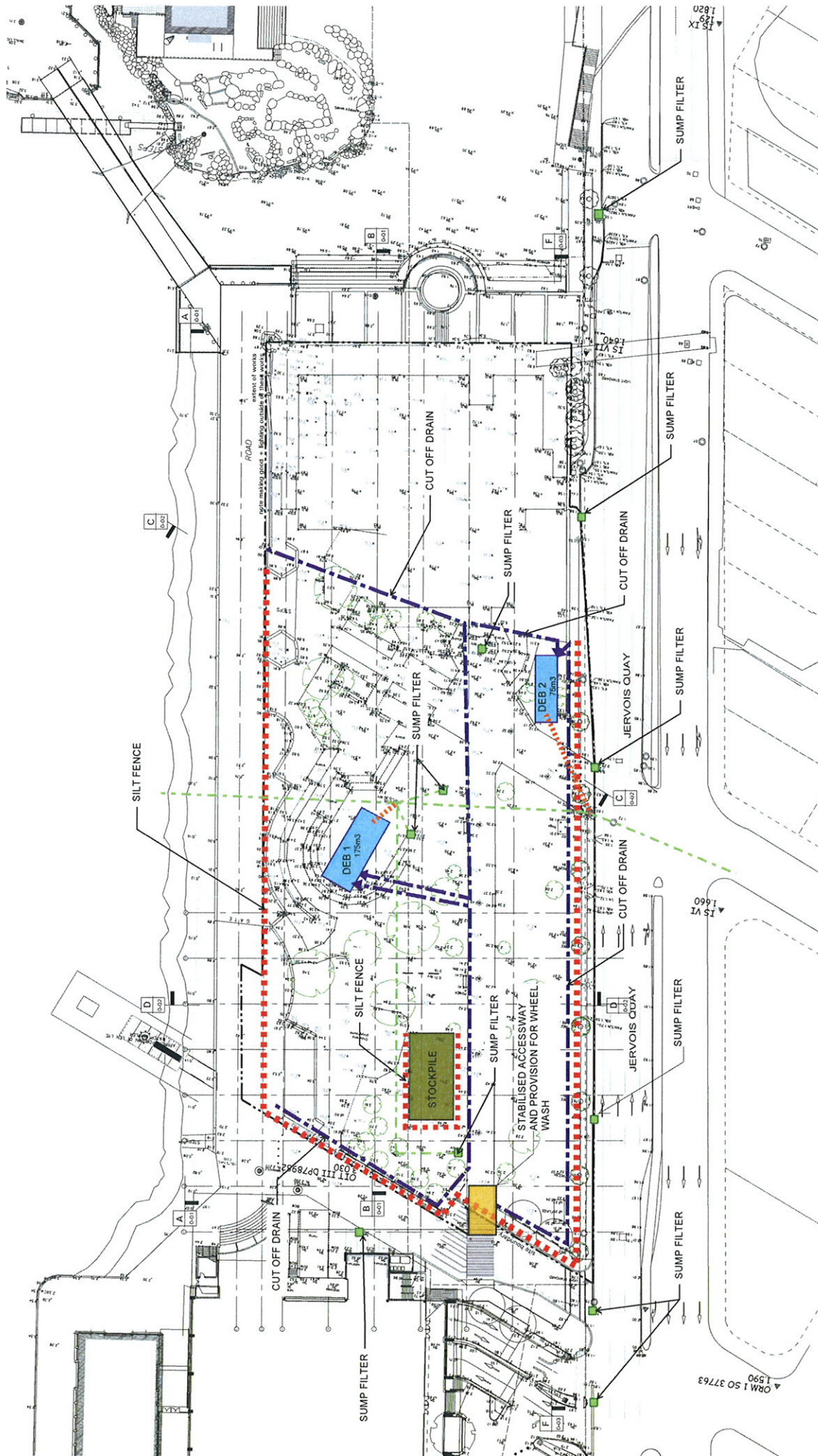
Erosion and sediment controls will be the first step of site establishment and will be in place prior to any significant site works.



Appendix A

Erosion & Sediment Control Plan Layout

1:800@A3
NORTH



by Wright + Associates Ltd. - Landscape
Athfield Architects - Architecture
Duncan Campbell - Chinese Garden Consultant
for Wellington Waterfront Limited
Wellington Chinese Garden Society

Dunning Thornton Consultants Limited - Structural
Aurecon - Civil, Services + Environmental
SKM - Lighting

RESOURCE CONSENT
4th February 2016

LA RC 0-02
Existing survey plan

REV DATE
A RC CLIENT REVIEW
ISSUE
04 02 2016





Appendix B

Related Drawings

CONCRETE TO BE BROKEN OUT AND REMOVED
ON SITE

EXISTING PAVEMENT TO BE LIFTED AND
REMOVED FROM SITE

WALL TYPE REFER TO DRAWING CIV-001 FOR DETAILS

EXISTING LIGHTS

EXISTING STAIRS

STRUCTURAL DEPOSITION EXTENT OF WORK

[illegible]

CUT / FILL DEPTH BANDS

CUT -10.0m to -4.0m
 CUT -4.0m to -3.5m
 CUT -3.5m to -3.0m
 CUT -3.0m to -2.5m
 CUT -2.5m to -2.0m
 CUT -2.0m to -1.5m
 CUT -1.5m to -1.0m
 CUT -1.0m to -0.5m
 CUT -0.5m to 0.0m
 FILL 0.0m to 0.5m
 FILL 0.5m to 1.0m
 FILL 1.0m to 1.5m
 FILL 1.5m to 2.0m
 FILL 2.0m to 2.5m
 FILL 2.5m to 3.0m
 FILL 3.0m to 3.5m
 FILL 3.5m to 4.0m
 FILL 4.0m to 10.0m

FINAL DESIGN LEVELS TO BE CONFIRMED

EARTHWORK VOLUMES

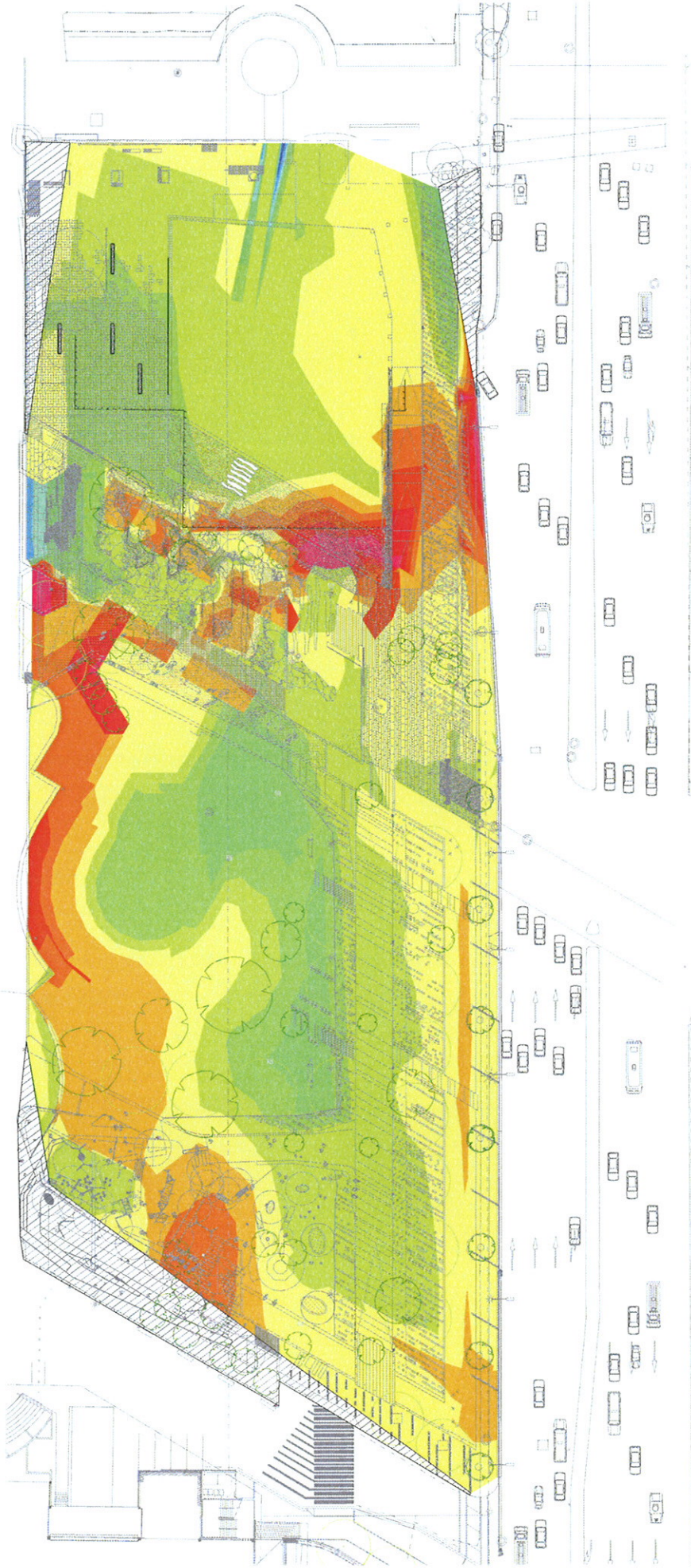
RAW VOLUMES
 CUT = 4,590m³
 FILL = 2,260m³

VOLUMES LESS TOPSOIL, PAVERS AND CONCRETE

CUT = 3,520m³
 FILL = 2,610m³
 EXCESS CUT = 910m³

NOTES

- EXISTING SITE SURVEY PROVIDED BY CADPO 1/8 DATED 2/8/2018
- PROPOSED SITE LEVELS PROVIDED BY WEIGHT
- ASSUMED: DATED 18/03/16
- PAVEMENT THICKNESS NOT PROVIDED, THEREFORE ASSUMED DEPTHS / QUANTITIES SUBJECT TO CHANGE



| REV | DATE | REVISION DETAILS | APPROVED | SCALE | SIZE | RESOURCE | CONSENT |
|-----|----------|-----------------------|-----------|----------|------|----------------------|---------|
| 01 | 14/07/16 | ISSUE FOR INFORMATION | P/A | AS SHOWN | A1 | NOT FOR CONSTRUCTION | |
| 02 | 15/09/16 | ISSUE FOR INFORMATION | P/A | | | | |
| A | 18/03/16 | DRAFT FOR INFORMATION | N.SIMPSON | | | | |

| SCALE | SIZE | RESOURCE | CONSENT |
|-----------|------|----------------------|---------|
| AS SHOWN | A1 | NOT FOR CONSTRUCTION | |
| DRAWN | | | |
| DESIGNED | | | |
| CHECKED | | | |
| N.SIMPSON | | | |

| PROJECT | TITLE | DATE | RESOURCE |
|-----------------|--------------------------------------|------|----------|
| FRANK KITS PARK | EARTHWORKS PLAN CUT / FILL DEPTHS | | |

| PROJECT No. | 251271 | DRG | CIV | 002 | A |
|-------------|--------|------|-----|-----|-----|
| DRAWING No. | 251271 | 0000 | DRG | CIV | 002 |


1. EXISTING SITE SURVEY PROVIDED BY CARDNO ICB, DATED 25/02/2008
2. PROPOSED SITE LEVELS PROVIDED BY WRIGHT - ASSOCIATES, DATED 14/03/2008
3. PAVEMENT THICKNESS NOT PROVIDED, THEREFORE ASSUMED DEPTH 7.0 UNITS, SUBJECT TO CHANGE



EXISTING GROUND MODEL

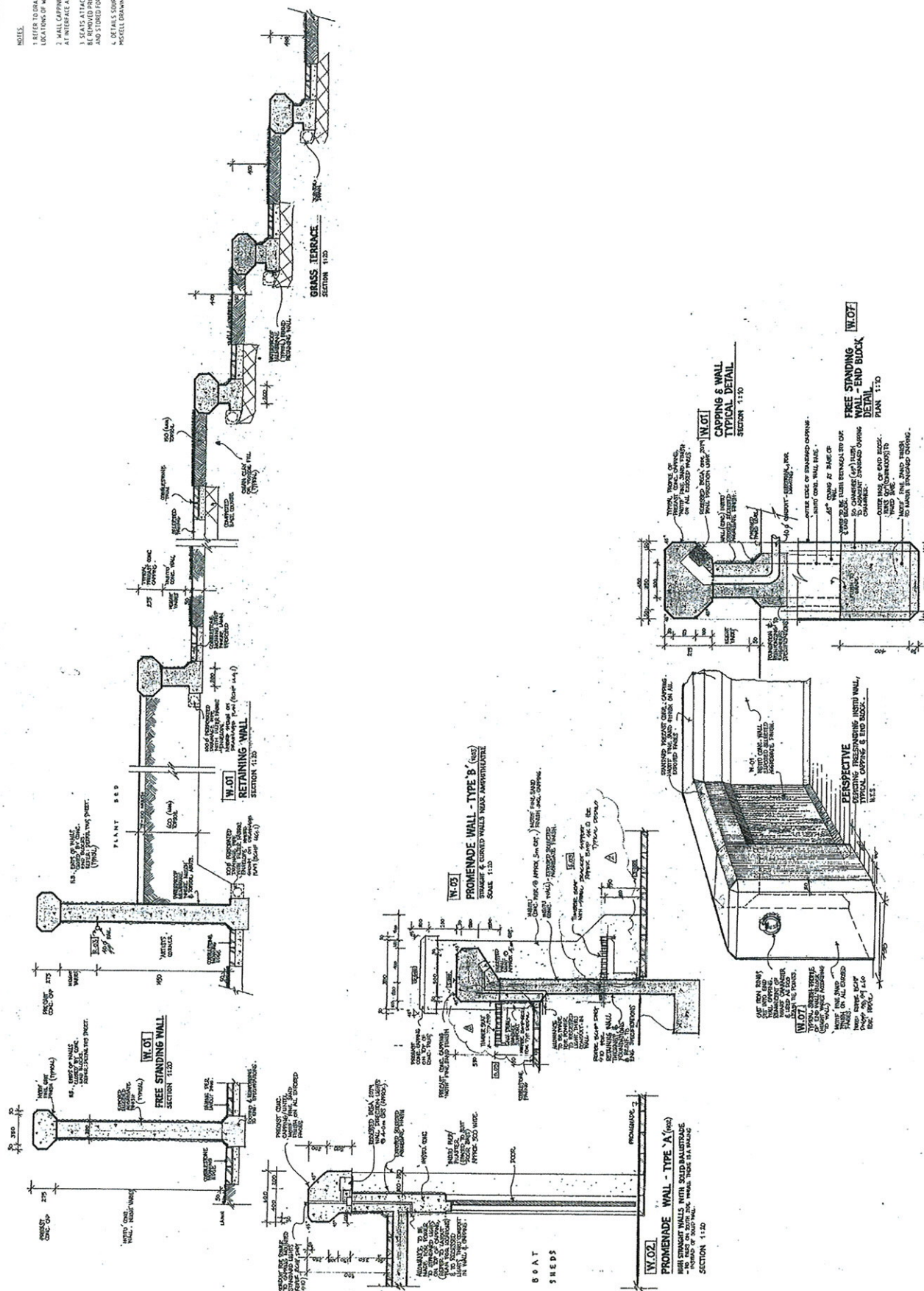


PROPOSED SURFACE MODEL

| | | | | | | | | | |
|---|---|------------|-----------------|-------------------------------|-------------------|--------------|-----------------------------|-----------------|--|
|  www.aurecongroup.com | CLIENT Absolutely POSITIVELY <small>Heritage in Planning</small> Wellington <small>Wellington City Council</small> | REV | DATE | DESCRIPTION/DETAILS | APPROVED | SCALE | RESOURCE CONSENT | | PROJECT FRANK KITTS PARK |
| | | U1 | 18/03/18 | ISSUED FOR INFORMATION | PA | A1 | NOT FOR CONSTRUCTION | | |
| | | A | 18.03.18 | DRAFT FOR INFORMATION | N.J.M.P.S. | | | | |
| | | | | | | | | | |
| | | | | | | | DATE | APPROVED | TITLE EARTHWORKS PLAN SURFACE MODEL PERSPECTIVE VIEWS |
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| | | | | | | | | | DRAWING No. 25/271 |
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NOTES:

1. REFER TO DRAWING CIV-001 FOR LOCATIONS OF WALL STRUCTURES.
2. WALL CAPPINGS TO BE SAWCUT AT INTERFACE AND REMOVED.
3. SEATS ATTACHED TO WALLS TO BE REMOVED PRIOR TO DEMOLITION AND STORED FOR REUSE.
4. DETAILS SOURCED FROM BOFFA MOSKELL DRAWING NO. 8975-11 REV 2

[illegible]



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Swaziland, Tanzania, Thailand, Uganda,
United Arab Emirates, Vietnam, Zimbabwe.