METHOD STATEMENT FOR ROAD WORKS

Project No:	

REVISION HISTORY	ISSUE DATE	DESCRIPTION	REVIEW / STATUS
00			

PREPARED BY:	**REVIEWED & APPROVED BY:**
QA QC ENGINEER	PROJECT ENGINEER

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1.0. PURPOSE

The purpose of this method statement is to describe the procedure which shall be followed for Laying of Asphalt road to comply with the Specifications in Facilities Project at ABC.

2.0. SCOPE OF WORK

This method statement is made to enumerate the work procedure details that involved in the Construction of Road as per approved drawings and Project specifications and to ensure that the works are carried out in accordance with the HSEQ documents of the Facilities Project at ABC.

3.0. TERMS, DEFINITIONS AND ABBREVIATIONS

PROJECT	0000000000
COMPANY	0000000000
CONTRACTOR	0000000000
SUBCONTRACTOR	0000000000

4.0. REFERENCE DOCUMENTS

HSE Manual

Project Quality Plan

Quality Management Requirements of Construction Subcontractor

Quality Control Requirements of Construction Subcontractor

Quality Control Plan for Civil General Works

All other specifications mentioned and incorporated within the above specifications

5.0. DUTIES AND RESPONSIBILITIES

5.1. **Project Manager**

5.1.1. The Project Manager shall be responsible for the over-all direction, coordination and Control of all the work activities attached and related to the work.

5.2. Construction Manager

5.2.1. The Construction Manager shall be responsible for the overall implementation and monitoring of all the activities involved in work.

5.3. QA/QC Manager

5.3.1. QA/QC Manager is responsible for the implementation of all required Quality Control activities such as test and inspection for this job and keeps record of its necessary documentation.

5.4. QA/QC Inspector

5.4.1. The QA/QC Inspector shall be responsible for the necessary inspections and tests to be carried out for all the activities involved in the work.

5.5. Superintendent / Supervisors

5.5.1. The Superintendent/Supervisor are responsible to implement the proper working procedure and strict- adherence of the HSE policy related to the work explained herein.

5.6. Safety Manager / Supervisor / Officer

5.6.1. Shall review prior to the start of the work Safe Work Plan and work permit, if required prior to submittal to the CONTRACTOR which must be implemented and observed during the works.

5.6.2. Provide appropriate Safety and Health, accident prevention and investigation.

5.6.3. Implement all safety aspects.

5.6.4. Coordinate with Project Manager.

5.6.5. Ensure work permit procedures are followed.

6.0. SEQUENCE OF ACTIVITIES WITH RESPONSIBILITIES

6.1. Pre-Commencement Requirements

6.1.1. Asphalt Batching Plant prequalification and approval

6.1.2. Approval of Work procedures shall be obtained prior to the start of the activity.

6.1.3. Asphalt mix design test results shall be submitted for the review and approval.

6.1.4. Safety regulations as per specifications and standard shall be followed.

6.1.5. Contractor shall maintain separate stockpile of coarse and fine aggregates at Asphalt Batching Plant for the job

6.1.6. All raw ingredients of Asphalt will be tested before start of actual job at site:

- Coarse Aggregate: Gradation, LA Test and Soundness test
- Fine Aggregate: Gradation
- Bitumen: Penetration, Softening point, Flash point, Ductility and Viscosity
- Bitumen shall be tested for each consignment/batch

6.2. General Requirements

Before start of the work, the following shall be ensured:

6.2.1. Availability of valid work permit

6.2.2. Tools, Equipment & Machinery is suitable and approved for use.

6.2.3. Availability of suitable quantity of approved material for the work as per specifications

6.2.4. Area clearance obtained from other subcontractors.

6.3. Coordination with other trades

6.3.1. No laying of Asphalt road work to be started unless it is cleared for laying works.

6.3.2. Prior to start of works, check all architectural, mechanical and electrical works are completed.

6.4. Delivery, Storage and Handling of Materials

6.4.1. All materials shall comply with specifications regarding quality, dimensions and strength etc.

6.4.2. The material shall be approved and shall be used as per approved drawings

6.4.3. Materials received at site shall be checked

6.4.4. Sampling /testing to be done as per Project Specification.

7.0. Execution

7.1. Surface Preparation

7.1.1. Clearing, grubbing, stripping, removal of waste, source of borrow, and construction drainage shall conform to “Earthwork”.

7.1.2. The surveyor shall mark the road center line and width of embankment prior to starting of any road works.

7.1.3. It is required to make a detail survey of the existing service (if any) by the side of the road or crossing the road.

7.1.4. Surveyor shall make survey report for the existing levels prior to filling or cutting and engineer should make sure for the same

7.1.5. •All the road works and road crossings must be executed as per approved drawings and as per project specifications

7.2. Road Embankment

7.2.1. Embankment shall be installed on top of the existing natural ground, thickness of this layer shall be at least 30cm

7.2.2. Material to be used for road embankment as per project specifications

7.2.3. Every layer should be compacted with heavy compactor and the compacted density of the soil shall be equal to or greater than 95% M.D.D.

7.3. Sub-Grade

7.3.1. Subgrade preparation for roadways shall be in accordance with specification “Earthwork.”

7.3.2. Ensure that approved Sub-grade material is used and the material sample shall be collected and tested as per project specifications “Earthwork.” upon receiving of material at site.

7.3.3. Sub-grade material shall be placed above embankment filling.

7.3.4. The approved Sub-grade Material shall be backfilled to the thickness of 300mm and it should be backfilled in two layers (each layer 150mm) compaction shall be as per “Earthwork. “And MDD shall be at least 95% of MD

7.3.5. For Subgrade shall be use structural material and thickness for each layer shall be not more than 20 mm as per Earthwork specification.

7.3.6. The formation shall be shaped and graded to an even and uniform, well filled surface, shaped similarly to the finished surface of the road.

7.3.7. Compaction test shall be done by approved laboratory for the sub-grade.

7.4. Sub-Base

7.4.1. Ensure that approved Sub-base material is used and the material sample shall be collected and tested as per project specifications upon receiving of material at site.

7.4.2. SUBCONTRACTOR shall perform all Sub-base course material tests for qualification before using at site, according with the Standards and Codes specified in this Method Statement.

7.4.3. Thickness of Sub-base course shall be 200mm as specified in the approved drawings and it shall be placed in two layers.

7.4.4. Sub base material spreading shall be started after receiving the compaction test results of subgrade.

7.4.5. Sub-base material loads shall be spread outside area on which it is spread to ensure that no segregation occurs, and it shall be spread evenly using grader to maintain the levels and thickness of layers.

7.4.6. Each layer shall be compacted to an average of at least 95% MDD.

7.4.7. Field density tests shall be one test for each 180m2 as per general note and earth work specification

7.4.8. Minimum material test requirement shall be one sample for every 1000 cum of material and test shall be as follows grading, plasticity index, sand equivalent, MDD and CBR, loss by abrasion by the approved laboratory as per project specifications.

7.4.9. SUBCONTRACTOR will take elevation of finish layer upon completion of Sub-base layer and submit to CONTRACTOR and COMPANY for verification and future reference.

7.5. Aggregate Base Course

7.5.1. Ensure that approved aggregate base course material is used and the material sample shall be collected and tested as per project specifications upon receiving of material at site.

7.5.2. Aggregate base course material will consist of crushed stone/gravel.

7.5.3. SUBCONTRACTOR shall perform all the following aggregate base course tests for qualification before using the material at site:

- Gradation
- MDD & OMC
- CBR
- LA Abrasion

7.5.4. Thickness of aggregate base course shall be 150mm as specified in the approved drawings.

7.5.5. Aggregate base course material spreading shall be started after receiving the compaction test results of subgrade.

7.5.6. Aggregate Base course material loads shall be spread outside area on which it is spread to ensure that no segregation occurs, and it shall be spread evenly using grader to maintain the levels and thickness of layers.

7.5.7. Measurement of thickness of aggregate base course shall be as per requirements.

7.5.8. SUBCONTRACTOR will take elevation of finish layer upon completion of aggregate base course layer and submit to CONTRACTOR and COMPANY for verification and future reference.

7.6. Prime coat

7.6.1. Ensure that approved material is used and each consignment test certificate for prime coat (MC70) shall be provided.

7.6.2. Prime coat shall be tested as per project specifications.

7.6.3. Prime coat shall be applied between road base course and binder bituminous base course as per approved drawings and cure at least 24 hr.

7.6.4. Bituminous material shall be applied in quantity 0.7 lit to 1.8 lit per m2 as per the requirements and standards.

7.7. Binder Bituminous Base Course

7.7.1. Asphalt mix design Binder Bituminous Base Course shall be submitted to COMPANY for approval.

7.7.2. Ensure that approved Bituminous base course material is used and each consignment test certificates shall be provided for Asphalt cement used (AC 40-50).

7.7.3. Binder bituminous base course shall be of thickness 50 mm as per DRAWING.

7.7.4. Binder Bituminous base course shall not be placed during dusty, foggy and Rainy weather.

7.7.5. Hot-mix asphalt shall be transported in tight, clean vehicles with facilities for maintaining the specified temperature. The temperature of hot-mix asphalt dumped from the transporting vehicle to the asphalt-laying machine shall not be lower than 127°C (260°F) or higher than 160°C (320°F) as per the requirements and standards.

7.7.6. Consistency of mixture shall be checked for each 200 tons or for each working day whichever is lower.

7.7.7. Following test will be performed to check consistency of asphalt mixture:

- Gradation
- Bitumen Content
- Marshall Stability
- Marshall Flow
- Lab Density
- Air Void Ratio
- Crushing Ratio

7.7.8. Site engineer in coordination with surveyor must ensure laying of bituminous course to the correct levels and to the specified longitudinal and cross section profiles.

7.7.9. The Bituminous base course shall be evenly placed by mechanical spreader on a clean base in a manner that it does not become segregated.

7.7.10. The seams of the bituminous base course shall be sufficiently staggered against each other and it should be executed straights, longitudinal if necessary being adapted to the road alignment.

7.7.11. Bituminous base course shall be compacted evenly over the entire surface by using pneumatic & steel roller.

7.7.12. Gradient slope shall be maintained as per approved drawings.

7.7.13. Actual bulk density for full depth of compacted asphalt paving as determined by ASTM D2726 shall range between 92% and 97% of theoretical maximum density as determined by ASTM D2041.

7.7.14. SUBCONTRACTOR will take elevation of finish binder course upon completion and submit to

7.7.15. CONTRACTOR and COMPANY for verification and future reference

7.8. Tack coat

7.8.1. Ensure that approved material is used and each consignment test results shall be provided for Tack coat (SS1-h).

7.8.2. Tack coat shall be tested as per project specifications.

7.8.3. Tack coat shall be applied between bituminous base course and the wearing course as per the IFC drawings.

7.8.4. Tack Coat shall be cured for at least 1 hour.

7.8.5. The tack coat shall be applied with a suitable hand sprayer or truck-mounted spray bar. The typical rate is 0.09 liter to 0.36 liter per square meter (0.02 gallon to 0.08 gallon per square yard) of surface, as per the requirements and standards.

7.9. Wearing Course

7.9.1. Asphalt mix design Wearing Course shall be submitted to COMPANY for approval.

7.9.2. Ensure that approved material is used and each consignment test results shall be provided for Asphalt Cement used (AC 40-50).

7.9.3. Hot-mix asphalt shall be transported in tight, clean vehicles with facilities for maintaining the specified temperature. The temperature of hot-mix asphalt dumped from the transporting vehicle to the asphalt-laying machine shall not be lower than 127°C (260°F) or higher than 160°C (320°F), as per the requirements and standards.

7.9.4. Consistency of mixture shall be checked for each 200 tons or each working day, whichever is lower. Following test will be performed to check consistency of asphalt mixture:

- Gradation
- Bitumen Content
- Marshall Stability
- Marshall flow
- Lab Density
- Air Void Ratio

- Crushing Ratio

7.9.5. Thickness of wearing course shall be 50mm as per approved drawing.

7.9.6. Wearing course shall be placed in one layer above the bituminous base course and one coat of tack coat shall be applied between bituminous base course and wearing course.

7.9.7. The wearing course shall be evenly placed by mechanical spreader on a clean base in a manner that it does not become segregated.

7.9.8. The seams of wearing course shall be sufficiently staggered against each other and it should be executed straight. If it is necessary longitudinally, the alignment of the road is adopted.

7.9.9. Wearing course shall be compacted evenly over the entire surface by using pneumatic & steel roller.

7.9.10. Site engineer in coordination with the surveyor must ensure the top levels and slope in maintained as per approved drawings.

7.9.11. The core sample have to be taken after compaction to determine the layer thickness and MDD as per project specification.

7.9.12. SUBCONTRACTOR will take elevation of finish wearing course upon completion and submit to CONTRACTOR and COMPANY for verification and future reference.

7.10. Temperatures

7.10.1. Temperatures shall be checked whenever material is delivered to site.

7.10.2. Aggregate ingredient shall be heated to a temperature between 160 to 179ºc.

7.10.3. Hot-mix asphalt shall be transported in tight, clean vehicles with facilities for maintaining the specified temperature. The temperature of hot-mix asphalt dumped from the transporting vehicle to the asphalt-laying machine shall not be lower than 127°C (260°F) or higher than 160°C (320°F), as per the requirements and standards.

7.10.4. Prime coat (MC 70) shall be between 50 and 80ºc.

7.10.5. Tack coat (SS-1 or RS-1) shall be between 10 and 50ºc.

7.11. Joints

7.11.1. Each asphalt paving layer shall be placed as continuously as possible to keep the number of joints between old and new pavements between successive working days, or when the mixture has become cold less than 60°C [140°F]) to a minimum.

7.11.2. Longitudinal Joints in asphalt courses shall be offset by 300mm in relation to the longitudinal joints of the underlying course.

7.11.3. Transverse joints in succeeding layers shall be offset by at least 2m. The same shall apply when new pavement is laid in contact to an existing, which will be cut back in steps, 2m wide in each of its layers.

7.11.4. At transverse joints the previously laid work shall be cut to a vertical edge. Before laying the material against it, the vertical edge to be painted with hot bitumen.

7.11.5. Minimum number of joints to be exercised / considered during execution.

7.12. Compaction of Mixtures

7.12.1. After spreading and strike-off, the rolling operation by pneumatic and roller shall start immediately and shall operate as close as possible to the paver without excessive tearing.

7.12.2. Rolling will not be prolonged till cracks appear.

7.12.3. Actual bulk density for full depth of compacted asphalt paving as determined by ASTM D2726 shall range between 92% and 97% of theoretical maximum density as determined by ASTM D2041.

7.13. Thickness of cores

7.13.1. Depth of each bituminous paving course shall be measured by course samples.

7.13.2. At least 3 Nos of core samples shall be taken for each working day or one sample per 600 sqm of asphalt, whichever is higher as per ASTM D979-01.

7.13.3. Cored sample shall be 10cm in diameter (nominal).

7.14. Surface Tolerances

7.14.1. Non-Bituminous Course

- The thickness and cross section as shown on the approved drawings shall not vary more than -5mm to +10mm from the required elevations.

7.14.2. Bituminous Course

Following tolerances will be applicable:

- Wearing course = (+/-) 4mm
- Binder course = (+/-) 6mm
- Cross fall = (+/-) 0.4%

7.15. Road Markings

7.15.1. Road markings shall be applied as per design.

7.15.2. Road markings shall be marked by thermoplastic as per project specifications.

7.15.3. Road markings shall be sprayed on the road in an even thickness of 2.0mm.

7.16. Inspection and Testing

7.16.1. Each activity like backfilling of Sub Grade, Sub Base and Aggregate Base Course, in situ Density test for Sub base, Sub grade, Aggregate, laying of Bituminous base course and Wearing course works shall be intimated to COMPANY through inspections.

7.16.2. After due completion of laying of Asphalt work shall be offered to COMPANY inspection and comments on the work shall be rectified and notified for re-inspection if any.

7.16.3. Testing of each consignment delivered to the site shall be carried out as per the specifications for road works ITP

8.0. REQUIREMENTS

8.1. Plans /Records and Job instructions (Documentations)

Before commencing the work, the following things should be available:

8.1.1. Inspection request for materials, erection & installation

8.1.2. Approved drawings / Material approval for the work

8.1.3. Method statement for the work

8.1.4. Key site plan for that work area

8.1.5. All inspected tools & machineries

8.1.6. Emergency escape route without obstructions

8.1.7. Clearance from electro mechanical in charge

8.2. Trainings

8.2.1. Trained/Experienced & Skilled personnel shall be used for the work

8.2.2. All operator / Laborers are safety trained and toolbox shall be conducted for each potential hazard mentioned in the Risk assessments

8.3. PPE (Personal Protective Equipment)

8.3.1. Protective clothing
8.3.2. Protective gloves
8.3.3. Safety helmet
8.3.4. Safety goggles
8.3.5. Hard Gloves
8.3.6. Hi-visibility jacket
8.3.7. Flagging tape
8.3.8. Warning tape
8.3.9. Flasher light
8.3.10. Safety Harness (above 1.8m)

8.4. Manpower, Equipment and Tools required

8.4.1. Manpower requirement

General Supervisor/Foreman	
Charge hand	
Mason.	
Helpers	
Electrician	

8.4.2. Equipment

Shovel	
Compaction roller machine	
Spreader	
Trucks	
Sprit level	
Plumb bob	
Electric air blower/Air compressor for cleaning	
Drilling Machine	
Hammer	
Measuring Tapes	
Marker	

9.0. RISK ASSESSMENT

9.1.1. Risk assessment to be ensured that it is available in the work spot

9.1.2. All control measures as per risk assessed to be implemented and ensured before start of work

9.1.3. All workers shall be made aware of the risk involved in carrying out the activity and requirement of control measures during toolbox talk

10.0.HSE REQUIREMENTS

10.1.1. The entire works will be carried out as per the guidelines established in the Project Specific HSE Plan

10.1.2. Utmost importance shall be given to safety or personnel and protection of existing above/underground services. It will be ensured that the personnel involved are thoroughly aware of the safety regulations. To achieve the above the following shall also be ensured:

10.1.3. Tool box meetings will be conducted before starting the works

10.1.4. All personnel will be provided with suitable personal protective equipment

10.1.5. Required permits will be obtained from the authorities concerned before starting the works, if any

10.1.6. Plant & equipment's will be fully tested for safety compliances

10.1.7. Proper and safe access will be provided for workers to reach the work spot and carry out their works safely

10.1.8. Necessary and essential lighting and ventilation will be provided during the course work to protect labor from suffocation

10.1.9. Scaffolding and working platforms provided to facilitate the works will be checked frequently for its safety

10.1.10. The necessary safety measures will be taken to prevent accident or injury all the times. This may include barriers, warning tape / net, signage, watchman, flashing & rotating lights at night

10.1.11. Heat Stress training will be provided during summer season

10.1.12. Provision of adequate cool drinking water, shades if necessary will be arranged in place

10.1.13. Plants & Equipment will be provided with back-up lights and all other applicable safety devices

11.0. QUALITY CONTROL AND INSPECTION TEST PLAN

11.1.1. All necessary inspections shall be carried out as per approved ITP by CONTRACTOR / COMPANY.

11.1.2. Prior to work, related request for inspection (RFI) must be approved by CONTRACTOR / COMPANY.

11.1.3. Quality shall be maintained by ensuring the systematic implementation of this procedure and ensure that necessary quality records are generated as appended formats to this procedure.

12.0. ATTACHMENTS

12.1.1. Risk Assessment for MS Road Works Doc. No: 0000000