PROJECT SPECIFICATION

For

Rehabilitation of Psychosocial Center Front Yard Landscaping

Misrata , Libya

2018

UNDP Libya

1.2.1 GENERAL

1.2.1.1 CONTRACT DOCUMENTS

Drawings

Large scale drawings take precedence over small scale drawings. Written or calculate able dimensions take precedence over scaled dimensions.

If there are any errors in dimensions, set out or size, immediately notify the Engineer.

Schedule

The schedule forms part of the specification. Information in the schedule will take precedence over information in the specification.

Bill of Quantities

If there are any errors in description of items or omissions in the BOQ, immediately notify the Engineer.

If there are any items which are unclear or are not available within the project program, immediately notify the Engineer.

Services diagrammatic layouts

Layouts of service lines, plant and equipment shown on the drawings are diagrammatic only, except where figured dimensions are provided or calculable.

Before commencing work:

- Obtain measurements and other necessary information.
- Coordinate the design and installation in conjunction with all trades.

Site Levels

Spot levels and identified levels on drawings take precedence over contour lines and ground profile lines.

1.2.1.2 INSPECTION

Inspection Notification Schedule

The Contractor is to notify the Engineer when the items identified in the **Inspection notification schedule** are ready for inspection.

Written Notice

Minimum notice for inspections to be made on site is 24 hours for off-site personnel, 4 hours for onsite personnel.

If notice of inspection is required in respect of parts of the works that are to be concealed, advise when the inspection can be made before concealment.

1.2.1.3 SUBMISSIONS

Samples

The Engineer must approve the laboratory used for testing.

Submit nominated samples for approval of the Engineer.

If it is intended to incorporate samples into the works, submit proposals for approval. Only incorporate samples in the works which have been approved. Do not incorporate other samples.

Keep endorsed samples in good condition on site, until practical completion.

Shop Drawings

General: If required, submit dimensioned drawings showing details of the fabrication and installation of services and equipment, including relationship to building structure and other services, cable type and size, and marking details.

Diagrammatic layouts: Coordinate work shown diagrammatically in the contract documents, and submit dimensioned set-out drawings.

1.2.2 PRODUCTS

1.2.2.1 TESTS

Notice

Give notice of time and place of nominated tests.

Attendance

The Contractor is to carry out and attend all tests where nominated in this specification.

The independent approved testing laboratory shall perform the required tests and report results of all tests noting if the tested material passed or failed such tests and shall furnish copies to the Engineer.

1.2.2.2 MATERIALS AND COMPONENTS

Consistency

For the whole quantity of each material or product use the same approved manufacturer or source and provide consistent type, size, quality and appearance.

Manufacturers' or Suppliers' Recommendations

Proprietary items: Select, if no selection is given, and transport, deliver, store, handle, protect, finish, adjust, prepare for use, and provide manufactured items in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Proprietary systems/assemblies: Assemble, install or fix in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Project modifications: Advise of activities that supplement, or are contrary to, manufacturer's or suppliers' written recommendations and instructions.

Proprietary Items

Identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but indicates the necessary properties of the item.

Alternatives: If alternatives are proposed, submit proposed alternatives and include samples, available technical information, reasons for proposed substitutions and cost. If necessary, provide an English translation. State if provision of proposed alternatives will necessitate alteration to other parts of the works and advise consequent costs.

1.2.3 EXECUTION

Use of explosives will not be permitted.

1.2.3.1 COMPLETION

Warranties

Name the owner as warrantee in conformance with the **Warranty** schedule. Register with manufacturers as necessary. Retain copies delivered with components and equipment.

Commencement: Commence warranty periods at practical completion or at acceptance of installation, if acceptance is not concurrent with practical completion.

1.2.3.2 OPERATION AND MAINTENANCE MANUALS

General

General: Submit operation and maintenance manuals for installations.

Format – hard copy

These will be A4 size loose leaf, in commercial quality files with hard covers, each indexed, divided and titled. Include the following features:

- Cover: Identify each binder with typed or printed title "*OPERATION AND MAINTENANCE MANUAL*", to spine. Identify title of project and date of issue.
- Drawings: Fold drawings to A4 size and accommodate them in the files so that they may be unfolded without being detached from the rings.
- Text: Manufacturers' printed data, including associated diagrams, or typewritten, single-sided on paper, in clear concise English.

Number of copies: 3.

Format – soft copy

- In PDF, Auto Cad or Microsoft Word, Excel format.

- On compact disk properly identified as above

1.3 NUMBER OF COPES: 3. PAVEMENT KERB, CHANNEL AND LINEMARKING

1.3.1 GENERAL

1.3.1.1 Inspection

Notice

Give sufficient notice so that inspection may be made of the following:

Set out of kerbs and channels.

Set out of line marking prior to painting.

1.3.1.2 Tolerances

Kerbs and channels conform to the following:

Absolute level tolerance: 10 mm.

Maximum deviation from design alignment: 50 mm.

Maximum deviation from a 3 m straightedge placed on horizontal, vertical, or sloping surfaces required to be straight: 5 mm.

Line marking to conform to the following:

The location of markings shall not vary from the locations shown on the drawings by more than 50 mm.

1.3.1.3 Interpretation

Definitions

General: For the purposes of this worksection the definitions given below apply.

Absolute level tolerance: Maximum deviation from design levels.

Relative level tolerance: Maximum deviation from a 3 m straightedge laid on the surface

Channels and kerbs: Includes all forms of concrete gutters, dish drains, grated drains and mountable barrier kerbing.

1.3.2 PRODUCTS

1.3.2.1 Materials

Concrete

Ready-mixed concrete shall comply with M-150 (1:2:4) for non-reinforced mass concrete and M-200 (1:1.5:3) for reinforced concrete and the requirements of these standards.

On site batch mixed concrete shall have characteristics and proportions of concrete ingredients which conform to those specified in M-150 (1:2:4) and M-200 (1:1.5:3).

Pavement Marking Paint

Provide samples of pavement marking paint and technical specifications for approval by the Engineer prior to use on site.

1.3.3 EXECUTION

1.3.3.1 Line marking

Setting out

Set out the work to ensure that all markings are placed in accordance with the drawings.

Surface Preparation

Clean dry surface: Pavement markings shall only be applied to clean dry surfaces. Clean the surface to ensure a satisfactory bond between the markings and wearing surface of the pavement.

Wet weather: Pavement marking shall not be carried out during wet weather or if rain is likely to fall during the process.

Provision for traffic: Provide for traffic while undertaking the work and protect the pavement markings until the material has hardened sufficiently so that traffic will not cause damage.

Mixing of paint: All paint shall be thoroughly mixed in its original container before use to produce a smooth uniform product.

Application of Paint

Pavement markings shall be straight or with smooth, even curves where intended. All edges shall have a clean, sharp cut off. Any marking material applied beyond the defined edge of the marking shall be removed leaving a neat and smooth marking on the wearing surface of the pavement.

Removal of Pavement Markings

General: Remove pavement markings, no longer required, from the wearing surface of pavements without significant damage to the surface.

1.3.3.2 Channels and Kerbs

General

Before placing any kerb and/or gutter, the foundation material shall be shaped and compacted to form a firm base. Where placed on pavement courses, the foundation shall be compacted to the requirements of the *Pavement base and subbase* worksection.

Kerb and/or gutters may be constructed in fixed forms, by extrusion or by slip forming in accordance with the drawings. The foundation, concrete quality, curing and testing details shall be in accordance with the *Concrete Paving* work section.

Tolerances

The level at any point on the surface of the gutters shall be within ± 10 mm of design levels. When a straight edge 3 m long is laid on top of or along the face of the kerb or on the surface of gutters, the surface shall not vary more than 5 mm from the edge of the straight edge.

Joints

Contraction joints: Formed every 3 m of gutter length for a minimum of 50% of cross sectional area. The joint shall be tooled 20 mm in depth to form a neat groove of 5 mm minimum width.

Expansion joints: 15 mm in width for the full depth of the kerb and gutter. Joints shall be constructed at intervals not exceeding 15 m and where the gutter is attached to pits and retaining walls. Expansion joints shall consist of approved preformed jointing material.

Concrete pavement: Where kerbs and/or gutters are cast adjacent with a concrete pavement the same type of contraction, construction and expansion joints specified in the concrete base shall be continued across the kerb and/or gutter.

Backfill

Timing: After the new kerb and gutter has been constructed and not earlier than three days after placing, the spaces on both sides of the kerb and/or gutters shall be backfilled and reinstated in accordance with the drawings.

Material: Backfill material behind the kerb shall consist of granular material, free of organic material, clay and rock in excess of 50 mm diameter.

Compaction: Backfill material behind the kerb shall be compacted in layers not greater than 150 mm thick.

1.4 LANDSCAPE – WALLS AND FENCES

1.4.1 GENERAL

1.4.1.1 Inspection

Notice

Give sufficient notice so inspection may be made of the following:

Setting out before commencement of construction.

Filter fabric and subsurface drainage in place before backfilling.

1.4.2 PRODUCTS

1.4.2.1 Timber

Hardwood

All hardwood in timber fences is to be without any rot, significant knots, twists, or other defects which may affect its strength and to be as per Engineer's approval.

Preservative treatment: Provide only timbers with preservative treatment painted on the timbers surface where the timber is in the ground, or ensure that all timber is highly resistant to rot.

1.4.2.2 Steel

Steel Tubes and Channels

All steel tubes and channels used for posts, rails, stays are to be painted or galvanised to ensure the maximum lifetime for the item without significant maintenance.

1.4.2.3 Wire

Chainwire, cable wire, tie wire and barbed wire are to be galvanised or other suitable metallic finish for maximum lifetime.

1.4.2.4 Concrete Walls

General

Concrete walls and concrete foundations are to be constructed as shown on the drawings.

1.4.2.5 Stone Walls

Walling Stone

Natural stone: Stone of uniform quality, sound and free from defects liable to affect its strength, appearance or durability.

Field stone: Local weathered uncut random sized natural stones.

Quarried stone: Cut or uncut random or regular size stone.

1.4.2.6 Crib Walls

General

Type: Proprietary system of interlocking precast concrete units with selected backfill placed and compacted progressively to form a retaining wall.

1.4.2.7 Gabion Walls

General

Type: Proprietary system of rock filled wire baskets.

1.4.2.8 Brick Walls

General

Brick walls on stone or concrete foundations are to be constructed as shown on the drawings.

1.4.2.9 Earth Block Walls

General

Earth block walls on stone or concrete foundations are to be constructed as shown on the drawings.

1.4.2.10 Filter Fabric

General

Type: Polymeric fabric formed from a plastic yarn composed of at least 85% by weight of propylene, ethylene, amide or vinyl Eden chloride and containing stabilisers or inhibitors to make the filaments resistant to deterioration due to ultraviolet light.

Protection

Provide heavy duty protective covering. Store clear of the ground and out of direct sunlight. During installation do not expose the filter fabric to sunlight for more than 14 days.

1.4.3 EXECUTION

1.4.3.1 General

Set out

General: Set out the wall and fence lines and mark the positions of posts, gates and bracing panels.

Clearing

Extent: Except trees or shrubs to be retained, clear vegetation within 1 m of the landscape walls. Grub out stumps and roots of removed trees or shrubs and trim the grass to ground level, but do not remove the topsoil.

Excavation

Excavate for foundations and footings.

Earth Footings

Backfill with earth around posts, compacting firmly by hand or machine in 150 mm deep layers.

Concrete Footings

In ground: Place mass concrete around posts and finish with a weathered top falling 25 mm from the post to ground level.

On slabs: Provide welded and drilled post flanges and fix with 3 masonry anchors per post.

Strip footings: Place mass concrete or reinforced concrete footings for walls. Refer to drawings for details.

1.4.3.2 Gates

Types

Gates are to be constructed with minimum 30 x 30mm steel tube frames for rigidity. Infill panels can be steel sheet, steel mesh, timber boards or other material as identified on the drawings.

Hardware

Provide the following:

Drop bolt and ferrule to each leaf of double gates.

Latch to one leaf of double gates.

Provision for locking by padlock.

Holding lugs for security bars to inside face of double gates with vehicle access.

Minimum of 2 hinges for gates 1.2m high. 3 hinges for gates 1.2 to 2.1m high. 4 hinges for gates greater than 2.1m high.

Hand Access

General: Where required, provide hand holes to give access from outside to reach locking provision.

1.4.3.3 Timber Fencing

Timber Picket Fence

Height (mm):As shown on drawings

Maximum post spacing: 2400 mm.

Member sizes (dressed):

Posts: 90 x 90 mm.

Rails: 70 x 40 mm.

Pickets: 70 x 19 mm.

Picket spacing: 125 mm maximum.

Footing type: Earth.

Footing size: 200 mm diameter x 600 mm depth.

Installation

General: Mortice posts, taper splice rails and nail twice in mortices. Set pickets and palings clear of the ground.

Picket fence: Nail twice to each rail.

1.4.3.4 Chain wire Barriers

Fence Dimensions

Maximum post spacing: 3000 mm.

Component Sizes

Intermediate posts: 42.4 mm diameter, 2.6 mm wall thickness.

End, corner and gate posts: 60.3 mm diameter, 2.9 mm wall thickness.

Chain wire: 3.15 mm diameter wire woven to form uniform mesh.

Mesh generally: 50 mm.

Tie wire: 2 mm diameter.

Post and rail barriers:

Rails and gooseneck stay: 33.7 mm diameter, 2.6 mm wall thickness.

Rail less barriers:

Struts: 42.4 mm diameter, 2.6 mm wall thickness.

Cable wires:

Two strands: 3.15 mm diameter wire.

One strand: 4 mm Heli coil wire.

Security barriers:

Chain wire selvedge's: Twisted and barbed.

Barbed wire to security fencing post extensions: Barbs at 95 mm maximum centres.

Installation

Posts: Do not splice members except in posts when splice is embedded at least 150 mm into concrete. Fit tightly fitting steel caps to posts, except where fixed to overhead structure.

Chain wire: Lace chain wire to end and gate posts. Tie chain wire twice around members at 250 mm maximum intervals. Twist ends twice and cut off neatly.

Cable wire: Tension cable wire(s) to support chain wire after at least 24 hour curing of concrete footings.

Footing type: Concrete.

Footing size:

Intermediate and end posts: 225 mm diameter x 600 mm depth.

Corner posts and gate: 225 mm diameter x 900 mm depth.

Post and rail barriers:

Rails: Connect rail(s) to posts using bolted split pipe fittings and purpose-made caps and brackets with rail apertures.

Continuous rail type fences: Join the rails together in long lengths using purpose-made sleeves or socketed connections, and pass them through the apertures of caps and brackets on intermediate posts.

Rail less barriers:

Struts: Provide struts at ends, corners and gates.

Security barriers:

Security fencing: Strain barbed wire between post extensions.

Gates

Frame tubes: 33.7 mm diameter, 2 mm wall thickness.

Chain wire: Match fence.

Maximum width: 3600 mm.

Security barriers:

Barbed wire security gate extension supports: 26.9 mm diameter, 2 mm wall thickness.

Barbed wire: Match fence.

1.4.3.5 Stone Walls

Construction

Select the stones for their locations and lay them in the wall with the minimum of stonecutting.

Footings: Select the largest, flattest and most regular stones for footings, and set them in concrete blinding in accordance with drawings.

Copings: Select stones of reasonably uniform size and finish the top of the wall to a level line or cap with precast concrete sections.

Retaining Walls

Construction: Where dry stone walls act as retaining walls, construct the stonework to be free draining through the wall. Batter back the wall face 50 – 70 mm for every 300 mm in height. Cap the top of the wall. Backfill progressively, with a layer at least 300 mm thick of porous material, such as coarse aggregate or crushed rock in the size range 20 – 40 mm. Install filter fabric to stop movement of silt into porous material.

Minimum thickness: 450 mm.

Where stone walls are mortared, batter back the wall face 50 – 70 mm for every 300 mm in height. Cap the top of the wall. Backfill progressively, with a layer at least 300 mm thick of porous material, such as coarse aggregate or crushed rock in the size range 20 – 40 mm. Install filter fabric to stop movement of silt into porous material. Install a slotted pipe drain at the bottom of the wall backfill to ensure all water is drained away from the wall face.

Minimum thickness: 450 mm.

1.4.3.6 Crib Walls

Construction

Construct walls in conformance with the manufacturer’s written requirements or specific design included in the drawings.

1.4.3.7 Gabion Walls

Assembly

Construction: Assemble the baskets and join them together by wiring along edges both horizontally and vertically before placing the rock fill. Fix the top of the basket by wiring to both the sides and the diaphragms.

1.4.3.8 Brick, Earth Block Walls

Construction

Construct walls in conformance with the specific design included in the drawings. Construction of brickwork and earth blockwork to be in accordance with the relevant specification sections.

1.5 LANDSCAPE – SOILS AND PLANTING

1.5.1 GENERAL

1.5.1.1 Submissions

Suppliers

Obtain statements from suppliers of plant materials, giving the following:

Particulars of the supplier's experience in the required type of work.

Lead times for delivery of the material to the site.

1.5.1.2 Inspection

Notice

Give sufficient notice so that inspection may be made of the following:

lawns prepared before seeding

plant holes excavated and prepared for planting

set out of gravel paths prepared for filling

1.5.2 PRODUCTS

1.5.2.1 Topsoil

Source

Import topsoil unless the topsoil type can be provided from material recovered from the site.

Additives

Use additives to raise topsoil to the required standard approved by the Engineer.

1.5.2.2 Compost and Fertiliser

Compost

Provide well-rotted vegetative material or animal manure, free from harmful chemicals, grass and weed growth.

Fertiliser

Provide proprietary fertilisers, delivered to the site in sealed bags marked to show manufacturer or vendor, weight, fertiliser type, recommended uses and application rates.

1.5.2.3 Gravel Paths

Provide paths constructed with consolidated small gravel chippings and concrete edging pavers where shown on plans.

1.5.3 EXECUTION

1.5.3.1 Preparation

Vegetative Spoil

Remove vegetative spoil from site. Do not burn.

1.5.3.2 Rockwork

Rock Work

General: Place rocks while ground formation work is being carried out. Provide site rock, otherwise provide imported rock. Bury rock two thirds by volume, with weathered faces exposed. Protect the weathered faces from damage.

Site rock: Stockpile for future placement and accessibility for lifting. Dispose of other rock off site.

Imported rock: Provide rock which has been selected before delivery.

1.5.3.3 Subsoil

Ripping

Rip parallel to the final contours wherever possible. Do not rip when the subsoil is wet or plastic. Do not rip within the dripline of trees and shrubs to be retained.

Ripping depths: Rip the subsoil to the following typical depths:

Compacted subsoil: 300 mm.

Heavily compacted clay subsoil: 450 mm.

Planting Beds

Excavated: Excavate to bring the subsoil to at least 300 mm below finished design levels. Shape the subsoil to fall to subsoil drains where applicable. Break up the subsoil to a further depth of 100 mm.

Unexcavated: Remove weeds, roots, builder's rubbish and other debris. Bring the planting bed to 75 mm below finished design levels.

Cultivation

Minimum depth: 100 mm.

Services and roots: Do not disturb services or tree roots; if necessary cultivate these areas by hand.

Cultivation: Thoroughly mix in materials required to be incorporated into the subsoil. Cultivate manually within 300 mm of paths or structures. Remove stones exceeding 50 mm, and weeds, rubbish or other deleterious material brought to the surface during cultivation. Trim the surface to design levels after cultivation.

Additives

Apply additives after ripping or cultivation and incorporate into the upper 100 mm layer of the subsoil. Refer to the **Soil additives schedule.**

1.5.3.4 Topsoil

Placing Topsoil

Spread the topsoil on the prepared subsoil and grade evenly. Ensure that grassed areas may be finished flush with adjacent hard surfaces such as kerbs, paths and mowing strips.

Contamination: Where diesel oil, cement or other toxic material has been spilt on the subsoil or topsoil, excavate the contaminated soil, dispose of it off the site, and replace it with site soil or imported topsoil.

Finishing: Feather edges into adjoining undisturbed ground.

Consolidation

Compact lightly and uniformly in 150 mm layers. Produce a finished topsoil surface which has the following characteristics:

Smooth and free from stones or lumps of soil.

Graded evenly into adjoining ground surfaces.

Ready for planting.

Topsoil Depths

Spread topsoil to the following typical depths:

Excavated planting areas: If using organic mulch, 200 mm.

Irrigated grassed areas generally: 150 mm.

Non-irrigated grass areas: 100 mm.

Surplus Topsoil

Spread surplus topsoil on designated areas on site, if any; otherwise, dispose off site.

Designated areas to be determined by the Engineer.

1.5.3.5 Grass Seeding

Preparation

Prepare the areas to be sown. Spread the fertiliser evenly over the cultivated bed within 48 hours before sowing, and rake lightly into the surface. If a prepared area becomes compacted from any cause before sowing can begin, rework the ground surface before sowing.

Sowing

Do not sow if frost is likely before the plant has reached an established state, or in periods of extreme heat, cold or wet, or when wind velocities exceed 8 km/h. Provide even distribution. Lightly rake the surface to cover the seed.

Rolling

Roll the seed bed immediately after sowing.

Roller weight (maximum):

Clay and packing (heavy) soils: 90 kg/m width.

Sandy and light soils: 300 kg/m width.

Watering

Before germination: Water the seeded area with a fine spray until the topsoil is moistened to its full depth. Continue watering until germination to keep the surface damp and the topsoil moist but not waterlogged.

After germination: Water to maintain a healthy condition, progressively hardened off to the natural climatic conditions.

Germination

Maintain sown areas until healthy grass covers the whole of the seeded area.

Reseeding: If germination has not been attained within one month, reseed the sown areas.

Weeding

Remove weeds that occur in sown areas. Where necessary spray with a selective weedkiller for broad leafed weeds. Do not spray grass seeded areas within 3 months of germination.

Protection

Protect the newly sown areas against traffic until well established. Protection method to be approved by the Engineer.

Mowing

Mow to maintain the grass height within the required range. Do not remove more than one third of the grass height at any one time. Carry out the last mowing within 7 days before the end of the planting establishment period. Remove grass clippings from the site after each mowing.

1.5.3.6 Plants

Plants

Characteristics: Provide plants with the following characteristics:

Large healthy root systems.

Vigorous, well established, free from disease and pests.

Suitable for planting in the natural climatic conditions prevailing at the site.

Replacement: Replace damaged or failed plants with plants of the same type and size.

Plant Containers

Supply plants in weed-free containers of the required size.

Open rooted stock: If trees are to be supplied as open rooted stock, ensure this is appropriate to the species, variety, size, and time of year for planting.

Refer to the **Plant Schedule**.

Labelling

Label at least one plant of each species or variety in a batch with a durable, readable tag.

Storage

Deliver plant material to the site on a day to day basis, and plant immediately after delivery.

1.5.3.7 Planting

Individual Plantings in Grassed Areas

Excavate a hole to twice the diameter of the root ball and at least 100 mm deeper than the root ball. Break up the base of the hole to a further depth of 100 mm, and loosen compacted sides of the hole to prevent confinement of root growth.

Locations

If it appears necessary to vary plant locations and spacing's to avoid service lines, or to cover the area uniformly, or for other reasons, obtain directions from the Engineer.

Planting Conditions

Do not plant in unsuitable weather conditions such as extreme heat, cold, wind or rain. In other than sandy soils, suspend excavation when the soil is wet, or during frost periods.

Watering

Thoroughly water the plants before planting, immediately after planting, and as required to maintain growth rates free of stress.

Placing

Remove the plant from the container with minimum disturbance to the root ball, ensure that the root ball is moist and place it in its final position, in the centre of the hole.

Fertilising

In planting beds and individual plantings, place fertiliser pellets around the plants at the time of planting.

Watering Basins for Plants in Grass

Except in irrigated grassed areas and normally moist areas, construct a watering basin around the base of each individual plant, consisting of a raised ring of soil capable of holding at least 10 L.

1.5.3.8 Stakes and Ties

Stakes

Use Hardwood stakes, straight, free from knots or twists, pointed at one end.

Drive stakes into the ground at least one third of their length, avoiding damage to the root system.

Stake sizes:

For plants 2.5 m high: Three 50 x 50 x 2400 mm stakes per plant.

For plants 1 – 2.5 m high: Two 50 x 50 x 1800 mm stakes per plant.

Ties

Provide ties fixed securely to the stakes, one tie at half the height of the main stem, others as necessary to stabilise the plant.

Tie types for plants < 2.5 m high: 50 mm sack webbing stapled to the stake.

1.5.3.9 Gravel Paths

Pavement

Use small size gravel in layers not exceeding 150mm thick to form paths where shown on drawings. Colour and type of gravel to approval of Engineer. Retain sides of path with either:

Precast decorative concrete paving edge strips, colour to approval of Engineer.

Concrete kerbs

1.5.3.10 Planting Establishment

Period

The planting establishment period commences at the date of practical completion and finishes at the date of final certificate.

Existing Planting and Grass

Where existing grass or planting is within the landscape contract area, maintain it as for the corresponding classifications of new grass or planting.

Recurrent Works

Throughout the planting establishment period, carry out maintenance work including, watering, mowing, weeding, rubbish removal, reseeding, staking and tying, replanting, cultivating, and keeping the site neat and tidy.

1.6 PAVEMENT KERB, CHANNEL AND LINEMARKING

1.6.1 GENERAL

1.6.1.1 Iinspection

Notice

Give sufficient notice so that inspection may be made of the following:

Set out of kerbs and channels.

Set out of line marking prior to painting.

1.6.1.2 Tolerances

Kerbs and channels conform to the following:

Absolute level tolerance: 10 mm.

Maximum deviation from design alignment: 50 mm.

Maximum deviation from a 3 m straightedge placed on horizontal, vertical, or sloping surfaces required to be straight: 5 mm.

Line marking to conform to the following:

The location of markings shall not vary from the locations shown on the drawings by more than 50 mm.

1.6.1.3 Interpretation

Definitions

General: For the purposes of this work section the definitions given below apply.

Absolute level tolerance: Maximum deviation from design levels.

Relative level tolerance: Maximum deviation from a 3 m straightedge laid on the surface

Channels and kerbs: Includes all forms of concrete gutters, dish drains, grated drains and mountable barrier kerbing.

1.6.2 PRODUCTS

1.6.2.1 Materials

Concrete

Ready-mixed concrete shall comply with M-150 (1:2:4) for non-reinforced mass concrete and M-200 (1:1.5:3) for reinforced concrete and the requirements of these standards.

On site batch mixed concrete shall have characteristics and proportions of concrete ingredients which conform to those specified in M-150 (1:2:4) and M-200 (1:1.5:3).

Pavement Marking Paint

Provide samples of pavement marking paint and technical specifications for approval by the Engineer prior to use on site.

1.6.3 EXECUTION

1.6.3.1 Line marking

Setting out

Set out the work to ensure that all markings are placed in accordance with the drawings.

Surface Preparation

Clean dry surface: Pavement markings shall only be applied to clean dry surfaces. Clean the surface to ensure a satisfactory bond between the markings and wearing surface of the pavement.

Wet weather: Pavement marking shall not be carried out during wet weather or if rain is likely to fall during the process.

Provision for traffic: Provide for traffic while undertaking the work and protect the pavement markings until the material has hardened sufficiently so that traffic will not cause damage.

Mixing of paint: All paint shall be thoroughly mixed in its original container before use to produce a smooth uniform product.

Application of Paint

Pavement markings shall be straight or with smooth, even curves where intended. All edges shall have a clean, sharp cut off. Any marking material applied beyond the defined edge of the marking shall be removed leaving a neat and smooth marking on the wearing surface of the pavement.

Removal of Pavement Markings

General: Remove pavement markings, no longer required, from the wearing surface of pavements without significant damage to the surface.

1.6.3.2 Channels and Kerbs

General

Before placing any kerb and/or gutter, the foundation material shall be shaped and compacted to form a firm base. Where placed on pavement courses, the foundation shall be compacted to the requirements of the *Pavement base and subbase* work section.

Kerb and/or gutters may be constructed in fixed forms, by extrusion or by slip forming in accordance with the drawings. The foundation, concrete quality, curing and testing details shall be in accordance with the *Concrete Paving* work section.

Tolerances

The level at any point on the surface of the gutters shall be within ± 10 mm of design levels. When a straight edge 3 m long is laid on top of or along the face of the kerb or on the surface of gutters, the surface shall not vary more than 5 mm from the edge of the straight edge.

Joints

Contraction joints: Formed every 3 m of gutter length for a minimum of 50% of cross sectional area. The joint shall be tooled 20 mm in depth to form a neat groove of 5 mm minimum width.

Expansion joints: 15 mm in width for the full depth of the kerb and gutter. Joints shall be constructed at intervals not exceeding 15 m and where the gutter is attached to pits and retaining walls. Expansion joints shall consist of approved preformed jointing material.

Concrete pavement: Where kerbs and/or gutters are cast adjacent with a concrete pavement the same type of contraction, construction and expansion joints specified in the concrete base shall be continued across the kerb and/or gutter.

Backfill

Timing: After the new kerb and gutter has been constructed and not earlier than three days after placing, the spaces on both sides of the kerb and/or gutters shall be backfilled and reinstated in accordance with the drawings.

Material: Backfill material behind the kerb shall consist of granular material, free of organic material, clay and rock in excess of 50 mm diameter.

Compaction: Backfill material behind the kerb shall be compacted in layers not greater than 150 mm thick.

1.7 DOORS AND DOOR HARDWARE

1.7.1 GENERAL

1.7.1.1 Interpretation

Definitions

For the purposes of this work section the definitions given below apply.

Door frame: Includes door trims.

Doorset: An assembly comprising a door or doors and supporting frame, guides and tracks including the hardware and accessories necessary for operation.

Fire-door set: A door set which retains its strength and limits the spread of fire.

Smoke-doorstep: A door set which restricts the movement of smoke.

Flush door: A door leaf having two flat faces which entirely cover and conceal its structure. It includes doors with cellular and particleboard cores.

Joinery door: A door leaf having stiles and rails, framed together. A joinery door may also incorporate glazed panels.

Louvered door: A joinery door in which the panel spaces are filled in with louvre blades.

1.7.1.2 Inspection

Notice

Give sufficient notice so that inspection may be made of the following:

- Door frames standing in place before building in to brickwork.
- Door frames installed before fixing trim.

1.7.1.3 Submissions

Samples

Submit samples of all hardware items for approval by the Engineer before use in the works.

Subcontractors

Automatic sliding door assemblies: Submit names and contact details of proposed supplier and installer.

Product Warranties

Automatic sliding door assemblies: Submit a warranty from the supplier and installer for the system and its installation, for a period of at least twelve months from the date of completion.

Hardware: Submit the warranties offered by the manufacturer for the hardware items provided in the works.

Keys

Key codes: Submit the lock manufacturer's record of the key coding system showing each lock type, number and type of key supplied, key number for re-ordering, and name of supplier.

Keys: For locks keyed to differ and locks keyed alike, verify quantities against key records, and deliver all keys and records to the Engineer at completion.

1.7.2 PRODUCTS

1.7.2.1 Frames

Aluminium Frames

To be assembled from aluminium sections, including necessary accessories such as buffers, strike plates, fixing ties or brackets, and suitable for fixing specified hardware.

Timber Frames

To be constructed with best quality timber. Obtain approval from the Engineer for the timber selection before use. Construct as shown on the drawings and ensure that all joints are securely made to avoid distortion of the frame in use.

Steel Frames

To be folded from metallic-coated steel sheet sections, joints to be continuously welded, including necessary accessories such as buffers, strike plates, spreaders, fixing ties or brackets, and suitable for fixing specified hardware.

Finish: Grind the welds smooth, prepare and paint the welded joints with primer. Then prime the entire frame.

Hardware and accessories: Provide for fixing hardware including hinges and closers, using 4 mm backplates inside the frame. Screw fix the hinges into the back plates.

Base metal thickness:

- General: ≥ 1.1 mm.
- Fire rated door sets: ≥ 1.4 mm.
- Security door sets: ≥ 1.6 mm.

1.7.2.2 Doors

Flush Doors

Cellular core flush doors:

- Provide a sub frame of 25 mm minimum width timber around openings for louvres and glazing.
- Provide additional material to take hardware and fastenings.
- Cut outs: If openings are required in flush doors (e.g. for louvres or glazing) make the cut outs not closer than 120 mm to the edges of the doors.

Solid core flush doors:

- Core of timber strips laid edge to edge, fully glued to each other and to facings each side of no less than two sheets of timber veneer.
- Single thickness of moisture resistant general-purpose particleboard.

Refer to drawings and **Flush Doors** schedule for details.

Joinery Doors

Fabricate joinery doors as shown on the drawings and in the **Joinery Doors** schedule.

PVC Doors

Fabricate PVC doors as shown on the drawings and in the **PVC Doors** schedule.

Construction

Form rebates to suit standard rebated door hardware.

Louvre grilles: Construct by inserting the louvre blades into a louvre frame, and fix the frame into the door.

Double doors

Provide rebated meeting stiles unless the doors open in both directions. Chamfer square edged doors to prevent binding between the leaves.

1.7.2.3 Door sets

Automatic Sliding Door Assemblies

Provide auto sliding door assemblies in accordance with the **Automatic door schedule**.

Toughened Glass Door Assemblies

Provide toughened glass door assemblies with matching concealed hinges and patch fittings as appropriate. Ensure that all glass edges are protected during installation and polish on completion.

Fire-Resistant Doors etc

Provide fire resistant doors and frames as matched sets for door openings required to have a fire rating. Refer to the **Fire and smoke resistant doors ets schedule** for details.

Provide copies of test certificates from recognised authorities proving the performance of the door sets.

Smoke-Resistant Door sets

Provide smoke resistant doors and frames as matched sets for door openings required to have a smoke stopping capability. Refer to the **Fire and Smoke Resistant Door sets** schedule for details.

Provide copies of test certificates from recognised authorities proving the performance of the door sets or seals to frames.

Security Screen Door sets

Provide security screen door sets in accordance with the **Security Screen Doors schedule**.

1.7.2.4 Ancillary materials

Nylon brush seals

To be dense nylon bristles locked into galvanized steel strips and fixed in a groove in the edge of the door or in purpose-made anodised aluminium holders fixed to the door

Pile weather strips

To be polypropylene or equivalent pile and backing, low friction silicone treated, ultra-violet stabilised.

Door Seals

To be proprietary items as identified in Schedules and to approval of Engineer.

1.7.2.5 Hinges

Butt hinge sizes

Refer to **Hinge Table A** and **Hinge Table B** in which length (l) is the dimension along the knuckles, and width (w) is the dimension across both hinge leaves when opened flat.

- Steel, stainless steel, brass, bronze butt hinges for timber doors in timber or steel frames: To **Hinge table A**.
- Aluminium hinges for aluminium doors, or for doors of other materials in aluminium frames: To **Hinge table B**.

Hinge materials

Aluminium hinges: High tensile aluminium with fixed stainless steel pins in nylon bushes, and with nylon washers to each knuckle joint.

Doors fitted with closers: Provide low friction bearing hinges.

Hinge Pins

Exterior or security doors opening out: Provide fixed pin hinges.

Hinge Table A

Nominal hinge size l x w x t (mm)	**Door leaves not exceeding any of the following**		
	Mass (kg)	**Width (mm)**	**Thickness (mm)**
70 x 50 x 1.6	16	620	30
85 x 60 x 1.6	20	820	35
100 x 75 x 1.6	30	920	40
100 x 75 x 2.5	50	920	50
100 x 75 x 3.2	70	1020	50
125 x 100 x 3.2	80	1220	50

Hinge Table B

Nominal hinge size l x w x t (mm)	**Door leaf not exceeding mass (kg)**	**Minimum construction**	
		Knuckles	**Screws/hinge leaf**
100 x 70 x 3	30	3	3
100 x 80 x 3.5	50	5	4

Number of Hinges

Provide 3 hinges for doors up to 2200 mm high, and 4 for door leaves between 2200 mm and 3000 mm high.

Wide Throw

If necessary, provide wide throw hinges to stop doors binding on obstacles such as nibs or deep reveals.

1.7.2.6 Door Hanging Systems

General

Provide sliding door tracks in conformance with the **schedules**.

1.7.2.7 Locks and Latches

General Door Hardware

Provide hardware of sufficient strength and quality to perform its function, appropriate to the intended conditions of use and climate and fabricated with fixed parts firmly joined.

Bolts

Provide bolts including barrel bolts and tower bolts with associated hardware, including lock plates, ferrules or floor sockets.

Furniture

Provide lock and latch furniture suitable for use with the lock or latch to which it is installed with the corresponding level of performance.

Strike Plates

Use strike plates provided with the locks or latches.

Fire Rated Door closers

Provide closers tested and certified for use as components of fire door assemblies.

Door Controllers Performance

Provide door controllers, including door closers, floor or head spring pivots which are suitable for the door type, size, weight and swings required and the operating conditions, including wind pressure.

1.7.3 EXECUTION

1.7.3.1 Frames

General

Install doors so that the frames:

- Are plumb, level and straight within acceptable building tolerances.
- Are fixed or anchored to the building structure to resist the wind loading.
- Will not carry any building loads, including loads caused by structural deflection.
- Allow for thermal movement.

Flashing and Weathering's

Install moulds, sealant and cement pointing as required so that water is prevented from penetrating the building between the door frame and the building structure.

Aluminium frames

Building in to masonry: Screw galvanized steel brackets twice to jambs and build in.

Fixing to masonry openings: Use proprietary expansion anchors and screw through jambs at each fixing.

Frame Fixing

Brackets: Metallic-coated steel:

- Width: ≥ 25 mm.
- Thickness: ≥ 1.5 mm.

Jamb fixing centres: ≤ 600 mm.

Fixing and Fasteners

Materials: Use materials compatible with the item being fixed and of sufficient strength, size and quality to perform their function.

Concealed fixings: Provide a corrosion resistant finish.

Exposed fixings: Match exposed fixings to the material being fixed.

Support: Provide appropriate back support (for example blocking and backing plates) for hardware fixings.

Packing: Pack behind fixing points with durable full width packing.

Prepared masonry openings: If fixing timber door frames into existing prepared openings with fastenings through the frame face, make the fastener heads finish below the surface and fill the hole for a smooth surface finish.

Joints

Make accurately fitted tight joints so that neither fasteners nor fixing devices such as pins, screws, adhesives and pressure indentations are visible on exposed surfaces.

Operation

Ensure moving parts operate freely and smoothly, without binding or sticking and are lubricated.

Supply

Deliver door hardware items, ready for installation, in individual complete sets for each door.

In a separate dust and moisture proof package labelled for the specific door.

Including the necessary templates, fixings and fixing instructions.

Refer to the drawings and **Flush doors, Joinery doors, PVC doors, Security screen doors, Fire and smoke resistant doorset** and **Automatic door schedules** for details of frames, doors and hardware.

1.7.4 COMPLETION

1.7.4.1 Cleaning

The Contractor is to clean all frames, doors, glass, hardware at completion. Any damage to frames and doors, or broken glass is to be repaired or replaced to the satisfaction of the Engineer.

1.7.4.2 Adjustment

Leave the hardware properly adjusted with working parts in working order and lubricated where appropriate.

1.8 METALWORK

1.8.1 GENERAL

1.8.1.1 Inspection

Notice

Give sufficient notice so that inspection may be made of the following:

- Shop fabricated or assembled items ready for delivery to the site.
- Site erected assemblies on completion of erection.

1.8.1.2 Submissions

Samples

Submit samples to the **Sample table for approval by the Engineer.**

Sample Table

Description	**No. of samples**
Each type of metal item to be purchased	2
Typical joints of welded or fabricated items	2
Finished sample of each type of painted or anodised metalwork indicating range within colour specified and finish	2
The finish to all stainless steel items	2

Manufacturer's data: Submit manufacturer's published product data and details for purchased items.

Stainless steel: For each batch of stainless steel supplied to the works, submit the certificate of compliance specified for the applicable standard.

1.8.2 PRODUCTS

1.8.2.1 Materials and components

Metals

Performance: Provide metals suited to their required function, finish and method of fabrication, in sections of strength and stiffness adequate for their purpose.

Rivets

Use blind rivets where available in the required metal.

Masonry Anchors

Proprietary types comprising screws or bolts in self-expanding sockets.

Masonry Plugs

Screws in purpose-made resilient plastic sockets or fixed to timber plugs built into the wall surface.

1.8.3 EXECUTION

1.8.3.1 Construction Generally

Metals

Provide metals so that they transmit the loads imposed and ensure the rigidity of the assembly without causing deflection or distortion of finished surfaces.

Fasteners

Materials: Provide fasteners in materials of mechanical strength and corrosion resistance at least equal to that of the lowest resistant metal joined.

To copper and copper alloys: Provide copper or copper-alloy fixing devices only.

To aluminium and aluminium alloys: Provide aluminium alloy or stainless steel fixing devices only.

To stainless steel: Provide appropriate stainless-steel materials only.

Fabrication

Workshop: Fabricate and pre-assemble items in the workshop wherever practicable.

Edges and surfaces: Keep clean, neat and free from burrs and indentations. Remove sharp edges without excessive raising.

Tube bends: Form bends in tube without visibly deforming the cross section.

Colour finished work: Match colours of sheets, extrusions and heads of fasteners.

Thermal movement: Accommodate thermal movement in joints and fastenings.

Fabrication Tolerances

Structural work generally: □ 2 mm from design dimensions.

Joints

Fit joints to an accuracy appropriate to the class of work. Finish visible joints made by welding, brazing or soldering using grinding, buffing or other methods appropriate to the class of work, before further treatment.

Self-finished metals: Free of surface colour variations, after jointing.

Joints: Fit accurately to a hairline where feasible.

Marking

Provide suitable and sufficient marks or other means for identifying each member of site-erected assemblies, and for their correct setting out, location, erection and connection.

Splicing

Provide structural members in single lengths where possible. Obtain approval of the Engineer for locations of joints where splices in metalwork cannot be avoided.

1.8.3.2 Welding and brazing

General

Quality: Provide finished welds which are free of surface and internal cracks, slag inclusion, and porosity.

Brazing

General: Ensure brazed joints have sufficient lap to provide a mechanically sound joint. Do not used butt joints relying on the filler metal fillet only.

1.8.3.3 Stainless Steel Fabrication

Welding Stainless Steel

All tube, angle or thick plate material is to be welded unless noted otherwise on the drawings. Ensure that welds do not discolour the final surface finish in the welding process.

Riveting

Riveting may be used only to join stainless steel sheet or strip less than 1 mm thick. Drill (not punch) the rivet hole, and drive the rivet cold. On completion, clean and passivate the riveted assembly.

Soldering

Do not solder stainless steel.

1.8.3.4 Metal fixtures

General

Provide metal fixtures where noted on drawings and in the **Metal fixtures schedule** as follows:

- Components such as toilet roll holders, towel rails, soap dishes and their location, indicative construction details, trims, materials, dimensions and thicknesses, and finishes shall be as detailed or described in the schedule.
- All dimensions noted on drawings shall be confirmed on site.

1.8.3.5 Pipe Handrails, Stairs, Ladders and Balustrades

Assembly

Material: Refer to drawings and BOQ for details of member sizes and assembly of components.

Fabrication

Method: Welding.

Joints: Produce smooth unbroken surfaces at joints. Make end-to-end joints over an internal sleeve.

Bends: Make changes of direction in rails by evenly curved pipe bends.

Free ends: Seal the free ends of pipes with fabricated or purpose-made end caps.

Fixing to Structure

Provide fabricated predrilled or purpose-made brackets or post bases, and attach the pipework to the building structure with fixings, including bolts into masonry anchors, and coach screws or bolts into timber, of metal compatible with the pipework.

Galvanizing

If possible, complete fabrication before galvanizing; otherwise apply a zinc-rich primer to affected joint surfaces.

Painting

If possible, complete fabrication before painting; otherwise apply paint to affected joint surfaces after fixing on site. Make good all damaged painted surfaces before completion of the building works. Paint finish in accordance with the **Exterior and Interior painting schedules**.

1.8.3.6 Corner Guards and Vehicle Guards

Corner Guards

Where corners of the structure are required to be protected from mechanical damage, provide metal corner guards as follows and as identified on the drawings or in the BOQ:

- Consisting of angle sections or sections fabricated from metal sheet bent to the radius or angle of the corner.
- Fitting close to adjoining surface finishes.
- Solidly grouted up at the back to eliminate voids.
- Securely fixed by a method which does not cause distortion in the guard surface, and consists of either concealed built in lugs, or flush countersunk head fixings into masonry anchors.
- Paint finish in accordance with the **Exterior and Interior Painting** schedules.

Vehicle Guards

Where external features such as lamp posts, fire hose reels or pedestrian walkways are required to be protected from vehicle damage, provide metal guards as follows and as identified on the drawings and in the BOQ:

Consisting of steel pipe posts set in deep concrete pads with welded end caps or bent to form a rail and two posts.

Steel barrier rails securely bolted to the posts.

Heavy duty protection posts will be large diameter steel pipe posts filled with concrete.

Paint finish in accordance with the **Exterior and Interior painting** schedules.

1.8.3.7 Water Storage Tanks and Stands

Water Tanks

Fabricate metal water storage tanks to sizes shown on drawings and as identified in the BOQ. Allow for all reinforcement of tank walls, floors, and around fixtures projecting from the tank.

Bolt together prefabricated plastic or metal water storage tanks to sizes shown on drawings and as identified in the BOQ.

Fabricate metal tank stands for the water storage tanks as identified on the drawings and in the BOQ.

Refer to the **Metal fixtures** schedule for details.

Paint finish in accordance with the **Exterior and Interior Painting** schedules.

1.8.4 COMPLETION

1.8.4.1 Maintenance manual

General: Submit manufacturer's published recommendations for service use.

1.8.4.2 Cleaning

Temporary coatings: On or before completion of the works, or before joining up to other surfaces, remove all traces of temporary coatings used as a means of protection.

1.9 PLASTERING

1.9.1 GENERAL

1.9.1.1 Interpretation

Abbreviations

For the purpose to this work section the abbreviations given below apply.

CRF: Cement render – finish.

CRM: Cement render – medium.

CRS: Cement render – stronger.

CRW: Cement render – weaker.

LF: Lime felting render- weaker.

GPM: Gypsum render - medium

GPF: Gypsum plaster – finish.

1.9.1.2 Inspection

Notice

Give sufficient notice so inspection may be made of the following:

Backgrounds immediately before applying base coats.

Finish treatments before decoration.

1.9.2 PRODUCTS

1.9.2.1 Materials and components

Accessories

Beads: To be metal proprietary sections manufactured to be fixed to backgrounds and/or embedded in the plaster to form and protect plaster edges and junctions.

Aggregates

Sand: To be fine, sharp, well-graded sand with a low clay content and free from efflorescing salts.

Bonding products

To be proprietary products manufactured for bonding cement-based plaster to solid backgrounds.

Cement

Cement shall conform to the requirements of ASTM specification C-150 Type 1 or similar approved standard for normal Portland cement.

Colouring Products

To be proprietary products manufactured for colouring cement plaster.

Integral pigment proportion: 5% by mass of cement.

Curing Products

To be proprietary products manufactured for use with the plaster system.

Gypsum Plaster

To be a proprietary product containing calcium sulphate hemihydrate with additives to modify setting.

Lime

Confirm source of Lime with Engineer to ensure highest quality Lime is used in the mortar. Protect from damage on site and store minimum 300mm above ground in waterproof storage facility.

Preparing lime putty:

Using hydrated lime: Add lime to water in a clean container and stir to a thick creamy consistency. Leave undisturbed for at least 16 hours. Remove excess water and protect from drying out.

Using quicklime: Run to putty as soon as possible after receipt of quicklime. Partly fill clean container with water, add lime to half the height of the water, then stir and hoe ensuring that no lime remains exposed above the water. Continue stirring and hoeing for at least 5 minutes after all reaction has ceased, then sieve into a maturing bin. Leave undisturbed for at least 14 days. Protect from drying out.

Mixes

Select a mix ratio to suit the application in conformity to the **Mixes table**.

Measurement: Measure binders and sand by volume using buckets or boxes. Do not allow sand to bulk by absorption of water.

Plaster mixing: Machine mix for greater than 3 minutes and less than 6 minutes.

Strength of successive coats: Ensure successive coats are no richer in binder than the coat to which they are applied.

Mixes Table

Mix type		**Application**	**Upper and lower limits of proportions by volume**			
			Gypsum	**Cement**	**Lime**	**Sand**
Cement render coats in: - Single or multi-coat systems with integral finishing treatments - Base coats in multi-coat systems with cement or gypsum finishes	CRS	Dense and smooth concrete and masonry Thrown finishing treatments Tiled finishes Gypsum finishes Cement finishes	- -	1 1	0 0.5	3 4.5
	CRM	Clay or concrete masonry	- -	1 1	0.5	4.5 6

Mix type		Application	Upper and lower limits of proportions by volume			
			Gypsum	**Cement**	**Lime**	**Sand**
	CRW	Lightweight concrete masonry and other weak backgrounds	- -	1 1		6 9
Cement finish coats	CRF	Cement render base coats	- -	1 1	1	1.5 2
Lime felting finish coats	LF	Cement render base coats			1	3
Gypsum medium coats	GPM	Gypsum render base coats	Ready-Mix			
Gypsum finish coats	GPF	Gypsum render finish coat	Ready-Mix			

Movement Control Joint Products

To be proprietary products manufactured for use with the plastering system and to accommodate the anticipated movement of the backgrounds and/or the plaster.

Water

To be clean and free from any deleterious matter.

Refer to the **Plastering** schedule for details of plastering and locations.

1.9.3 EXECUTION

1.9.3.1 Preparation

Substrates

Ensure substrates have:

Any deposit or finish which may impair adhesion of plaster cleaned off.

If solid or continuous, excessive projections hacked off and voids and hollows filled with plaster stronger than the first coat and not weaker than the background.

Absorbent substrates: If suction is excessive, control it by dampening but avoid over-wetting and do not plaster backgrounds showing surface moisture.

Dense concrete: If not sufficiently rough to provide a mechanical key, roughen by scratching or hacking to remove 2 mm of the surface and expose the aggregate then apply a bonding treatment.

Painted surfaces: Remove paint and hack the surface at close intervals.

Untrue substrates: If the substrate is not sufficiently true to ensure conformity with the thickness limits for the plaster system or has excessively uneven suction resulting from variations in the composition of the background, apply additional coats.

Beads

Location: Fix beads as follows:

Angle beads: At all external corners.

Drip beads: At all lower terminations of external plaster.

Mechanical fixing to background: at 300 mm centres.

Movement control beads: At all movement control joints.

Stop beads: At all terminations of plaster and junctions with other materials or plaster systems.

Bonding Treatment

If bonding treatment is required, throw a wet mix onto the background as follows:

Cement plaster: 1 part cement to 2 parts sand.

Gypsum plaster: 1 part gypsum to 2 parts sand.

Curing: Keep continuously moist for 5 days and allow to dry before applying plaster coats.

Thickness: From greater than 3mm but less than 6 mm.

Embedded Items

If there are water pipes and other embedded items, sheath them to permit thermal movement. Ensure embedded items will have a suitable level of corrosion resistance prior to embedment**.**

1.9.3.2 Application

Plastering is to follow ASTM C842-05 standard for Application of Interior Gypsum Plaster.

Plastering

General: Provide plaster finishes as follows:

- Resistant to impacts expected in use.
- Free of irregularities.
- Consistent in texture and finish.
- Firmly bonded to substrates for the expected life of the application.
- As a suitable substrate for the nominated final finish.

Base coats: Scratch-comb each base coat in two directions when it has stiffened.

A bonding agent is required before the application of Gypsum Plaster – Medium (GPM) on concrete surfaces.

Finishing Treatments

- Bag: To be a finish mainly free from sand by rubbing the finish coat with a Hessian pad when it has set firm.
- Carborundum stone: To be a smooth finish free from sand by, rubbing the finish coat with a fine carborundum stone when it has set hard.
- Steel trowel: To be a smooth dense surface by steel trowelling which is not glass-like and is free from shrinkage cracks and crazing.
- Wood or plastic float: To be an even surface by wood or plastic floating the finish coat on application.

Incidental Work

Return plaster into reveals, beads, sills, recesses and niches. Plaster faces, ends, and soffits of projections in the background, such as string courses, sills, and other wall features. Trim around openings. Plaster exposed inside of built-in cupboards.

Joining-Up

If joining up is required, ensure joints will not be visible in the finished work after decoration.

Movement Control Joints

Provide movement control joints in the finish to coincide with movement joints in the background. Ensure that the joint in the background is not bridged during plastering.

- Depth: Extend the joint right through the plaster and reinforcement to the background.
- Width: 3 mm, or the same width as the background joint, whichever is greater.

Damp-proof courses: Do not continue plaster across damp-proof courses.

V-joints: Provide V-joints, cut right through the plaster to the background, at the following locations:

- Abutments with metal door frames.
- Abutments with other finishes.
- Junctions between different backgrounds.

Plaster Thickness

Conform to the **Plaster Thickness table**.

Plaster Thickness Table

Plaster	Application	Upper limit of thickness (mm)			
		Single coat systems	Multi-coat systems		
			Base coat(s)	Finish coat	System
Cement render base coats and cement finish	On clay and concrete brickwork and other backgrounds	15	13	4	16
Gypsum Plaster	On smooth dense concrete	-	10	4	13
	On clay and concrete brickwork and other backgrounds	-	13	4	16

Temperature

If the ambient temperature is less than 10ºC or more than 30ºC ensure that the temperature of mixes, backgrounds and reinforcement are, at the time of application, greater than 5ºC or less than 35ºC.

1.9.3.3 Tolerances

General

Conform to the **Tolerances table**.

Tolerances Table

Property	Tolerance criteria: Permitted deviation (mm)
Features[1]: Verticality in 2000 mm	3
Features: Horizontality in 2000 mm	3
Soffits: Horizontality in 2000 mm	5
Walls: Verticality in 2000 mm	5
Walls: Flatness[2] in 2000 mm	4
[1] Features: Conspicuous horizontal or vertical lines including external corners, parapets, reveals, heads, sills, movement control joints and mouldings.	
[2] Flatness: Measured under a straightedge laid in any direction on a plane surface.	

1.9.3.4 Completion

Curing

General: Prevent premature or uneven drying out and protect from the sun and wind.

Keeping moist: If a proprietary curing agent is not used, keep the plaster moist as follows:

Cementitious Base coats and single coat systems: Keep continuously moist for 2 days and allow to dry for 5 days before applying further plaster coats.

Cementitious finish coats: Keep continuously moist for 2 days.

1.10 PAINTING

1.10.1 GENERAL

1.10.1.1 Inspection

Notice

Give sufficient notice so that inspection may be made of the substrate immediately before application of paint finishes.

Materials and Equipment Not to be Painted

Unless scheduled, specified, or required by the drawings to be painted, the following items do not require painting. These surfaces shall be left completely clean and free from droppings and accidentally applied material.

1. Non-ferrous metals, chrome plated metal, and stainless steel.
2. Finish Hardware.
3. Ceramic tile.
4. Floor finish materials.
5. Acoustic tile.
6. Equipment furnished with complete factory-applied finish, (except A.C. units) unless specifically noted on the drawings or specified herein to be painted.

1.10.1.2 Submissions

Prior to start of painting, submit three copies of a complete list of all materials, identified by manufacturer's name and product label or stock number, to the Engineer for approval. This list shall be in the form of a repetition of the paint finishes specified, with the addition of the specific product intended for each coat.

Clear Finish Coated Samples

Submit pieces of timber or timber veneer matching the timber to be used in the works, prepared and coated in accordance with the paint system.

Opaque Coated Samples

Provide approx 600x600mm samples on representative substrates of each paint system showing surface preparation, colour, gloss level and texture.

1.10.2 PRODUCTS

1.10.2.1 Materials General

Thinners, vehicles, pigments, and other incidental materials intended to be combined with or used with factory-mixed products shall be of the types and kinds recommended by the paint manufacturer for the intended purpose. Include listing of such materials in the material list required hereinafter.

Deliver materials to the job in unopened containers bearing manufacturer's name and product designation corresponding to designation on material list.

Insofar as practicable, each kind of coating for the various types of paint finish shall be factory-mixed to match approved samples and colors, and of consistencies ready for immediate application.

1.10.2.2 Paints

Combinations

Do not combine paints from different manufacturers in a paint system.

Clear timber finish systems: Provide only the combinations of putty, stain and sealer recommended by the manufacturer of the top coats.

Delivery

Deliver paints to the site in the manufacturer’s labelled and unopened containers.

Tinting

Provide only products which are colour tinted by the manufacturer or supplier.

1.10.2.3 Putty

Non-timber substrates: Oil-based or polymeric based.

Timber finishes: Lacquer or water based only.

1.10.3 EXECUTION

1.10.3.1 General

Store and mix paint materials in places as directed. Portions of the building used for paint storage and mixing shall be suitably safeguarded against stains, damage and defects. Take adequate precautions against fire hazard.

Mixing and thinning of prepared paints: In accordance with recommendations of manufacturer whose material is being altered, where necessary to produce satisfactory results.

Painting materials required for use on the project shall conform in all respects, with applicable air pollution control regulations.

1.10.3.2 Preparation

Order of Work

Other trades: Before painting, complete the work of other trades as far as practicable within the area to be painted, except for installation of fittings and laying flooring materials.

Clear finishes: Complete clear timber finishes before commencing opaque paint finishes in the same area.

Acceptance of Surface

Inspect surfaces to be treated to effectively safeguard work of others and to preserve painted work free from damage of every nature.

All surfaces which are found to be unsuitable for application of paint finish, shall be properly prepared before painting is started. Application of the first coat of paint shall be construed as acceptance of the surface as satisfactory for application of painter's finish.

Report unsatisfactory conditions disclosed by inspections in writing for correction. Do not proceed with the work until such unsatisfactory conditions have been properly corrected.

Protection

Fixtures: Remove door furniture, switch plates, light fittings and other fixtures before starting to paint, and refix in position undamaged on completion of the installation.

Adjacent surfaces: Protect adjacent finished surfaces liable to damage from painting operations.

Under no circumstances is the painter allowed to get paint on any surface which is not to be painted. The painter is required to protect all surfaces other than the one which is to be painted immediately, with coverings. These include, but are not limited to: drop cloths, masking tape, plastic sheeting, and paper. No paint may be allowed on glass, stone, floors, stone walls, suspended ceilings, windows or any other surface which is not mean to be painted.

Cover well with drop cloths and do not use fixtures or finished building construction of any type for scaffolding or support of scaffolding.

Post signs immediately following application of paint. Exercise proper care to completely protect fixtures, and cabinets that will be installed before painting operations are complete.

In the event finish materials which require no painting should be accidentally splashed with paint or otherwise disfigured by unauthorized application of paint, and if the paint cannot be removed without damage to the material involved, then these materials shall be removed and replaced with new materials, and all costs incidental thereto shall be paid by the Contractor. Cleaning and removal of unauthorized paint or other such materials shall be accomplished with materials and procedures which are non-injurious to the surface, all as approved by the Architect.

After completion and acceptance of the painter's work in any area, the Contractor shall be responsible for provision and maintenance of such forms of protection that may be required to protect finished work from damage from any cause prior to acceptance of the job by the Owner. Schedule the work, and exclude traffic and unauthorized personnel from finished areas, to the extent necessary to prevent damage.

"Wet paint" warning

Place notices conspicuously and do not remove them until paint is dry.

Restoration

Clean off marks, paint spots and stains progressively and restore damaged surfaces to their original condition. Touch up damaged decorative paintwork or misses only with the paint batch used in the original application.

Substrate preparation

Prepare substrates to receive the painting systems.

Cleaning: Clean down the substrate surface. Do not cause undue damage to the substrate or damage to, or contamination of, the surroundings.

Filling: Fill cracks and holes with fillers, sealants, putties or grouting cements as appropriate for the finishing system and substrate, and sand smooth.

Clear finish: Provide filler tinted to match the substrate.

Clear timber finish systems: Prepare the surface so that its attributes will show through the clear finish without blemishes, by methods which may involve the following:

Removal of discolourations, including staining by oil, grease and nailheads.

Puttying.

1.10.3.3 Painting

Provide coating systems to substrates as follows and as scheduled:

- Consistent in colour, gloss level, texture and thickness.
- Free of runs, sags, blisters, or other discontinuities.
- Fully adhered.
- Resistant to expected impacts in use.
- Resistant to environmental degradation within the manufacturer’s stated life span.

Number of Coats

The number of coats specified is minimum that shall be applied. It is intended that paint finishes of even, uniform color, free from cloudy or mottled surfaces, be provided. The work shall be "spot-coated" or undercoated as necessary. Unless specified as one coat or two coat systems, each paint system consists of at least 3 coats comprising priming coat and 2 top coats.

Each coat shall be of a proper ground color to receive a succeeding coat, and wherever practicable, shall differ in color tint. Each coat shall be approved by the Architect before the next coat is applied; otherwise an extra coat will be required over the entire surface involved, except where otherwise directed.

Drying

Ensure that the moisture content of the substrate is at or below the recommended maximum level for the type of paint and the substrate material.

Paint application

Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Apply subsequent coats after the manufacturer’s recommended drying period has elapsed.

Priming before fixing

Apply one coat of wood primer (2 coats to end grain) to the back of the following before fixing in position:

- Timber door and window frames.
- Bottoms of external doors.
- Associated trims and glazing beads.

Spraying

If the paint application is by spraying, use conventional or airless equipment which does the following:

- Satisfactorily atomises the paint being applied.
- Does not require the paint to be thinned beyond the maximum amount recommended by the manufacturer.

- Does not introduce oil, water or other contaminants into the applied paint.

Sanding

Clear finishes: Sand the sealer using the finest possible abrasive and avoid cutting through the colour. Take special care with round surfaces and edges.

Repair of Galvanizing

For galvanized surfaces which have been subsequently welded, prime the affected area.

1.10.4 SELECTIONS

1.10.4.1 Paint Systems

Paint System Description

Choose from the following paint systems and substrates and paint in accordance with manufacturers recommendations and **Interior** and **Exterior Painting** schedules.

Paint Systems

Flat water based: Interior
Low gloss water based: Interior
Flat or low gloss water based: Exterior
Semi-gloss water based: Interior
Semi-gloss water based: Exterior
Gloss water based: Interior
Gloss water based: Exterior
Semi-gloss, oil based: Interior
Full gloss, oil based: Interior
Full gloss, oil based: Exterior
Texture finish, water based: Interior
Texture finish, water based: Exterior
Varnish clear: Interior
Varnish clear: Exterior
Varnish tinted: Interior
Opaque timber finish, water based: Exterior
Clear or tinted timber finish, oil based: Interior
Clear or tinted timber finish, oil based: Exterior
Paving paint - Semi gloss oil based
Roofing paint, oil based
Low flame spread specialised coating

Substrate Types

Existing paintwork (oil based)
Existing paintwork (water based)
Concrete
Cement render
Fibre cement
Brickwork
Stonework
Set plaster
Glass reinforced gypsum plaster
Plasterboard (paper faced)
Iron and steel
Aluminium

Metallic-coated steel
Oil-based air-drying primed metal
Organic or inorganic zinc primed metal
Timber
Particleboard
UPVC

Colour Selection

As nominated in the **Interior** and **Exterior painting** schedules.