TECHNICAL SPECIFICATIONS

For Road Performance-based Maintenance Services

TIRANA 2020

ABBREVIATIONS

ARA	Albanian Road Authority
WB	World Bank
PBC	Performance Based Contracts
WS	Supervisor (works supervisor)
SL	Service Level
AS	Albanian Standard
EN	European Standard
RPM	Retro-reflective Raised Pavement Marker
MSDS	Material Safety Data Sheet
IRI	International Roughness Index
ARC	Albanian Road Code
RSM	Road Signs Manual

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INTRODUCTION

The main goal for the development of these Technical Rules is as follows:

Improving road asset maintenance quality in accordance with the state-of-the-art standards to guarantee road longevity and use, effective public funds expenditure in this regard, and investment sustainability.

OBJECTIVES:

1. Improving circulation conditions for all road users, including users with disabilities.
2. Increasing road longevity.
3. Decreasing large investment expenditures through continuous performance-based maintenance.
4. Company training and awareness raising on maintenance methods other than previous traditional methods.
5. Enforcing penalties against companies failing to comply with contract conditions.
6. Improving inspection methods and ways to keep roads under control 24 hours a day.

I. PART A1.

Fundamental Performance Based Maintenance Contract Concepts

The road network maintenance includes **routine** and **periodic** maintenance tasks.
Routine maintenance consists in tasks required to keep the road operational (such pot hole repair, drainage cleaning, crack filling, vegetation management, etc.).
Periodic maintenance consists in more costly less employed measures to prevent road degradation (such as leveling, drainage, refilling, asphalt top layers, etc.). These are measured works that will be completed at various times of the contract period, based on need and weather conditions. In this regard, careful management, intervention deadlines and accuracy of technical solutions are very important.
Minimum conditions and Service Levels are defined during the road and Performance measurement process.

The Performance requirement must cover all contract aspects and take into account the fact that different areas covered by the contract require different service levels. The criterion may be set using three levels (the fourth level is applied to unpaved roads); however, the simplest contracts will not all use the criterion defined below:

Services required for road Maintenance are classified into:

Periodic/Rehabilitation Works, considering a ceiling amount in indicating measurable works to be provided for the road to reach its performance Standards.

Routine Maintenance Services in the amount indicated as a monthly ceiling (this will be a monthly ceiling amount applicable during the length of the contract and expressed in price per kilometer per month, multiplied by the length of the road and length of services in time);

Emergency Works in the form of a traditional bill of quantities.

The main functions of general maintenance bases should be as follows:

1. Road segment/section supervision in given periods according to service levels
2. Weather factor observation
3. First aid in case of accidents
4. Maintenance according to desirable conditions for road layers
5. Maintenance of parking and service areas, road signs, lighting systems, future signs and telecommunications.
6. Repairs and reconstruction after road accidents
7. Repairs and reconstruction after natural disasters
8. Cleaning operations of drainage, culverts and other objects related to removing water for road surfaces

9. All cleaning and maintenance operations for:

   ■ road signs, safety equipment (medians, parapets), lighting system (light bulb replacement, small conductor repairs, etc.).

   ■ local sidewalk damage repairs

   ■ vegetation management

   ■ winter activities for snow and ice removal

   Maintenance woks in winter conditions include:

   1. Preliminary works before the start of winter conditions
   2. Organization of material deposit locations
   3. Protection measures against snow, ice, snow accumulation, and avalanches
   4. Protection measures against road icing in case of very low temperatures.
   5. Snow cleaning from highway carriageway, signs and communication signals
   6. Carriageway border marking
   7. Ensuring carriageway drainage operation
   8. Vehicle removal from roadway
   9. Installation of special communication signals in case of specific road closure traffic regime.
   10. Continuous public information on road conditions and traffic flow through daily briefings to ARA.

Should the scope of the contract include road maintenance, but excluding winter maintenance (because it relates to an area not affected by this type of maintenance), the contractor will have the obligation to provide the services, because changes in weather conditions may lead to rare and isolated phenomena of road icing or snowfalls.

2. PART A2. Description of Services to be provided

Regardless of work type, method or line in developing performance-based maintenance bills of quantities, the following specifications will apply to all road segments.

2.1. Description of Services to be provided

Services to be provided include all physical or otherwise activities to be performed in compliance with Service Levels and the criterion defined for their performance, or in the framework of any other requirement.

They especially include management tasks and physical works related to road assets and lines:

- Asphalting
- Embankments
- Road safety signs and equipment supply
- Lighting (where available)
- Drainage structures
- Vegetation management
- Escarpments (excavations and embankments)
- Art Works (retaining walls, barrier, other culverts)
- Bridges especially
- Traffic management
- Soil clearance
- Snow clearance

2.1.2. Description of road location area

This provides a description of the road location, length, width, current conditions, climate conditions in the area, the extent of the conditions, need for rehabilitation (if any), accompanied by a partial map of the road that will be subject to maintenance.

2.2 Periodic/rehabilitation works to be undertaken

Total periodic/rehabilitation works to be undertaken should not cost more than **40% of the total contract value**.

2.2.1 Definition of periodic/rehabilitation works

Rehabilitation works are woks to be conducted at the start of the contract, and obligatorily within the first year, to bring the road to acceptable conditions to start maintenance in accordance with the level determined for that particular road, while periodic works are works to be undertaken during the period of the contract at favorable times depending on weather.
These works will consist in no more than 40% of the total contract value.
The road supervisor is the authority competent to extend this time frame through a special order, in case of extraordinary weather conditions or other causes related to Government orders, decisions or laws.

2.2.2 Design/drawing requirements for periodic/rehabilitation works

All periodic/rehabilitation works will be designed/drawn to meet all the requirements of the Technical Road Design and Construction Regulation.

2.2.3 List of relevant documentation for approval of periodic/rehabilitation works

- Complete drawings of rehabilitation works according to the Albanian Standard for road design, including exact locations expressed in kilometers and accompanied with photographs, video of the existing conditions of the road segments. They will be developed by the Contractor and approved by the Supervisor.

- Works schedule

- Traffic management plan

2.2.4 Description of Periodic/Rehabilitation Works

The contractor will need to undertake the periodic/rehabilitation works indicated in the bill of quantities for these types of works.

The contractor should undertake an independent assessment of the periodic/rehabilitation works, which in its point of view are necessary to bring roads to the required service levels, and include the cost of these works. However, only works specified in the article on Periodic/Rehabilitation Works will be specifically and separately paid according to the contract as rehabilitation works. Other works required to bring roads to required service levels, but which are not included in the Periodic/Rehabilitation Works article, will be included in the monthly Maintenance Services installment by the bidders. Bidders are responsible only for assessing the type and quantity of Periodic/Rehabilitation Works required to meet contract conditions. During Contract execution, the Contractor will not have the right to file any statements about Rehabilitation Works that have not been included in the bid, or the bid documentation.

Periodic/Rehabilitation Works indicated in the Amounts Bid represent the minimum periodic/rehabilitation quantities, required of the Contractor by the Contract; they will be dependent on the limit fund estimated, which is believed to be adequate to ensure compliance with Contract required Service Contracts.
These works refer to all road components (drainage, soil works, structures, asphalt layers, bridges, sign elements, art works, safety equipment, vegetation, etc.). Periodic/rehabilitation works will be performed based on designs, drawings, and bills of quantities developed by Contractors (with prices from applicable manuals), to bring the road to acceptable conditions to start routine maintenance based on required service levels.

Periodic/rehabilitation works are works foreseen with the objective of renovating various road elements, road equipment, and reinstating and improving the initial quality, when they are at risk or seriously damaged and include the following works:

- new cover of the drivable/carriageway surface
- improvement of the drainage system;
- erosion of erosion in embankments, rock slides, and installation of relevant protection systems.
- bridge repair, if the structural system and materials have not changed;
- replacement of road signs and equipment;

- Road geometry, widening and reorganizing the road;

During the periodic/rehabilitation works, segments earmarked for rehabilitation should not have open potholes, which should be filled in any case, when present along the length of the road.

If road traffic is interrupted as a result of rehabilitation works, the Contractor will take all necessary measures through a Traffic Management Plan, in order to:

- reopen traffic circulation as soon as possible
- keep road open during rehabilitation works.

2.2.5 Quality of materials to be used

The materials to be used by the Contractor will comply with the quality criteria defined in the **Road Design and Construction Technical Regulation. The Contractor will be required to perform the laboratory tests necessary to determine quality of materials. Contractor's compliance/non-compliance with the service level requirements will be reported by his Staff.**

2.3 Key Personnel Functions

The key personnel and their functions will comply with the required qualification data and technical proposals.

2.4. Preliminary work prior to initiation of works

a. Pursuant to the Law "On Controlling and Disciplining Construction Works", prior to initiation of works, the Contractor will be required to place a board containing: contract name, starting date, conclusion date, Contractor's name, Supervisor's name, etc.

a/1 The Contractor will place warning signs (traffic signs and other required signs) for road users, in order to prevent any potential accidents. The signals and protective barriers will be approved by the Supervisor.

b. In residential areas, prior to initiation of works, the Contractor will place information boards displaying necessary information as required by the Project Manager.

c. Prior to initiation of works, the Contractor will place Reduced Speed Ahead signs for drivers, whereas near residential areas, he will place signs showing an alternative pedestrian path.

d. Aside from clear temporary signs indicating driving lane changes (if applicable), the Contractor will also assign persons to guide traffic in case of closures.

2.6 Service Quality Criteria Regulations

For the purposes of this Contract, different service levels are required for specific roads or road sections. As regards national network roads, the following Service Levels will apply:

Very good

Good

Fair

Minimum (for unpaved and highly amortized roads)

Definitions explaining the differences in these service levels are provided in the following sections herein.

3. Inspection Methods of Service Levels

3.1. Formal Inspections of Service Levels

Formal inspections will be those scheduled in advance by the Supervisor and conducted in the presence of the Contractor. The main purpose of formal inspections is to enable the Works Supervisor to verify the information provided in the monthly statement of the Contractor. The Supervisor will notify the Contractor of his intention to conduct a formal inspection at least 48 hours prior, by providing the exact date, time and location where the formal inspection is to begin. The Contractor is required to be present on the date, time and location specified by the Supervisor, and will provide the required physical means. Formal inspections allow for the comparison of the compliance information provided by the Contractor in the standards tables included in the Monthly Statement with the actual measures adopted in locations to be determined by the Supervisor.

During formal inspections, the Supervisor will prepare a brief material describing (i) the general circumstances concerning the site visit, including the date, road sections visited, persons present etc., (ii) any non-compliance found, and the (iii) timeframe defined by the Supervisor within which the Contractor will be required to remedy any defects found during inspection. Formal inspections will also be scheduled for follow-up site visits, the purpose of which will be to verify whether the Contractor has remedied prior non-compliance findings within the timeframe defined by the Supervisor and specified in the document. Failure to remedy non-compliances within the specified timeframe will result in further reduction of the payment amount.

3.2. Informal Inspections of Service Levels

The Supervisor will carry out the informal inspections of Service Levels as part of his general mandate granted by the Employer. He may do so on his own initiative, at any time and for any section of the roads under contract. The Supervisor will use his own means during these inspections. Should he establish that any road section is in non-compliance with the Service Levels, he will notify the Contractor in writing within 24 hours, in order to allow the latter to take remedial action as soon as possible. The obligation of the Works Supervisor to notify the Contractor regarding any non-compliance found will in no way negate the obligation of the Contractor to constantly monitor road conditions and remedy any defects within the timeframes provided for under the Contract, and it bears noting that such timeframes specified for the remedy of defects by the Contractor will be valid starting from the occurrence or discovery of the defect, not from the defect notice by the Supervisor. Should the informal inspections identify defects that the Contractor failed to remedy within specified timeframes, such defects may be used by the Supervisor for purposes of correcting the Contractor’s monthly statements or applying penalties or liquidated damages. Where the Supervisor will identify defects during an informal inspection, he will conduct further inspections to ensure that the defect has been remedied within the specified timeframe. He may conduct a full Formal Inspection or simply request

the presence of a Contractor's representative to verify the situation. In such circumstances, should the Contractor fail to assign a representative following the request to do so, the Works Supervisor's decision on the nature of the remedy will be final and binding with no option for appeal or objection.

3.3. Road Management Information Provision

The following Service Level criteria will be applied to all the road sections required for the ongoing management of the contract.

3.3.1. Monthly Statement

The compliance or non-compliance of the Contractor will be reported to the Supervisor in the form of tables for which a mandatory standard format is adopted. There is one table for each road or road section. The tables are part of the Contractor's monthly statement, and they may be complemented by comments for which a specific format is not required.

4. Works Program

The Contractor will submit a Performance Program within twenty-eight (28) days following contract signing. This Program will include:

4.1. Contractor's Quality Assurance Plan

Contractor's Quality Assurance Plane defines the methods and procedures to be used by the Contractor for Contract implementation, including how to:

- identify specific contract quality requirements,

- plan and execute the requirement fulfillment work,

- inspect and/or test the work to ensure compliance with quality requirements,

- record and monitor results as compliance evidence, and

- ensure immediate action to remedy non-compliance.

Contractor's Quality Assurance Plan should provide clear descriptions of the systems, procedures and methods to be used to deliver and monitor Service compliance.

4.2 Health and Safety Management Plans

The Performance Program will include a Health and Safety Management Plan.

The purpose of the Health and Safety Management Plan is to foster a responsible attitude towards occupational health and safety and to comply with the provisions of the laws and regulations of the Republic of Albania.

Due to the nature of the Services, the Contractor may occasionally be exposed to hazardous situations which could involve risk of various degrees of harm, to the contracting staff and/or the public.

The Health and Safety Management Plan must be complied with by the Contractor's personnel and all subcontractors at all times.

The Health and Safety Management Plan will, when implemented in accordance with the plan requirements:

- Ensure the systematic identification of existing and new hazards on the work site(s)

- Ensure the minimization of significant hazards, where elimination and isolation are both impractical

- Ensure the provision and use of appropriate protective measures

- Include emergency procedures for dealing with accidental spillage, pollution or imminent danger

- Ensure regular review and assessment of each hazard identified and monitor employees exposure to these hazards

- Ensure reporting and recording of work site safety incidents so health and safety problems can be addressed quickly and regularly. It is a requirement of this Contract that any such incident be advised promptly to the Supervisor.

The Delivery Time for the initial Health and Safety Program shall be no later than 45 days after the Start Date.

4.3. Emergency Procedures

The Performance Program will include an Emergency Procedures Plan, which will establish the roles, practices and procedures during specific types of emergency events identified in the plans associated with the closure of roads. The purpose of the Emergency Procedures is to ensure the safety of the Contractor's personnel and road users in case of emergency and/or road closure. It should include:

- an effective communication and event recording system

- the name, contact number and specific duties of the Contractor's Personnel assigned to respond to an emergency event

- the contact number of other parties who need to be notified in cases of emergency events, e.g. police

- detailed response procedures for all emergency events

- possible detour routes in the event of road closure

4.4. Traffic Management Plan

The Performance Program will include a Traffic Management Plan. The Traffic Management Plan establishes the practices for traffic management at work sites. **The Traffic Management Plan must be developed by the Contractor and agreed with the Works Supervisor.**

The objectives of the Traffic Management Plan are to:

- clearly define and document the responsibilities and chain of command for the development, implementation and management of traffic control measures and systems

- establish the minimum requirements for temporary traffic control

- establish the minimum geometric, cross-section and surfacing standards for temporary works

- provide appropriate transitions and enable safe and efficient traffic flow into, through and out of work sites

- protect the Contractor's personnel at all times

- protect the Assets and the Contractor's resources at all times

- meet the operational requirements for the road

The Traffic Management Plan must include the following:

- A documented process for the preparation, review and approval of the Traffic Management Plan

- Layout diagrams, method statements etc for the implementation of traffic control while undertaking each aspect of the Services (including site specific layout diagrams and method statements if the Services require traffic control measures not covered by standard codes of practice)

4.5 Handover Report

Immediately prior to the completion of the contract, the Contractor will prepare a ***Handover Report***. The purpose of the Handover Report is to provide a smooth transition to the next contract and ensure that the next contractor is aware of any outstanding issues.

The Report will:

- Summarize any unresolved issues;

- Provide the following details:

- A schedule of outstanding defects and liabilities

- Details of any unresolved issues

- Details of any sensitive issues

- Details of any ongoing special monitoring/maintenance needs.

- Complete inventory of road segments under contract

5. Service Level Criteria for Paved Roads

This section specifies the Service Levels to be complied with in the case of paved roads. There are three overall criteria:

- Road Usability
- Road User Service and Comfort Measures
- Durability Performance Measures

5.1. Road Usability, Road User Service and Comfort Measures for Paved Roads

The Contractor will have to ensure that the road is open to traffic and free of interruptions at all times

Permitted exceptions are: a few closure hours following serious road accidents. The Service Level criteria of Road User Service and Comfort for paver roads are defined in Attachment A.

6. Durability measures for paved roads

6.1 Road Roughness

The Contractor must have the means required to perform regular road roughness measurements. The roughness measurement will be performed on a regular basis that allows for further comparison of previous and future roughness in any 500-meter road section.
No road roughness criteria will apply during the periodic contract rehabilitation phase. However, the roughness will be inspected at the end of the accepted periodic/rehabilitation stage and the recorded and accepted values for that stage will constitute the threshold to be used for future roughness comparisons. (as per IRI standards)

Where no Periodic/Rehabilitation stage is planned, the road roughness will be measured at the start of the contract and the recorded and accepted values for that stage will constitute the threshold to be used for future roughness comparisons.

In accordance with the periodic/rehabilitation stage values, or the start of contract values when no rehabilitation is scheduled, the Contractor will be responsible for ensuring that road roughness is below the threshold values above. The Supervisor will partake in the roughness measurements which will be regarded as part of the Formal Inspections.

If the roughness exceeds the permitted value, the basic monthly performance regarding the affected road length will be reduced by the following factor:

$$(Ra – Rp) / Rp$$

with Ra being the actual roughness and Rp being the permitted roughness for the required service level. (expressed in m/km).

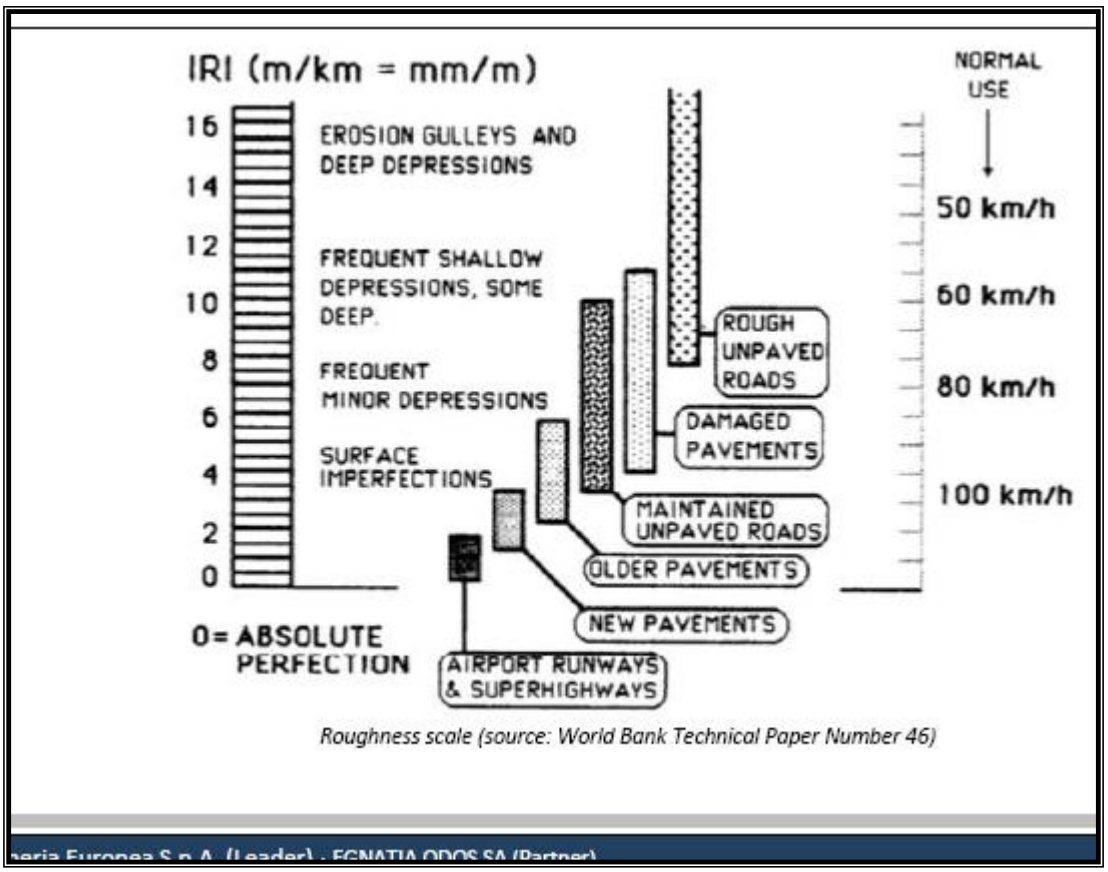
The reduction will take place monthly until such time that the measured roughness falls below the permitted threshold value.

(Below is shown the IRI scale as per the World Bank Standards).

6.1.1 ***IRI (International Roughness Index)***

Represents longitudinal road surface irregularities. This Index provides a mathematical summary of the longitudinal profile of a road surface along a rut, representing the changes experienced by the vehicle due to road roughness. These profile irregularities are a result of deficiencies caused by structural deformations. IRI is the most commonly used international index, designed to be calculated based on data regarding the profile.

The figure below shows the IRI scale (World Bank)



Roughness scale (source: World Bank Technical Paper Number 46)

6.2 Pavement Width

The Contractor is responsible for ensuring that the pavement width is at least as wide as specified in the table below:

Road	**Pavement Width**	**Time allowed for repairs or Tolerance permitted**
(insert road name)	*(insert road width)*	No tolerance permitted

Specified widths do not include paved road edges.

6.3 Means used for Assessing of Service Levels for Paved Roads

For the formal inspections of compliance with Service Levels, the Contractor will work in close collaboration with, and under supervision of the Supervisor.
For the purpose of performing said inspections, the Supervisor will be provided with the necessary means and qualified staff.

6.4 **Methodologies for Durability Measures**

The methodologies to be used for inspections of Service Levels are as follows:

6.4.1. Procedures for Inspection

The formal inspections of Service Levels on paved roads will be carried out following the procedures presented in this section.
The Supervisor will partake in all roughness measurement process stages, including equipment calibration.

(a) Road Usability

The condition is not complied with if the road is interrupted at any point. The condition is however complied with if it is possible to continue to drive on the road, and without the vehicle suffering any damage caused by the bad condition of the road

(b) Road User Comfort Measures and Pavement Width

Procedures for the Inspections of the road operation measures and pavement width aspects will be in accordance with the details provided for herein.

(b) Road Roughness

At regular intervals and each time a pavement has been modified through rehabilitation, overlay or similar works, the Contractor will measure the road roughness in collaboration with and under the supervision of the Works Supervisor. The methodology to be used for road roughness measurement will be the one proposed by the Contractor and approved by the Supervisor in line with the Specification requirements.

7. *Signage and Road Safety*

7.1 Service Levels Measures for Signage and Road Safety

The Contractor is responsible for ensuring that all horizontal and vertical signage, as well as guardrails and other road safety devices fully comply with the National Road Standards of Albania. For the contract implementation term, the Contractor is obliged to contract a road safety expert with the following certification:

"Certificate of Competency for road safety auditors/inspectors (RSA/RSI)"

The Service Level requirements for signage and road safety devices are provided in the following table:

Item	**Service Level**	**Measurement/Detection**	**Time allowed for repairs or Tolerance permitted**
Information signs	Signs have to be present, complete, clean, legible, and structurally sound;	Visual inspection	Absent or defective signs must be replaced within fourteen (14) days (for "good" service level")
Warning signs	Signs have to be present, complete, clean, legible, structurally sound and clearly visible at night°	Visual inspection and reflection testing	
Traffic guide signs	Signs have to be present, complete, clean, legible, structurally sound and clearly visible at night°	Visual inspection	
Horizontal demarcation: and/or pavement paint	Have to be present, legible and firmly attached to pavement. Micro spheres must be firm and visible.	Visual Inspection	
Mileposts and guidance posts	Have to be present, complete, clean, legible and structurally sound; surface painted or otherwise covered.	Visual Inspection	
Guardrails	Have to be present, clean (cleaned with a wire brush), without any significant damage, without corrosion	Visual Inspection	Guardrails damaged by accidents should be replaced within (7) seven days. (for "good" service level)
Lighting	Columns and other lighting elements should be present, controlled and have burned out bulbs changed, lighting columns damaged by accidents or other causes must be repaired. Any lighting defects will be repaired by the Contractor	Visual Inspection	All repairs for lamps should be carried out within 7 days and within 30 days for columns and other line defects.

Variations and gradual compliance with Service Levels for Signage and Road Safety

In order to respect the Contractor's initial mobilization period, compliance with any of the service level criteria will be in accordance with the Road User Service and Comfort Levels.

8. Drainage

8.1 Service Levels

In general terms, the Contractor must ensure that all drainage elements and structures are without any obstructions that may reduce their normal cross-section and impede the free flow of water.
The Service Level requirements for drainage structures or devices are as shown in the following table:

Item	Service Level	Measurement Detection	Time allowed for repairs or Tolerance permitted
Ditches and vertical drains with lining	Must be clean and lined without any significant damage of the lining.	Visual Inspection	Tolerance permitted; applicable to each of the following:
Ditches and vertical drains without lining	Must be clean and free of obstacles.	Visual Inspection	Obstructions will be: Obstructions resulting in over 10% reduction in drain
Collectors	Must be clean and	Visual	

Item	Service Level	Measurement Detection	Time allowed for repairs or Tolerance permitted
	free of obstacles, and without structural damage. Must be firmly contained by surrounding soil or material.	Inspection	capacity or obstructions equivalent to 5% of drain capacity. Obstructions must be cleared within seven (7) days after detection. Damages must be repaired within three weeks after detection.
Culverts and similar	Must be clean and free of obstacles, and without structural damage. Must be firmly contained by surrounding soil or material.	Visual Inspection	

Fig. Manhole cleaning example

Procedures for Inspection

The inspection is performed visually. The core principle used to determine cleanliness of drainage structures or devices is “the percentage of the theoretical cross-section of the structure or device which is unobstructed”. This percentage is specified in the Summary Table above. For a one km road section, the cleanliness of drainage ditches must be verified at least on two subsections of 50 meters each.

9. Vegetation (taking into consideration Article 25 of the Road Code Regulation)

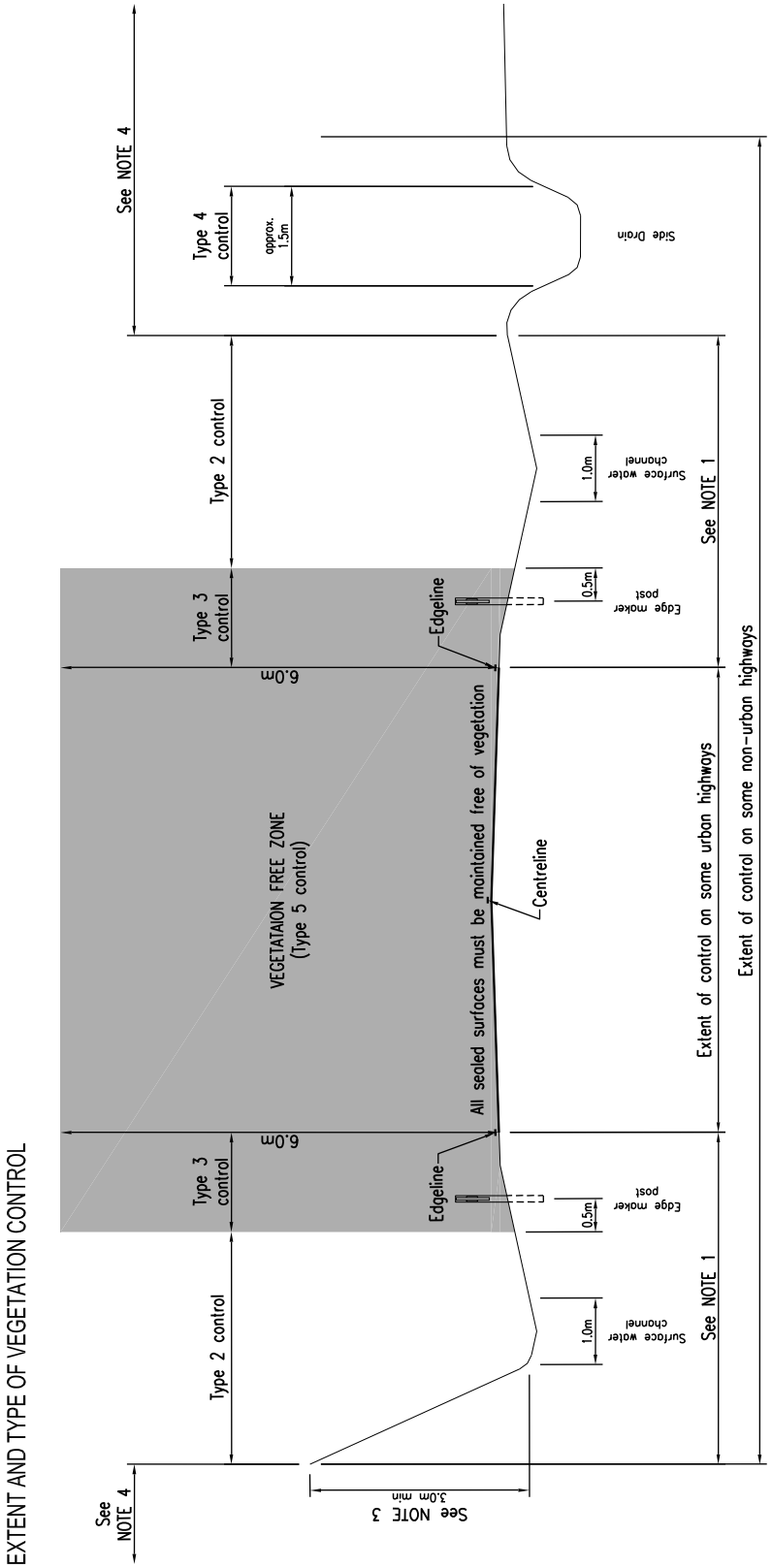
9.1 Service Levels

This section specifies the Service Levels to be agreed in case of vegetation which is in growth process within the road where the crossing is allowed: Vegetation should be checked regarding heights, places and restrictions as shown in the table and diagram below.

Table 1: Categories of Vegetation Control and Maintenance

Type	Height (mm)	Features to be applied:
1	25 – 75	The shoulders of the urban superstructure, the intermediate belts, green road-islands and the edges of road, vegetation in the rest areas, (including furnishing for the rest areas).
2	25 – 300	Non-urban roads and large green areas, including water channels that have a longitudinal bending radius of $\geq 3.3\%$.
3	0 – 200	Surroundings for vegetation control: Line posters Road sign posters Road signs of bridges and culverts Guardrails Parapets Lighting columns Bridge abutments
4	Green spaces or nearby distance of the green spaces	It is applied for controlling the surrounding green area: Closing of culverts Headwalls of culverts Side gutters water channels with a radius of <3% (except the places which are designated for relocation according to the specific contract requirements) Sidewalks and ditches Side ditches, all plugged surface Metal wings Decks of bridges

Type	**Height (mm)**	**Features to be applied:**
5	Cutting grass and weeds when they approach the free green zones starting from the sides to the beginning.	It is applied to control the green areas in the membrane, including trees, abrasions or branches that hang in the free green zones (within 0.5 m from the edge line of the line posters or within 6.0 m above the road)
6.	Maintenance of vegetation on side roads	Necessary services such as pruning, irrigation as well as their replacement in case of drying or damage (from road accidents or other natural causes) are applied.



Accompanying Figure: Control type of vegetation

Figure: Example of removal of vegetation

10. Artworks

The Contractor is responsible for the routine maintenance of all bridges and similar artworks, along the road and road sections which are included in the contract. In particular, he will be responsible for the proper functioning of artworks (painting of the metal structures, road of structures, cleaning of concrete walls and tunnel parapets, situation and placement of metal barriers) and safety and comfort of road users who cross the road at normal speed.

Regarding the maintenance of bridges, the following should be taken into consideration: maintenance of dilatation weep holes, control of substructure erosions by river flow, cleaning of deposits near the pier of bridges, placement of regular metal parapets, repair of existing sidewalks, providing informatory road signs regarding the length and the bearing capacity of the bridge, etc.

However, the reconstruction and improvement of bridges (but not that of culverts) is excluded from the obligations of the Contractor only if specified.

Every 6 months it should be carried out the verification of the actual condition of the bridges and their condition shall be reported to the supervisor of works.

10.1 Service Levels

The requirements for Service Levels for bridges and supporting walls as well as artworks are as shown in the table below:

Item	Service Level	Measures / Procedure to be followed	Time given for repairs or allowable tolerances
Metal structures or others like these	Guardrails will be tested and not deformed. All metal parts of the structures as a whole will be painted or protected in the same way and will be checked for corrosion. The drainage system will be in good condition and fully functional.	Visual Inspection	The Contractor shall promptly notify the Supervisor of Works in the event of a threat to the structural integrity of the structure.
Concrete structure (work of art)	Patching damage due to atmospheric agents and covering the iron framework when it is eroded by various factors. Repairing the damaged parts at the front face of bridges from falling stones. Parapets will be installed and painted. The rods and other parts of the structure will be in perfectly good working condition.	Visual Inspection	The Contractor shall promptly notify the Supervisor of Works in the event of a threat to the structural integrity of the structure.
Coupling weep holes	Cleaning and good conditions. Checking and maintaining the weep holes (nuts, seals etc.), as well as the damage caused to the foundation of concrete weep holes / edges.	Visual Inspection	Damage and defects that need to be repaired within seven (7) days.
Supporting Walls	The contractor will check the situation and the conditions of the supporting walls and their drainage.	Visual Inspection	Damage and defects that need to be repaired within fourteen (14) days.
River Bed	The contractor must ensure that the river bed water flows in a clean and normal way and that its level reaches up to 100 meters on both sides of the bridge. The contractor must maintain and keep the part below the bridges as clean as possible. The Contractor must take all necessary measures to control the erosion around the bridge piers and abutments.	Visual Inspection	If these works are not accepted, they will be removed and replaced within fourteen (14) days after the waters are withdrawn and the interventions are enabled.

11. *Escarpments – Excavations and Shoulders*

The Contractor is responsible for the maintenance of the entire shoulder and the escarpments along the sections of the road that are included in the contract. He is particularly responsible for ensuring that they are stable, free of deformations and erosions. However, the reconstruction and improvement of the supporting artworks and the stabilization of the escarpment is excluded from the obligations of the Contractor, unless it is specified in the Technical Specifications or it is stated in the Emergency Works.

11.1 Service Levels

The requirements of the Service Level are shown in the table below.

Item	Service Level	Measures / Procedure to be followed	Time given for repairs or allowable tolerances
Shoulders of escarpments	They will be free of deformations and erosions. They will be well compacted, free of potholes, at the levels allowed by that road.	Visual Inspection	Repairs will be completed within seven (7) days after the defect.
Landslide Repair	Materials that fall on the road from the slope slides should be cleaned by the Contractor, within the deadlines according to the service level.	If the contractor intends to implement the terms of the emergency contract, he has thus assessed the quantities and notifies immediately the Supervisor of Works, who then makes the verifications.	Traffic flow will be re-stabilized within 6 hours. The removal period of other materials that have fallen on the road is carried out as specified in the emergency clauses by the order of the Supervisor of Works
Excavations on the escarpments	The excavations on the escarpments must be stable and/or suitable for the supporting walls and for the stabilization of the escarpment, therefore they must be accompanied by	Visual Inspection of the Material in escarpments on shoulders or bedding.	The material falling from the escarpment should be removed from the road. Quantities above 50 m^3: Should be removed from the road within 4 hours after following

	appropriate measures.		the procedure. Should be removed from the shoulders and sided gutters within 48 hours after following the procedure. Between 50 m^3 and 500 m^3 should be removed from the road within 24 hours after occurrence. Should be removed from the shoulders and sided gutters within 96 hours after occurrence. Note: for landslides classified as "Emergency" other rules are applied.

11.2 ***Deviations and gradual compliance with Service Levels***

In order to comply with the initial mobilization period of the Contractor, compliance with the Criterion of the level of earthworks services will be in accordance with the term of works of the road duration criterion.

11.3. Inspection Procedures

Visual inspection will be undertaken as part of official and unofficial inspections. The criterion for escarpments will be checked in those sections selected by the Supervisor based on visual clarity. The Supervisor will be the only judge who decides on compliance. If a selected criterion is not followed, then unqualified measures will be taken for each km of road where this deficiency occurs.

12. Part B: Payments and Penalties

12.1 Payment withholding and Liquidated Damages

Payment Withholding will be applied if there is a non-compliance in the requirements of the Service Levels, while Liquidated Damages will apply in case of non-compliance with Rehabilitation Works.

12.2 Payment withholding estimation methodology

Payments coming from the Contractor in connection with maintenance interventions become the basis for the payment withholds as they also represent the lack of uncompleted items of maintenance work in accordance with the requirements of the Specifications. Payment withholding is based on three forms of reporting:

- The report by the Contractor himself on the self-control of the working units that constitutes a part of the Interim Certificate of Contractor's Payments.
- Unofficial inspections carried out by the Supervisor during the previous month and reported to the Contractor.
- Official inspections carried out upon submission of the Payment Certificate and any other document required at any time by the Supervisor.

The results of each Service Level inspection and other criteria of the performance of the works will be documented by the Supervisor in the form of a memo. The memo will clearly show the category and positioning of any defective work, especially those works that do not comply with those categorical standards set for the Contractor as part of the monthly works conditions. For each particular case of non-compliance, the Contractor becomes part of the payment withholding.

Payment Withholding are accrued over time. If the Contractor fails to complete a defective work for which a payment withhold has already been applied, then the amount of payment withholding increases from month to month for that specific case of defective work, without applying a ceiling amount, until the moment when this work is replaced according to the specified standard. The calculation of the initial amounts of payment withholding (of the first months) as well as the formula in which they are going to be adjusted in time, will be done by the following rules, based on the table of application of penalties.

Payment Withholding for non-compliance regarding the Use, Road User Service Comfort and the Measures taken for the Road Duration: For each road or road section, the Employer will make deductions from the monthly payments payable to the Contractor by deducting the total payable length by the number of those kilometers of roads incompatible with the Standards as determined each month by the Supervisor. Payment for each road will be indisputable for each kilometer of road per month of maintenance value multiplied by the length of the entire road and is expressed in the **Payment Withholding for non-compliance with the Road Severity Criteria**

In cases when the payment withholding (penalties) sum reaches the amount of 30% of the value of routine maintenance works, this fact may become the reason for initiating the procedures leading to the termination of the contract, with the justification of non-fulfillment of the required criteria of service.

12.3 Compliance / non-compliance with the performance of the service at certain levels.

After inspections, compliance/ non-compliance with the required service levels for certain roads will be done according to the table of Annex A, where the deadlines for reacting to defects and penalties for non-compliance with them are clearly given.

(According to Annex A) /

ATTACHMENT A

MONTHLY PENALTIES FOR FAILURE TO MEET CONDITIONS

Description		**SERVICE LEVEL**				**Observation**	**Repair or**	**Penalty rate**
Item	**Conditions**	**Very good**	**Good**	**Sufficient**	**Minimum**	**methods**	**tolerance time**	**for non-compliance**
Potholes	Road surface should be maintained to not have potholes	All potholes must be repaired within 24 hours following their detection	All potholes must be repaired within 2 days following their detection	All potholes must be repaired within 5 days following their detection	All potholes must be repaired within 10 days following their detection	Visual inspection	According to specification	25% of the monthly lump-sum per 1 km to be applied to each km of the section in non-compliance
Patches on asphalt layers	Patches must be in square or rectangular shape they must be of the same material and at the same level as the asphalt layer	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection	Unsatisfactory patches must be repaired within 7 days following detection	25% of the monthly lump-sum per 1 km to be applied to each km of the section in non-compliance

Description		**SERVICE LEVEL**				**Observation methods**	**Repair or tolerance time**	**Penalty rate for non-compliance**
Item	**Conditions**	**Very good**	**Good**	**Sufficient**	**Minimum**			
(an open crack on the asphalt wider than 3 mm)	No cracking is permitted on the road	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection Crack width is measured using a small transparent ruler	Cracks wider than 3 mm are tolerated up to 28 days Cracks wider than 10 mm must be cleaned and repaired within 48 hours	per 1 km to be applied to each km of the section in non-compliance
						Visual	The cracked	20% of the

Multiple surface cracking	For each 50-meter section, cracks must not cover more than 10% of the surface the cracked area is equivalent to a square area, parallel to the lane, which is a full crack, with the nearest crack being 0.25 m from the crack extremities					Inspection Crack width is measured using a small ruler	surface should be cut out and patched within 28 days following inspection except when WS agrees to seal the cracks	monthly lump-sum for the section exceeding the area of the damaged layer in a 50-meter section
Surface and Shoulder cleaning	Road surface must always be free of sand debris and other objects	Removed within 3 hours if they pose a danger to traffic safety, within 3 days if there is no danger	Removed within 4 hours if they pose a danger to traffic safety, within 4 days if there is no danger	Removed within 6 hours if they pose a danger to traffic safety, within 7 days if there is no danger	Removed within 8 hours if they pose a danger to traffic safety, within 14 days if there is no danger	Visual inspection	According to specification	30% of the monthly lump-sum per 1 km to be applied to each km of the section in non-compliance
Ruts	No ruts deeper than 40 mm are allowed In case of deeper than	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Measured with 2 rulers, one horizontal 3 m long and the other a	In case of verification of exceeding the permitted levels they must be eliminated	10 % of the monthly lump-sum per 1 km to be applied

	10 mm, no more than 5% per each 1km length are allowed					small perpendicular ruler measures depth of rut	within 28 days	to each km of the section in non-compliance
Asphalt raveling	Such surfaces must not exist	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection	The damaged surface must be repaired within 28 days following detection	20 % of the monthly lump-sum per 1 km to be applied to each km of the section in non-compliance

Loose pavement edges	Damaged edges are not permitted.	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection	The damaged surface must be repaired within 28 days following detection	15% of the monthly lump-sum for the section exceeding the area of the damaged layer in a 50-meter section

Height of pavement vs. height of shoulders	This difference must never be more than 50 mm	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Measured with 2 rulers, one horizontal the other a small perpendicular ruler measuring the diff. of pavement vs. shoulder	The difference must be repaired within 7 days following detection	20% of the monthly lump-sum per 1 km to be applied to each km of the section in non-compliance
Paved shoulders	Must be free of deformations, erosion and potholes	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection	The damaged surface must be repaired within 28 days following detection	20% of the monthly lump-sum per 1 km to be applied to each km of the section in non-compliance
Unpaved shoulders	Should be maintained smooth No lowering of shoulder edges up to	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Measured with 2 rulers, one horizontal 3 m long and the other a small	The damaged surface must be repaired within 7 days following	50 % of the monthly lump-sum per 1 km to be

	75 mm for a 3- meter length					perpendicular ruler measures lowering depth difference	detection	applied to each km of the section in non-compliance

Description		**SERVICE LEVEL**				**Observation**	**Repair or**	**Penalty rate**
Item	**Conditions**	**Very good**	**Good**	**Sufficient**	**Minimum**	**methods**	**tolerance time**	**for non-compliance**
Excavation and filling of slopes	In accordance with specifications	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection	Slope repair should be completed within 7 days following detection of the defect In case of traffic it must be repaired within 6 hours The material will be removed from the road in 4 hours for less than 50m³. Within 24 hours for more	20 % of the monthly amount for the entire road, for each non-compliance

							than 500m³.	
Structures	According to specifications	Same in all	Same in all	Same in all	Same in all	Visual inspection	According to relevant clauses	25% for each event detected
Signage	According to specifications	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection	Missing or damaged signs will be replaced within 14 days	20 % of the monthly amount for the entire road, for each non-compliance
Horizontal signage and marking	Markings must be clean and visible	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection	Paved road markings must be repainted within 56 days following notice	25 % of the monthly amount for the entire road, for each repair day delayed
Guardrails	Must be present at all times, cleaned, straight firmly attached	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection	Damaged guardrails must be replaced within 7 days	25 % of the monthly amount for the entire road, for each repair day delayed
Lighting	Columns and other lighting elements should be present, controlled and	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual Inspection	All repairs for lamps should be carried out within 7 days and within 30	20% of the lump sum for each km that does not meet criteria

	have burned out bulbs changed, lighting columns damaged by accidents or other causes must be repaired or replaced. Any lighting defects will be repaired by the Contractor						days for columns and other line defects.	

Description		**SERVICE LEVEL**				**Observation**	**Repair or**	**Penalty rate**
Item	**Conditions**	**Very good**	**Good**	**Sufficient**	**Minimum**	**methods**	**tolerance time**	**for non-compliance**
Drainages	According to specifications	Same in all cases	Same in all cases	Same in all cases	Same in all cases	Visual inspection	Obstructions must be remedied within 7 days Drainage damages within 21 days	50 % of the monthly amount for the entire road, for each repair day delayed
Vegetation	In accordance with	Same in all	Same in all	Same in all	Same in all	Visual inspection and height	Vegetation must not exceed the	25 % of the monthly amount for the entire road,

	specifications regarding the permitted vegetation height and maintenance of vegetation on road edges	cases	cases	cases	cases	measurement	permitted height Trimming and removal of branches and bushes must be performed before they reach the threshold. Road edge vegetation must be trimmed, watered and replaced in case of wilting or damage.	for each repair day delay

13. ITEMS OF ROUTINE MAINTENANCE WORKS

Routine maintenance expressed in monthly sum in ALL / km / month (Lump Sum), summarizes the performance of works for 11 items, named and specified according to the table below:

No.	Description of works	Unit ALL/km/month
A	**ROUTINE MAINTENANCE**	
1	Cleaning of roadside ditches and gutters	Month
2	Cleaning existing circular and box culverts	Month
3	Filling and leveling of shoulders	Month
4	Removal of vegetation	Month
5	Cleaning the carriageway from alluvium and other materials	Month
6	Repair of asphalt potholes	Month
7	Filling and profiling of subgrades in asphalt roads	Month
8	Filling and profiling in unpaved roads	
9	Repair and upgrade of horizontal road signs	Month
10	Repair and upgrade of vertical road signs and road safety equipment (guardrails) and lighting devices	Month
11	Routine maintenance of artworks	Month
B	**WINTER MAINTENANCE (ALL/km/month)**	

13.1 Specification of items of routine works

Item 1. **Cleaning of roadside ditches and gutters**

Description

This item will cover routine cleaning of gutters and ditches from various deposits and materials, including the collection, loading and transportation of broken materials off-

road. The Contractor will conduct routine inspections and, based on current findings, he will take appropriate action to improve it.

In case the ditches are completely covered and the dimension is difficult to be measured, the excavation will be made as deep and wide as it will; allow the flow of water that can be collected by a strong storm as well as it will allow the drainage of the carriageway.

Request

The ditch will be cleaned to allow free flow of water. The bottom of the ditch will be excavated to the original depth with a tolerance of ± 5cm measured with a 2 meter long rod where water retention is not allowed. The inner side will be excavated up to 1: 3 with a maximum slope of 1: 2.

Payment

This item will be paid monthly.

Item 2. Cleaning existing circular and box culverts

Description

This item will cover the cleaning and removal of deposits and other waste from circular and box culverts as well as their entries and exits, loading and transporting them off-road.

Request

Circular culverts will be cleaned to allow effective drainage of water through the road body. At least ¾ of pipe diameter will be free from deposits allowing free flow of water.

Payment

This item will be paid monthly.

Item 3. Filling and leveling of shoulders

Description

This item includes the elimination of potholes and ripples in the shoulders (on the free s of the shoulders, around the metal parapets, traffic signs and similar equipment on the shoulders) by placing additional material and transporting the material off-road. In order to repair the potholes it should be used non-cohesive material and it should be

compressed as long as needed. This item also includes works of filling maintenance during the expansion of the shoulders.

Request

Shoulders must be able to discharge rainwater from the road at any time. Shoulders should have a 4-8% decline in relation to the slope of fillings. The presence of water on the filled is not allowed. The bearing capacity of the shoulders must be such as to withstand the pressure of heavy vehicles without allowing a permanent deformation. Deviations of longitudinal ripples will be measured with a 2m long straightedge. The side of the shoulder along the asphalt should not pass over the asphalt. The material used must comply with the quality specifications. Small deformed s in the fillings will be excavated and refilled in cases when these damages come as a result of erosion or any other cause. Leveling of sloping s should be done in such a way that the degree of slope is close to that of the original filling.

Payment

This item will be paid monthly.

Item 4. Removal of Vegetation

Description

This item will cover the removal of vegetation as well as cutting, uprooting of shrubs, trees and branches from the shoulders or road signs nearby and similar equipment within the road zone; by stacking, collecting, loading, and transporting the material outside the zone which is under Road Ownership.

Request

The height of vegetation in the shoulders will be measured by the level of the nearest asphalt layer. The height of vegetation in other green areas will be measured by the level of existing soil.

Payment

This item will be paid monthly.

Item 5. Cleaning the carriageway from alluvium and other materials

Description

This item will cover the works for ensuring a safe passage of traffic, removal of gravels, stones, soil, wood, various solid materials as well as the removal of injured animals from the carriageway.

This item will also cover the cleaning of liquid and solid materials left behind in the carriageway after road accidents.

Requests

The part of the road where the landslides or other materials fell will be cleaned no later than 2 hours after receiving the information on the event. During the removal of the material, the road profile should not be damaged, nor should the road equipment be damaged, otherwise the Contractor will be charged with their repair without compensation.

Payment

This item will be paid on a monthly basis.

Item 6. Repair of asphalt potholes

Description

This description applies to the preparation of potholes with regular geometric shape with right angles and their spraying with primer as well as provision and pavement of asphalt.

Request

Requirements include pothole cutting. Potholes should be cut according to a regular geometric figure (square or rectangular) with sides parallel to the road axis or parallel to the sides of the existing layer. The sides should be cut vertically. Unstable parts should be removed and the pothole should be cleaned with high pressure air before spraying it with primer as well as safety and paving the asphalt. The compound must be bonded with bituminous emulsion.

According to the level of service, a pothole will be determined as such in case there is a single damaged of 0.2 m^2 or a maximum total damaged area that for 1 km reaches 2m^2.

In cases where the weather does not allow the asphalt potholes to be filled immediately, then the Contractor will fill them with temporary material, given that the road should be free of potholes. Potholes filled in this way will be properly refilled as soon as this is possible by the weather conditions.

Payment

This item will be paid monthly.

Item 7. Filling and profiling of subgrades in asphalt roads

Description

This description applies to the preparation of potholes, safety, laying, and compressing Macadam to form the base layer of the road.

Request

Requirements include pothole cutting. Potholes should be cut according to a regular geometric figure (square or rectangular) with sides parallel to the road axis or parallel to the sides of the existing layer. The sides should be cut vertically. Unstable parts should be removed and the pothole should be cleaned with high pressure air before wetting as well as it should be carried out the laying and compaction of the approved macadam.

Payment

This item will be paid monthly.

Item 8. Filling and profiling in unpaved roads

Description

This description applies to the profiling and filling of potholes, safety, laying and compressing of grave / granuled stones to repair unpaved roads and their shoulders.

Request

Requirements include profiling and filling of potholes. Inappropriate material should be removed. Spray with water before laying and compaction with gravel / granule material.

Payment

This item will be paid monthly.

Item 9. Repair and upgrade of horizontal road signs

Description

This description applies to the supply and painting with white paint of road signs, re-painting of milestones and structures. Repair and replacement of elements and equipment that are an integral part of horizontal road signs (including asphalt reflectors (cat eyes).

Request

The requirements deal with the supply of materials, machinery and workmen, the supply and loading of the necessary materials as well as painting and micro-spheres for the finalization of the signs but also for the preliminary procedures. Transportation includes means of transport and handling of all necessary machinery as well as road cleaning and signaling during operation and testing.

Payment

This item will be paid monthly.

Item 10. Repair and upgrade of vertical roiad signs, road safety (guardrails) and lighting devices

Description

This description applies to re-painting of road signs and traffic signs using the appropriate paint, in accordance with Technical Specifications, Traffic Management Plan and the Requirements of Project Supervisor. It also refers to repairs or replacements of deformed road signs, repairs or replacements of deformed supporting pipes (as works separated from each other); repairs or replacement of side marking lines; repairs or replacements of metal and concrete parapets, etc.

In terms of lighting, the replacement of lamps and other accessories of lighting devices that have been damaged is applied.

Request

The requirements deal with the supply of materials, machinery and workmen, the supply and loading of materials necessary for the painting and road and traffic signs in accordance with the Traffic Management Plan; transportation, includes means of transport and handling of all necessary machinery and materials as well as testing.

Payment

This item will be paid monthly.

Item 11. Routine maintenance of artworks

Description This description applies to the maintenance of artworks: bridges and supporting and retaining walls. The works will consist of: 1. **Bridges** - a) maintenance of the superstructure (asphalt layers, sidewalks, weep holes, side rails, maintenance of hinges, discharge gutters), for Bejli type bridges completion and maintenance of the wooden board layer, b) maintenance of the substructure (filling of the sided shoulders, removal of vegetation, etc. c) hydrology (maintenance of river protection, etc.).

Request

The requirements are for the supply of materials, machinery and workshop, the supply and loading of materials necessary for the maintenance of these elements in accordance with the Traffic Management Plan; including means of transport and handling of all necessary machinery and materials as well as testing.

Payment

This item will be paid monthly.

B.

Item: Winter maintenance

Description

In Albania, the duration of the winter period is estimated at about 5 calendar months. The phenomena of frost and snow can also appear in other periods due to bad weather conditions. *Having no fixed date on the beginning and end of winter phenomena, the payment will be made within 12 months, being included in the Lump Sum amount of routine maintenance.*

Despite this, the Contractor is obliged to carry out the complete winter maintenance, meeting all the criteria set out in the Technical Specifications.

Request

The weather in winter is often unpredictable, with variable intensity over long periods of time and requires a flexible approach to service provision.

Travel conditions for the vehicle and road safety during the winter are quite limited by snow and ice. All measures taken to counteract the effects of ice and snow can be described as Winter Maintenance Services. First of all they include:

- precautionary measures (snow fences, snow sign boards)
- snow cleaning
- avoidance of frost
- measures against ice
- removal of fallen stones and debris from the road

- provision of salt or alternative materials
- monitoring and reporting system of conditions.

Snow cleaning involves the tasks of plowing and transporting of the removed snow. Unlike water, snow can be compressed, but is not elastic. When the snow compresses, it retains its shape. **That is the reason why it is so important to remove it in time.** The Winter Maintenance Service is in the best interest of road safety and, as a result, is very important to the national economy.

Payment

This item will be paid monthly. **In case of non-fulfillment of the criteria for cleaning the road segment from snow and ice, the Contractor will be subject to the full deduction of the amount of maintenance routine item, in the amount of 100% for that segment. In case the problem is repeated in the following month, the procedures for termination of the contract begin.**

Part B

Emergency Works Rules

Content List

1. Definition of "Unforeseen Natural Phenomenon"

Emergency works have been prepared to repair the road damage included in the contract, which is caused directly by the unforeseen natural phenomenon with incalculable consequences that occur in the zone of the project roads or elsewhere, but which always have a direct impact on the road. The "Unforeseen Natural Phenomenon" includes phenomena such as:

- Heavy rains and strong winds/ storms that last long,
- Large-scale landslides that originated outside the yellow line of the road,
- Floods where waters reach higher levels than floods that have occurred in the past 10 years,
- Damage to artworks from landslides or erosion due to immediate rainfall.
- Earthquakes that cause serious damage to property, including the demolition of buildings.
- Damage to the substructure (including the road base) or the superstructure of artworks due to extreme weather conditions.

This does not include "normal" damage, such as falling trees on the road, minor erosions of road and shoulders, damage caused by traffic accidents, landslide blockages and **snowfall in any amount**; these must be repaired by the Contractor as part of his obligations under this contract.
Without being limited, a list of examples of emergencies that require Emergency Works is needed:

- Complete destruction of a culvert as a result of a rare rainfall density, which leads to road traffic blocks,

- Interruption of the road following the blockage of ditches that erode up to more than 500 (five hundred) cubic meters of road material for a section of 500 meters long or less than that,

- Road flooding of more than a length of 100 meters, after a careful assessment that this road flooding does not come as a result of deficiencies in the drainage system or due to insufficient drainage structures.

2. Procedures for the required emergency works

If it is obviously clear that the damage caused by "Unforeseen Natural Phenomena" leads to a decrease in Service Levels below the normal parameters of the specified values, the Contractor may make an official request to the Supervisor of Works to carry out the Emergency Works that are prepared in detail especially to repair these damages. If the Contractor decides to make a request for Emergency Works, he must:

- Immediately notify the Supervisor of Works regarding his intentions for this case, by telephone, e-mail or other means,

- Document the circumstances of a force majeure event and the damage caused through photographs, videos and other sustainable means,

- Prepare a written request, which confirms the type of work he intends to undertake, their correct positioning and the calculated amounts and costs, including photographic documentation. In any case, a request for Emergency Works will be made immediately after the Contractor receives accurate information on the existence of these damages caused by the "Unforeseen Natural Phenomenon".

Upon receipt of the request and not later than 24 hours thereafter, the Supervisor shall assess the request made by the Contractor accompanied by a visit to the site, and then the Supervisor shall issue the order to carry out the Emergency Works. The order will specify the type of works, their calculated quantities, the payment that shall be made to the Contractor, as well as the time allotted for their execution. The order may indicate a request for engineering/ geotechnical assessment of the possibilities for permanent site repairs.

3. Payment of Emergency Works

Emergency works are given by the Employer on a ceiling amount for each work specified in the order based on calculable quantities, unit prices determined in bill of quantities, works items and unit prices will be applied as defined in – Bill of quantities presented in the Tender. In case of Emergency Works, works which are not covered by the items

presented in the bill of quantities of Emergency Works will be performed based on the works performed for working days or based on the values given in the Rehabilitation Works of the Contractor or based on the values agreed between the Contractor and the Supervisor of Works using the Price Manuals in force. The agreed values will be the basis for approval by the Road Authority and the category and origin of these values to be used will be subject to free choice of the Supervisor of Works, who will require the completion of works at minimal cost.

4. Conditions for Emergency works

The total amount of the contract includes the Unforeseen Cost for the execution of Emergency Works during the contract period, in accordance with the data of the Tender. Current payments for Emergency Works will be based on tendered values or those values that will be determined in accordance with the road.

5. Obligations of the Contractor during Emergency Works and Emergency Situations

Due to the very nature of this technical rule and the fact that Emergency Works are paid separately, the Contractor will have ongoing responsibility throughout the execution of the Emergency Works to ensure normal service levels for all roads included in the contract. In addition, the Contractor shall do what is possible with the most reasonable justification for ensuring the normal use of contract roads, including sections affected by emergencies.

If the traffic on the road is interrupted as a result of an emergency, the Contractor shall take all necessary measures such as:

- To reopen traffic as soon as possible, and
- To maintain an open road during Emergency works,
- To officially inform the media and audiovisual bodies, upon approval by the Employer on the current situation

without receiving any additional rewards/payments for these Services. This also applies to all emergency circumstances such as damage to bridge ramps, shoulder erosion, collapse of the entire escarpment, road accidents, floods, etc.

6. Small repairs necessary through "Unforeseen Natural Phenomenon"

If the work required to repair the damage caused by the "Unforeseen Natural Phenomenon" is below the indicative values, or of a nature excluded from the category of Emergency Works, the Contractor shall perform those works as part of his normal

obligations and without having the right to take advantage of the condition specified in the contract relating to emergencies and payments to Emergency Works. In these cases, there is no need for the consensus of the Supervisor of Works, and the Contractor will simply perform these works upon his own initiative. However, he will always notify the Supervisor of Works on the damages that have occurred and the repair measures that will be taken. The indicative values per kilometer of the road for small repairs are shown in the table below:

Activity	**Unit**	**Quantity for Emergency situations**
Material slips on the road	m^3	500 (one in each case)
Damage, blockage, fall or drowning of culverts	number	1 in every 5 kilometers of road section
Asphalt-concrete	m^3	20
Base layer	m^3	50
Concrete	m^3	5
Shoulder	m^2	500 (one in each case)

Part C

Standard Rules

1. General requirements

a. Introduction

Each maintenance element will be implemented in accordance with the laws of the Republic of Albania.

b. Take-over of the road section to start the maintenance implementation

Road sections that will go under Performance Maintenance will be handed over to the Contractor by the Employer in the form of an inventory of all road elements and characteristics on their actual condition.

The form of this process will be prepared and it will include the following:

- Road section and length
- Number of lanes and width of carriageway
- Number of art works (bridges, culverts, supporting walls)
- Horizontal signaling
- Vertical signage (number and type of signs, delineators, reflectors, chevrons, etc.)
- Metal protectors (type and quantity)
- Drainage

  and other road elements, specified according to particular segments.

- Film footage, photos and videos should also be part of the file.

c. Description of Works

Works include a combination of rehabilitation, maintenance (routine and winter) and emergency works.

Rehabilitation works include shoulders, drainage and paving of roads that may include items such as pavements, signage and lines, parapets and other works related to civil works, which will be standardized according to the Levels of Service.

The needed rehabilitation works include some, or all of the following items:

- General items as specified
- Planning of Works
- Providing material resources and disposal areas.
- Ground works including excavation and embankment
- Accommodation of public traffic flows/movements and access requirements in the works area, according to appropriate measures.
- Cleaning of existing drainage structures and existing canals.
- Construction of culverts.

- Construction of pavements including the sub-base and base of the crushed rock and asphalt concrete .
- Installation of characteristic elements for road works, road equipment, including steel barriers/metal protectors, traffic signs and symbols, etc.
- Additional interventions for the main works.

Maintenance works include all works required to maintain the contract roads at the prescribed levels of the Service.

Emergency works include those necessary works that cover major natural phenomena that cause great damage and that cannot be covered by maintenance descriptions.

Additional definitions are provided through the main contract documents.

2. Definitions

Asphalt

A mixture of predetermined proportions of concrete material, filler material (used for thickness mixing) and bituminous cord prepared for the road, which meets certain specific requirements of the physical parts of the mixed material; usually placed by road paving machines.

Asphalt Surface

Layers, or asphalt layers built on the base, and in some cases, the edge of the carriageway/road.

Base; base material

A layer of material that lies immediately below the - a layer built over the sub-base.

The crossing of vehicles

The area that is normally crossed by vehicles and which consists of one or a number of traffic lanes close to each other, including auxiliary lanes and road edges.

Water drainage

A stack or longitudinal drainage canal outside the street prism used to divert water that would otherwise flow into the street prism.

Under road canals

Any construction not classified as a bridge that gives an opening according to a road underpass.

Left parts/openings

An opening means all excavations from the road prism, including side drainage canals, excavations in the railway junctions and parking paths, and, where classified as an opening, excavations for open drainage canals.

Filling

That portion of the road prism which consists of approved import material which lies between the road bed, and is connected by the side slopes, shown in the cross sections,

typical of the sketches in the downward and outward directions from the sides of the road to be built. The material imported to replace the unsuitable material in the road bed will also be classified as filler.

Drainage inlet and outlet canals
Channels leading to or discharging from under road canals, and bridges.

Lane
Part of a road over which only one traffic level in one direction can go, and which is marked as such by the respective road signs.

Amount
A considerable portion of work or quantity of material which is assessed as a unit for the purpose of quality control and is selected to represent material or work produced by the same processes and materials essentially.

Pavement layers
The upper layers of the road containing the selected layers, the sub base, the base, or paved lines, and the layers of the side of the road.

Road bed
Normal material at the work site where the filling will be done, or in absence of filling, any pavement layer.

Road prism
That portion of road construction included between the original ground level and the outer boundaries of the slopes of the fillings, openings and the side drainage canals. It will not include the selected layer, sub base, base, , side edges or road bed when these lie on the original ground but should include their volume up to the space they lie under the original ground, so that excavation can be performed to allow their construction.

Tools
Cables, pipes, or other constructions/parts, electrical pipes, telephone and telegraph connections, water, sewage, etc.

Lateral drainage canals
An open longitudinal drainage canal located close to, and at the end of the openings or filled slopes.

The edge of the road
(a) When we refer to this as a : the area between the outer edge of the passing road and the breaking point of the side of the road.
(b) when we refer to this as a pavement layer: the upper pavement that lies between the outer edge of the base and the breaking point of the road edge.
The breaking point of the road edge
The line along which the flat laid-out plans of the road edge and the outer slope of the

filling and the pavement intersect. This edge is normally round to a predetermined radius.

Waste (Material)
Original soil material that comes from construction works and that is not used for construction purposes. In general, it is clearly a material obtained from excavation unsuitable for use in works.

Stabilization
Treatment of materials used in the construction of the road bed, filling or pavement by the addition of cement hardening such as lime or Portland cement or mechanical modification of the material by the addition of a soil hardener or bituminous cord/hardener. Asphalt and concrete will not be considered as stabilized materials.

Sub-base
Material layer on top of selected or filling layers and under the base of the road edges.

The road that is used by vehicles
That part of the road where you pass by vehicle which includes various traffic lanes and auxiliary lanes, but excludes the road edges.

3. Skill and Quality Control

The responsibility to supply the material and to produce work that matches the quality and accuracy of the details with all the specifications requirements and sketches lies with the contractor, and the contractor - at his own expense - will set up a quality control system and provide experienced engineers, managers, supervisors, material technicians, other technicians as well as technical staff, together with all transport, tools and equipment, to ensure accurate supervision and positive control of works at any time.

4. Hand over to Supervisor

Whenever the Contractor is required to submit proposals, programs, details, sketches, calculations, information, literature, materials, test reports and certificates to the Supervisor, the Supervisor will consider any submissions and, if necessary, respond to the Contractor according to the relevant provisions of the terms of the contract. Each submission will be made on the dates agreed with the Supervisor of Works taking into account the approved program and the need to give him the proper amount of time to view each submission.

The approval of the Supervisor of Works will not release the contractor from his responsibilities under the contract.

5. Existing roads and constructions maintenance

The Contractor shall maintain all existing roads and constructions including indirect road equipment, from the beginning of the works until the end of the contract and/or the date when the sections are opened for public traffic. Road s, drainage canals and constructions

and any lighting within the limits of the contract (whether existing or reconstructed), will be kept in order and free from visible defects during the period of works until the issuance of the certificate of completion of works.

6. Materials and manufactured items

Before making any order for materials and manufactured items to be included in the works, the contractor will present to the Supervisor of Works the names of the firms from which it is proposed to obtain these materials and manufactured items. For each supplier, details shall include a description of the materials and items to be supplied, their origin, manufacturer specification, quality, weight and strength data as well as any other relevant details. The Contractor shall deposit with the Supervisor of Works, samples/specimens of these materials and items when required and necessary, the manufacturer's certificates for recent tests performed for similar items.

7. Interventions Notices

No action will be taken without full notice given to the Project Manager by the Contractor. This shall be sufficiently ahead of planned time of action to enable the Supervisor of Works to make any necessary adjustments for inspection and control. Each stage of the works to be inspected shall be agreed upon with the Supervisor of Works.

The Contractor shall give the Supervisor of the Works no less than one full working day prior to the written notice of his intention to place or give the levels of any/every part of the works in order to make adjustments for the control.

8. Temporary works

For all temporary works, the contractor will present to the Supervisor of Works the sketches showing the general arrangement/adjustment of the temporary works (with diagrams and descriptions showing how it is proposed that they be implemented) and how they fit into the overall program for permanent works.

The entirety of the temporary works, including the plant and the equipments to be used, shall be the responsibility of the contractor in relation to their construction, sufficiency, safety, maintenance and removal upon termination of the contract. Examination by the Supervisor of the proposals of the temporary works of the contractor or his subcontractor, or of any project or sketch related to it, shall not exclude the contractor from any liability/obligation imposed on him according to the contract.

There will be no special payment for the cost of compliance with the requirements of this point and the contractor is thought to have covered the cost of meeting these requirements in its values for the works.

9. Information provided by the employer

Any information contained in the contract documents or given separately, is provided in good faith, but in circumstances pertaining to the type of information provided, no

guarantee can be given that the information is undoubtedly accurate or representative in the conditions of the place of works.

The employer will not accept any liability for the accuracy of the information provided for any damage that may result, either directly or as a consequence that will occur during the term of the contract, or as a result of incorrect information. Any measure taken by the contractor in this information will be at his own risk.

10. General construction requirements

The following general requirements will apply:

1. When the night work is authorized by the Supervisor, the Contractor shall supply the appropriate temporary lighting and shall provide and install any additional lighting that the Supervisor may request, in order to supervise the works and to perform the tests and examinations of the materials.

2. Materials brought to this works site (including any material that must be available or supplied by the employer) will be used only for the implementation of works.

3. **The contractor will take all necessary measures regarding**:

-Any drainage canal or water line to prevent mud, flooding, erosion of beds and banks, as well as water pollution that can mutually affect the quality of presentation, or can cause damage to humans, animals or plant life.

-underground water resources (including water for which the source is known) to prevent any interference with the device or disconnection from sources and will ensure that in no way its actions will contaminate or mutually affect its quality.

4. The contractor must provide, maintain and remove, upon completion of the works, waste and other constructed equipment, in order to minimize pollution as a result of the operator's actions.

5. The Contractor shall ensure, maintain and remove, upon completion of the works, the appropriate fence around the parts of the work site including the appropriate safety measures for access roads. This will be fulfilled without diminishing in any way his obligations to maintain free access by the employer, Supervisor and/or other contractors or other persons entitled to this access.

6. The Contractor shall be responsible for and comply with all State decrees, orders or regulations including those relating to taxes, health and safety regulations, environmental protection and employee taxation.

11. Water protection

The contractor will be responsible for taking measures for the water, whether from existing drainage canals, water flows, groundwater sources, precipitation, tidal effects or

any other source or cause. In water discharge and deviation, measures should be in place to avoid flooding or damage to works or other Services, erosion and/or pollution.

The contractor shall maintain the entirety of works free from water, and will provide all the piers, places surrounded by rivers, pumping, platform on poles, shores, shades, temporary drainage canals, discharge gutters, etc. necessary for this purpose. Where possible, the works will be programmed in such a way that the need for temporary drainage canals, the original terrain, is partially prevented by works during dry periods.

From its amounts, the contractor will calculate all costs to deal with the water including those to take the necessary measures to prevent damage, as a result of erosion and mud during construction. Measures will include temporary drainage canals, cleaning controls, broken stones, and so on. Deteriorated or spare material will be spilled to prevent interference with flows, water lines or any of the water drainage systems.

With the closure of the works every day, the of each finished layer will be adjusted so that puddles and sliding of the do not occur. Any damage to works or properties near them, resulting from failure of the contractor to take the necessary measures, shall be supplemented at the expense of the contractor.

There will be no special payment for the cost of compliance with the requirements of this point and the contractor is thought to have covered the costs for meeting these requirements by his amount/value of works.

12. Safeguarding of existing utility services

The Contractor must know the position of all existing Services such as water drains, power and telephone cables, lighting poles, main water pipes, etc. before starting any excavation or other work that may affect existing Services.

Contract sketches indicate the location of existing utility Services. The information given in these sketches shows only their approximate location. The Contractor together with a representative of the individual utility Services agencies shall verify the existence and exact locations of all public utility Services affected by the temporary or permanent works, including but not limited to:

-Main water pipes, service connections and manholes
-Above ground cables with medium voltage and pole lines connected to these
-Underground cables with medium voltage
- Above ground cables with lower voltage and pole lines connected to these
-Substations and electric manholes
- Above ground telephone cables and pole lines connected to these
-Underground telephone cables
-Phone boxes and switch boxes
-Other mixed equipment as directed by the project manager

The Contractor shall remain liable for any damage to existing works or services and shall compensate the Employer against any complaint concerning this (including subsequent damages). The Contractor shall be responsible for the re-designation of any Service

affected in this way.

Special care should be taken while excavating, refilling and compacting materials near main pipelines, cables, etc., and to leave elements such as water meters, faucet boxes, etc. The contractor's attention is given to the regulation that is in force in Albania regarding the gaps/safety spaces of the works from the cables that have different voltages for actions that will be performed near the overhead power lines.

Notwithstanding the above requirements and without diminishing the responsibility of the contractor, he will inform the Supervisor of Works immediately if any existing work or service is exposed, placed or damaged. All works that need to be done to correct any damage caused to the Utility Services will be done with the consent of the owner's agency or the Supervisor of Works and at the expense of the contractor.

All costs that can be caused by the contractor as a result of programming and coordination of work to enable any change of services to be performed, and the cost of any safety warning which is considered necessary as a result of the proximity of works to the power or the utility lines will be with the Contractor Services.

No special payment will be made for the cost of compliance with the requirements of this point, in relation to the Utility Services which will not be permanently diverted, removed or abandoned as part of the Works, and the contractor is thought to have covered the full cost to meet all temporary requirements with its values/amounts for the Works.

13. ***Utility services deviation***

The Contractor shall be responsible for arrangement/adjustment, in coordination with the appropriate Authority, as soon as the request for the movement or alteration of the Services, whether for temporary or permanent work, is recognized. These may include energy, telephone lines, main water pipes, sewers and water drainage canals. Adjustment for any shift or change will be subject to the approval of the owner's agency and the Supervisor of Works. The Contractor shall allow the appropriate time in the program for the notification and execution of the works of the Utility Services as agreed with the appropriate Authority.

Where authorized work will be performed by the agency's own workforce, the contractor will coordinate and facilitate the work.

In the event that the water supply is cut off when a main water pipe is moved or changed, the contractor will be required to supply drinking water to any resident affected by such works.

Payment for receiving utilities when these utilities require permanent relocation will be made with the values in the amount invoices and those values will include the entire cost of implementing the required works. Where deviation or relocation is temporary to allow the contractor to carry out the Works, but no permanent relocation is required, the contractor is thought to have covered the full costs of meeting the temporary requirements in its values for the works in accordance with the preceding paragraph.

The contractor is reminded that the utility Services shown in the sketches will be considered as indicators of the Utility Services in each place, and that there may be others present, that are not shown in the sketches. It is the responsibility of the contractor to ascertain the full extent of the utility Services in each work site, and to provide from his amounts for the works for the costs of making them.

14. Coordination with government and police officials

The contractor will consult with police and government officials in the area regarding their requirements for traffic control and other matters. This can lead to the provision of assistance and facilitation that may be required of these employees to carry out their duties related to the works.

No special payment will be made for the cost of compliance with the requirements of this point, and the contractor is thought to have covered the full cost of meeting all temporary requirements with its values/amounts for the works.

15. Water Supply

The contractor will provide a clean, sufficient and continuous water supply - for the construction of works as well as for all houses, offices, laboratories and work units. The Contractor shall be fully responsible for making arrangements (including pipelines and subsequent connectors for connection to the main water pipelines) and to ensure the pumping, preserving of water reservoirs or water transport vehicles where necessary, and for the payment of all water tariffs and payments and for the satisfactory removal of these arrangements and provisions upon completion of works.

The water will be clean from solid waste and without any items in quantities considered by the Supervisor as harmful to the works. The water provided/brought to the offices, laboratories and houses will be abundant and drinkable according to the approval of the medical official in the area, or according to any other Authority as the Supervisor may say.

No special payment will be made for the cost of compliance with the requirements of this point, and the contractor is thought to have covered the full cost of meeting all temporary requirements with its values/amounts for the works.

16. Unfavorable Weather

The Contractor shall accept as true all risks of delays in the completion of works which may be caused by weather, including (but not limited to):

- Rainfall which is greater than expected, and which stops, hinders or delays the works;

- Periods of lower or higher temperatures than the expected temperatures that cause a slowdown in action;

- Extremely strong winds and any predictable wind direction that causes interruption of works, damage to equipment, materials and tools/buildings and loss of time as a result of repairs or replacement of works and equipment.

17. *Camp Dismantling*

Upon completion of the contract and after obtaining written approval from the Supervisor, the contractor will remove (dismantle) and take away all temporary constructions that form part of the Works, and will make the plan for disconnection of water supply and electricity, removal of temporary drainage services and will clean the sewers and sewage pits. The contractor will repair the workplace as much as he can, and return it to its original condition and leave it in a clean and tidy condition.

Part D

Contractor Schedule

1. Description

The contractor will provide a program and methodology of works to carry out rehabilitation works for each road where this rehabilitation is needed. This section expresses the requirements and procedures for the preparation and submission of the Contractor's prior schedule and the detailed follow-up schedule and the indicative progress, as well as the requirements relating to the update and summary of all of these.

2. General

The Contractor Schedule will be used by the Contractor to plan and execute Rehabilitation works. The schedule will also be used by the Supervisor to monitor progress and be the basis for assessing delays in the progress of Works.

The schedule will be prepared by the Contractor in the following stages:

Initial Schedule. A schedule that summarizes in total the rehabilitation works, which will be submitted to the Supervisor for his knowledge. If the Supervisor does not agree with it as this schedule does not comply with the Contract, then this schedule will be reviewed and re-submitted again. When the Supervisor has agreed on this schedule, then it will become the Approved Schedule.

Updated schedule. The approved schedule will be updated with current progress and maintained at least on a monthly basis for registration purposes. The Contractor may submit other reviews of approved or updated schedules for approval by the Supervisor.

All schedules submitted by the contractor must reflect the key dates indicated in the contract documents.

Approval by the Supervisor of any phase of the contractor's schedule does not make the schedule a contract document, or mandate, that the works will be carried out strictly in

accordance with the schedule. The Contractor shall, at all times, remain responsible for the construction of the Works.

3. Program Presentation

3.1 Time limits

Within 2 weeks of signing the contract, the contractor must submit to the Supervisor of Works for his information (his data) an initial program that shows, in detail, the order in which the contractor proposes to perform accelerated work in the first 3 months, after the contract is signed and a sketch of how he intends to complete the works. The initial program relates to the dates of termination of the contract and to any other moment, and/or to the controls/contents set out in the contract.

This program becomes the approved program with the approval by the Supervisor of Works. The approved program will be related to the contract expiration dates and any other moment, and/or to the controls/contents presented in the contract. Therefore, if the current progress does not comply with the approved program, the Supervisor for Approval/Acceptance has the right to request the Contractor to submit to the Supervisor of Works a revised program for approval, indicating the order of the procedure and the necessary periods to ensure the completion of the Works upon the dates of completion of the contract (on the date specified as the date of completion of works in the contract).

3.1 Reporting on the methodology of the works

At the same time with the contractor's submission of the program, he shall also submit a general description of the adjustment and methods for construction and design of temporary works to the Supervisor of Works for approval, which the contractor proposes to adapt for the implementation of rehabilitation works. The formulation should refer indirectly to the activities in the program.

The Contractor shall submit to the Supervisor of Works sufficient information which may be deemed necessary by the Supervisor of Works to interpret, evaluate and accept the formulation of the method.

Whenever requested by the Supervisor, the Contractor shall provide him with detailed information on the formulation of the Contractor's method.

If the Contractor changes any previously approved method formulation, which the Supervisor considers reasonable and necessary to change, then the Contractor must submit a reviewed method formulation to the Supervisor for his approval.

Acceptance/approval of the Project Manager for the formulation of the contractor's method does not make this method formulation a contract document, or a mandate that the works be strictly constructed in accordance with the formulation of the method. The Contractor shall, at all times, remain responsible for the construction of the works in accordance with the requirements of the contract.

3.2 Approval

Within 10 working days, upon the Contractor receives the complete program with all the required information to be approved by the Works Supervisor, the latter shall accept the program or shall provide the necessary reasons for not accepting it. Upon the reasons are provided, the Contractor shall take its own responsibility and shall provide again the program within 10 working days. If the Supervisor does not accept or rejects the program within 15 working days, the Supervisor shall deem as accepted.

The supervisor has the right to reject a program that indicates that works have been completed earlier than the date when the contract is terminated, if the same program is not accurate in value and / or account.

By agreement, the Contractor and the Supervisor may distribute the prints of the various forms of the Contractor's program, but under no circumstances can they make available the required electronic copies.

3.4 Details of the Program

The Supervisor shall accept the program, if it specifies as follows:

- interventions and all work packages including those of the main subcontractors or suppliers, well-known entrepreneurs, contractors and suppliers directly employed by the Employer and others.
- The earliest and most recent dates of the initiation and completion of each activity in each work package. A summary of all the main activities and any of the activities or time dedicated to the main activities shall be provided.
- Entry dates for each phase or section.
- The first or last start and end dates for each phase or section.
- Quarters and important dates.
- Holidays.
- Dates on which the Contractor, Subcontractor or Distributor projects or drawings shall be submitted for approval to the Works Supervisor and the dates on which the approval of the planning shall be requested by the Contractor at the time determined for presenters, re-presenters and reviewers.
- Dates, on which the models to be produced by the Contractor shall be submitted for approval by the Supervisor and the dates on which the

approval of these models shall be required by the Contractor, at the time determined for the presenters.

- Procurement periods and delivery dates for the main items of goods, plant and materials.
- Dates in which the work will be ready to be tested by the Project Manager/Employer.
- Details and dates of some information required by the Employer.
- The work is conducted based on the specified preliminary amounts.
- Activities representing the composition of expected works of the indefinite Preliminary Amounts, supplemented by logical connections.

3.5. Public Safety

The contractor shall be responsible for the safety of the public walking by the construction site. All excavations, plants and other items that pose a potential hazard to the public must have barricades and be equipped with appropriate signs satisfactory for the Works Supervisor. Also, the Contractor must provide adequate protection to ensure public safety at all times. All existing pedestrian roads shall be maintained in good condition except when another alternative road which is satisfactory for the Works Supervisor is provided. Temporary road sinking and elevations must be at an angle and design as to ensure stability and safety with the materials available.

3.6 Notification of accidents

The Contractor shall immediately notify the Works Supervisor in the event of accidents (in site or outside the site) in which the Contractor, his staff, the Construction Plant or those of his subcontractors are directly or indirectly involved by causing damages to the people. The notification may be verbal at first, but should be followed by a comprehensive report within 24 hours of the incident.

Part E

Road safety and traffic control

1. General Requirements

The contractor must keep the existing roads open to traffic during construction works but may divert the traffic on a side road of equal standards when the latter has been approved by the Supervisor. The Contractor shall be liable for the costs of all road deviations.

The contractor must maintain the roads that will be affected by the works clear of soil and other remaining materials and ensure that the construction area can accommodate traffic safely at all times. The Contractor shall establish and keep signs, barricades, and other means of traffic control as may be required to direct traffic in and out of construction areas and as indicated in the temporary Signs Schemes - Temporary Traffic Control or as guided by the Supervisor. The Contractor shall, without additional compensation, replace the traffic control devices that may be lost, that may have been stolen, destroyed or deemed unacceptable when required to be used.

During the break hours and upon completion of the construction works, all the warning signs, except those that are necessary for the public safety, will be removed. Painted and retro-reflective surfaces in signs, barricades and other tools will be kept clean, in good working condition, and shall always maintain their own retro-reflective feature. Measures, colors, messages and locations shall be approved by the Works Supervisor.

The contractor shall ensure at all times the suitability and safety of the residents along the road or any public highways affected by the works. The right to enter the vicinity of the construction site will always be valid.

The contractor shall be responsible for investigating and establishing traffic control and safety requirements, which includes familiarity with traffic conditions, importance of maintaining traffic safety and minimizing traffic delays by cooperating with relevant traffic control agencies.

2. Traffic Control Measures

To facilitate traffic movement and safety in nearby workplaces, the Contractor shall supply and maintain traffic signs, lights, barricades, cones and other materials necessary or required by the Supervisor.

In order to provide proper traffic control as needed, required or directed by the Supervisor, the Contractor shall supply and place persons with flags, whose task will be to direct traffic movement through or along the works. In order to minimize traffic disruption, the Contractor may temporarily close part of the site with a fence, as required, to provide a visual barrier between the works site and nearby traffic. In this case the following should be taken into account:

- Sign panels shall be orange with a black legend unless otherwise specified.
- Checkpoints should be of soft wood or other material acceptable by the Supervisor.
- Signs should not lose their position during normal traffic and windy weather.

- Temporary barricades and fences will be constructed of wood, metal or plastic and painted in the traffic direction.
- Cones will be at least 75 cm high with an extended base and be able to withstand impacts without damaging cones or vehicles. All cones will be orange/white, should be visible and be able to maintain their positions in normal traffic and windy weather.
- Warning lights (electric, colored, flash, on both sides) will be used as approved by the Supervisor.
- Traffic control tools will only be used when needed.

3. Number of traffic lanes

The contractor is required to maintain throughout the time a surface area with a standard equal to that of the original road, in terms of width, curves, gradient, and driving quality. Appropriate works should be performed to provide the foregoing. The Supervisor may approve a temporary road with accurate traffic deviation signs, if the Contractor proves that this shall not cause unnecessary traffic delays. Upon such approval, the Supervisor can specify the times when the reduced capacity road can be used. If additional delays occur, the Supervisor may withdraw its approval and in such cases, the Contractor is required to restore the original road standards within 48 hours.

When, in the opinion of the Project Manager, deviation cannot be possible, construction on existing public roads will be performed only on the half of the full road width. Upon closure of half of the road, its length will be minimized and the width of the functioning lane will be not less than 3.0m.

4. *Temporary road works*

Prior to the construction of a temporary road, the Contractor shall make all necessary arrangements, including payment if required, with public authorities or landowners regarding the use of the land and should obtain the approval of the Works Supervisor. All temporary roads will be constructed in accordance with the requirements of the Works Supervisor, but the Contractor shall be liable for any damage resulting by the use of the temporary roads.
The Contractor shall submit for approval to the Works Supervisor, the projects which contain the details of the layout, signs, lighting, profile, driving quality and the duration of the temporary road as well as their maintenance as proposed.

The Contractor must submit for approval to the Supervisor, the drawings that provide full details of the items proposed for the road, signs, lighting, profiles, driving, and duration of the road on temporary roads as well as adjustments for modified maintenance.

The contractor must make all necessary arrangements so that the materials and personnel belonging to any other contractor involved in the construction works are allowed to move along the road of the construction site. Upon completion of the works, the Contractor

shall supply, maintain and remove all temporary roads and shall clean and return the site in accordance with the requirements of the Works Supervisor.

5. Support for the Works Supervisor

The contractor must ensure full cooperation and support in all aspects of traffic and environment safety control performed by the Supervisor or Employer.

Part F

Quality Control

Overview

This section sets out the requirements for providing quality.

The Contractor shall be responsible for the quality control of the constructions, materials, products and installations of works. The contractor must establish and maintain an efficient quality control system. The system must be convenient in order to cover all actions.

1. ***Approval***

The samples of materials or mixtures that the Contractor is required to provide should be approved in advance by the Works Supervisor. The Contractor will fail to comply if he uses the materials or mixers without the written approval of the Works Supervisor. Therefore, the Contractor shall be held responsible for the consequences of non-compliance. All samples will be provided in due time to be tested appropriately by the independent testing laboratory.
The approval of any material and mixture by the Works Supervisor shall not in any way relieve the Contractor of his obligation to ensure the materials, mixtures and craftsmanship in accordance with the specifications and drawings.
Any material that seems to be inconsistent with the same approved material shall be compared tested and shall be subject to a new approval process, only if that material is removed voluntarily, replaced or corrected.

2. ***Inspection and evidence***

Testing inspection is divided in two categories:

- On site or daily inspection and testing;
- Off-site inspection and testing.

1. On-site inspection and testing

On-site inspection will be conducted inside the construction site where the works are being carried out. The material testing will be performed regularly by the laboratory set up for these tests which is approved by the Supervisor.

2. Off-site inspection and testing

Off-site testing and inspection for equipment and materials identified in the specifications may be set out in the contract. Off-site testing and inspection shall be carried out in the presence of the Works Supervisor.
The Contractor shall provide the Supervisor with a special written notice in not less than 28 days before the exchange of off-site inspections is required and shall provide the manufacturer with a safe and easy entry as well as shall cooperate with the inspection staff to fulfill their duties.

3. Measurements and payments

The contractor is fully responsible for all tests required to ensure reliability that the materials supplied by and the work done by it are in accordance with the required criteria. The contractor is fully responsible for all costs of such testing.

The independent test lab is to the benefit of the Contractor as it relieves the latter of the need of obtaining expensive and often heavily used equipment on site to perform tests that are not required on a regular basis. The cost of these tests, or of such test groups, will be borne by the Contractor. The cost of samples, transport samples, assistance and similar will be the sole responsibility of the Contractor.

Part G

Environmental Management

1. Description

The employer undertakes to protect the environment and conducts its day-to-day activity in an ecologically responsible manner and to prevent or minimize potential adverse environmental effects associated with road construction. The contractor is obliged to observe all rules, policies and procedures on the environment set out by the laws and regulations defined in our country for the environment protection.

If an environmental management plan (EMP) has been processed, developed for this contract, the contractor is obliged to implement the provisions as well as the whole construction process. If there is no EMP, the contractor must fully meet the following requirements. Many of the environmental requirements are included directly in the specific points. Regardless of the fact that the contractor has been notified that any of the following points must be correctly observed throughout project implementations and in all collection costs. All environmental collection costs are considered to be included in the contractor as quotations, in the form of taxes, prices for which there is a possibility to pay.

The employer reserves the right to independently authorize environmental monitoring performed throughout the work period. The persons in charge of monitoring shall report to the employer, engineers, and engineering staff the significant violations of environmental requirements and shall be responsible for monitoring environmental requirements day by day.

2. Reinstatement (vegetation)

All cuttings, embankment slopes, pile removal, slopes in deep borrowed pits, field areas and any temporary work should be vegetated again with plants, shrubs and lawn approved by the Engineer. Upon completion of the works, no remaining areas will be without vegetation in both temporary and permanent works, such as field settlements, work stations, etc. Measures will be taken to plant shrubs and small trees up to a height of 1.5 meters behind the shoulders that are more than 3 meters high.

3. Noise levels

High noise level equipment should be limited to work from 08:00-18:00 and will only be managed on normal working days. The Engineer can mitigate noise level restriction, if he is convinced that the affected position is far from the listening beam and from any potentially influenced community. High noise level equipment should be characterized as equipments that produce a noise level higher than 90db at a distance of 10 m under normal operating conditions. If so, the contractor uses anti-noise barriers to protect critical sectors (schools, hospitals, etc.) from the effects of high noise levels.

4. Access roads

All entrances to temporary areas occupied by the contractor must be directed in order to avoid environmental damages. These roads must be approved by the Engineer before they are built. If the engineer deems it reasonable, he approves and gives advices from an environmental point of view before approving these roads.

5. Property access roads

All entrances to existing properties and the roads must be observed at any time during implementation of works. Wherever there is an existing entry to the property, the contractor must ensure through the availability of adequate temporary works that this entry shall be at the disposal of the property owner throughout the works, and for the entire property as mentioned above.

6. Tree removal

At any time, the contractor must take all necessary measures in time to minimize the destruction of trees and vegetation. It must ensure that its staff does not take over unauthorized logging of trees or spaces at any time.

7. Public meetings

The contractor shall find the necessary action including public meetings in order to ensure that the public is constantly aware of the programs and what is happening. It also ensures that at least one member of its staff is available during working hours to meet the public demands and their claims regarding its activity.

Part H

Works and soil

1. Description

The works specified in this section cover the excavations and embankments required for constructing vehicle sidewalks and new drainage ditches, for the construction of filling areas and embankments of the enclosed swampy area by using excavations material at the works site and approved borrowed areas as well as for preparing the sub-slopes.

This job description shall not include potholes excavation and refilling or plot repair, drainage ditches and culverts cleaning, work invoiced specifically as structural excavation and structural refilling.

2. Classifications

The Excavation specified in this paragraph shall be classified as general, inappropriate material and as ditch excavation.

2.1. *General excavation*

General excavation will include road excavation and borrowed excavation as specified below. Therefore, it will comply with the requirements of the sketches.

2.2Excavations in gutters

This work deals with the excavation of new ditches and potholes as shown on the sketches or as otherwise instructed by the Supervisor.

Tolerances for new ditches are as follows, ensuring that the ditches' cross-sectional area, the width of the bed, and the level of the slope top will not be less than those shown in the sketches / drawings or ordered by the Supervisor.

2.3. Excavation of the vehicle road

Vehicle road excavation shall consist of excavating and placing on embankments (of satisfactory disposal) all the material necessary for the construction of earthworks shown in the sketches, including any reduction in the existing embankment slopes. If the excavation on a vehicle road is required at a specific level and the contractor digs below the required level, this over excavation will be carried out using approved materials, of a quality not less than the material over excavated at the contractor's expense.

2.4. Excavation in quarries

Inadequate excavation shall consist of excavating, transporting and placing the material on the embankment from authorized borrowing sources. Only material suitable for the construction of embankments or other works covered by the contract shall be used, and, if specified, it shall comply with the requirements of the sketches.

3. Disposal of surplus and inadequate materials

3.1. Ownership of excavated materials

Any excess material shall become the property of the contractor and shall be placed outside the road area upon the consent of the Works Supervisor and in accordance with state laws, the environmental management plan, and the requirements of this provision. The costs for the disposal/placements will be fully covered by the contractor who will deduct them from his excavation amounts.

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3.2. Disposal / Waste Areas

Until another permit has been granted, the contractor shall dispose of all excess excavated material, including the unsuitable material, off-road in approved waste areas. The Contractor shall provide the waste areas without additional compensation and shall submit them as well as the proposed disposal method for approval to the Works Supervisor.

The areas provided by the contractor for disposing removed materials will be far from the project site and it will be applied at least 100 m distance from the nearest public road.

4. Escarpment materials

4.1 General Requirements

The words "filling" and "embankment" replace one-another in this material.
Materials used for fillings should not contain stumps, roots, plants, fertilizers or other materials that cannot be compacted into a strong and suitable structure. Materials defined as unsuitable should be removed and disposed of. The filling or embankment must be constructed in accordance with the plans or according to the orders of the Works Supervisor. The filling material should not contain particles larger than 150mm.

4.2. Specially selected filling.

In cases where specially selected filling is included in the plans or ordered by the Supervisor, the material used should to provide a stable construction with low permeability and must be approved by the Works Supervisor.

4.3. Moisture content.

The materials must be compacted to the optimum moisture content in order to achieve the specified density. If necessary, to achieve the moisture content, water must be added to the material or moisture content must be reduced by processing the material and/or forming material piles in order to allow it to dry, as necessary.

5. Embankment construction

Fillings or embankments must be constructed, within the specified, tolerances in accordance with the prior agreement or Initial Construction, the lines, grades and plans shown in the Plans or pursuant to the order of the Works Supervisor. An existing embankment can be expanding by cutting and then filling the division areas cut into the existing escarpment. No separate payment will be made for cutting dividing areas, and the cost of this work will be included in the Contractor's expenses. The extension will be measured in them and there will be no special measurement for cutting or filling the dividing areas. They will be constructed in sections not less than 100 m long or along the entire length of the filling or embankment and will be placed in layers with a depth of not more than 200 mm, with loose measurements and throughout the width of the embankment. These layers will be approximately parallel to the vertical profile line of the road. The shoulder material shall be compacted well.

6. Works maintenance and safeguarding

As construction continues, proper drainage for the road cover must be maintained at all times. The Contractor shall maintain the entire construction of earthworks for the duration of the Contract and shall take all appropriate precautions to prevent the loss of the material from the road layer, due to the wind or water.

He must repair at his own expenses, unless otherwise specified in these provisions, any landslides, erosions, soil subsidence or other issues that may arise before the final acceptance of the works.

All ditches excavated must be preserved from natural shallowness or other damages caused to the lines, grades and sketches shown in the plans, until final acceptance of the project.

7. Final form completion and compacting: Subleveling

As a final escalation work, the shape of earthworks surface must comply with the preliminary agreement or initial construction, the lines, grades and sketches shown in the Plans or according to the order, within the specified tolerances. No manual work will be required unless required in limited areas where equipment cannot be used. The area where the upper embankment surface should form a bed, or the lower part of the base or lower sub-base, should be compacted and take the correct shape, in order to be in accordance with the form and levels required by the Albanian Road Construction Standard.

8. Geotextile

In terms of the case shown in sketches, the embankment base must be reinforced with a construction geotextile membrane, laid out as shown in the levels or sketches that can be attached to the contract. These reinforcing membranes must comply with the requirements of the sketches.

9. Works near the sidewalks

While performing manual works near the sidewalk, which is used to maintain traffic, extreme care must be taken to avoid pedestrian accidents.

10.Scarifying existing surfaces

10.1. General

Scarifying and compacting of some areas will be required in order to prepare them for laying additional material or for constructing a new layer. This article covers the requirements for scarifying, shaping and compacting existing materials.

10.2. Execution of works

While the works continue, accurate drainage will be provided for the road bed, which needs to be maintained at all times. The Contractor shall maintain all surfaces for the entire duration of the Contract and shall take all necessary measures to prevent material loss from the road bed due to the interaction of winds or water.

The contractor must repair, at his own expense, unless otherwise provided for in the contract, any landslide, shifts or malformations that occur before the work is taken over.

Scarification shall consist of crushing/breaking materials on an existing surface, giving the area the shape needed to make the molds, and compacting as needed before laying any additional material.

Existing material will be scarified and crushed to such an extent as no piece shall remain off the allowed standard, with a dimension greater than half the nominal depth of the scarred waste. Aggregates or fragile particles will crumble and all remaining particles will be disposed of.

The scarified material shall be redistributed before the surface is compacted, and it should be in the final shape as required in the contract (it is usually a parallel surface according to the required and final condition after the subsequent additional layers are laid) and it shall also have a layer of friable material which thickness is the same with the nominal depth of the predetermined scarification.

Part I

Structure excavation and backfilling

1. Description

The work described in this section consists of excavations of culverts, underground pipes, retaining walls, main walls, reinforced concrete sewers and similar constructions. The quoted fee shall include all costs related to:

-The construction and removal of areas surrounded by rivers, splits, junctions, etc.

-The pumping or otherwise, water drying of excavation foundations.

-Removal of existing constructions or parts of buildings that are not covered by any other object in the contract, including foundations, supporters, piles, consoles, and all other materials, barriers, etc.

-Any other extra excavation required to provide the relevant work surface;

-Removal of excess material and final cleaning, as may be necessary to perform the works.

-Refilling with approved materials.

2. Excavation for river detours

Excavations to change the direction, enlargement, depths or reinforcement of springs and rivers or to create new water flow routes will be carried out as shown in the sketches or as instructed by the Supervisor. This may also include site clearing, slope shifting, bed grading, and removal of excavated materials.

The places where water flow directions need to be changed, previous ditches should be cleaned of all vegetation and soft deposits and should be carefully filled with the approved material, deposited and compacted as instructed by the Supervisor.

3. Geotextile materials for structures

3.1 General

As already indicated in the Sketch or advised by the Supervisor, the Contractor shall provide a plastic (geotextile) filter which shall be wrapped around the concrete of the culvert potholes and behind the pre-set concrete to hold the filling material.

3.2. Materials

Geotextile reinforcing materials must have the approved features, continuous weave of 100% polypropylene or other approved material and should essentially comply with the requirements set out below.

The base PLASTIC must contain stabilizers and/or barriers to make the fibers resistant to abrasion due to prolonged exposure to light and ultra-violet rays ‘heat. It must also be completely non-biodegradable, resistant to soil chemicals and bacteria, and should not be affected by AIDS and alkalis.

The requirements for the woven geotextile qualities as follows:

Weaving	**Type 300**	**Type500**
In the direction of the length		
Normal elastic strength(minimum)	300 kN/m	500 kN/m
Extension to nominal strength	< 13%	< 11%
2% load extensions	> 30 kN/m	> 90 kN/m
5% load extensions	> 110 kN/m	>400 kN/m
	> 230 kN/m	
Indirect direction:		
Nominal tensile strength (minimum)	40 kN/m	50 kN/m
Extension to nominal strength	< 7%	< 9%
Static hole test		
Pull-through strength	> 10 kN	> 10 kN
Pull-through placement	< 30 mm	< 40 mm
Ultra Violet Resistance		
Xenon test	UTS > 90%	UTS > 90%
Classification	Class C	Class C
Thermal – oxidation resistance	Class A	Class A

Note that the features refer to the length and indirect affiliation of the construction catalog. During installation, the length used as above will be cross-sectional with the new central line of the road.

In addition to the mechanical features listed above, the surface of the approved geotextile shall be flat, consistently suitable for promoting friction between construction and nearby soil.

The Contractor shall provide details, with a certificate indicating the manufacturer's name, product name, style number, chemical composition, and examples of material proposed to the Supervisor for review and approval.

Product labels will clearly indicate the name of the manufacturer or supplier, the name of the style, and the name of the catalog. Each shipping document will include a note certifying that the material complies with the manufacturer's Certificate.

All geotextile catalogs will be wrapped with a material that shall protect the geotextile from water, sunlight and pollutants damages. Protective packaging will be maintained during storage and sea shipping periods. During storage, the geotextile catalogs will be lifted off the ground and covered properly to protect the geotextile's physical character from being damaged.

3.3. Plastic Filter (Geotextile)

The plastic filter will be placed in or in the opposite direction of a prepared bed or surface, without soil piles, debris that can damage the fabric. The fabric will be loose; it shall not be pulled out, and should have no wrinkles and folding. The damaged material will be repaired or replaced by a geotextile fabric large enough to cover the damaged area and meet compliance requirements. The fabric will be on top of each other with a minimum of 450 mm (18”) on all joints, seams and sides.
The requirements for all materials will be in line with the State Standard for Designing and constructing roads in our country.

3.3.1. Installation

The contractor and Works Supervisor will agree in advance upon the geotextile reinforcement installation procedure. Both parties shall be monitor prime coat actions, as well as any changes or adjustments to the agreed and demonstrated procedure. The agreed satisfactory procedure shall not be changed except with the approval of the project manager who will be contacted immediately if the contractor deems necessary to make any changes.

The agreed procedure shall ensure that:

- The fabric is stretched as soon as possible after the completion of the vertical drainage ditches;
- The fabric is spread over a smooth surface;
- The fabric stretched correctly with the appropriate placements/covers and with the joint lengths;
- The fabric is stretched without wrinkling;
- Refilling is done upon placing the fabric;
- Anchoring is done immediately after backfilling which starts at the right level of filling;
- The clay layer protects the exposed areas immediately after the layers have been refilled.

As soon as possible after installing a complete section of the embankment drainage ditches, the contractor shall install the geotextile membrane to reinforce the base of the embankment.

Once the road section is ready for the fabric layer, the fabric panels will be pulled indirectly along the road line to their correct position, with pure anchor lengths along each side of the road bed. The sidebar/edge of each panel shall cover the other panel with a minimum of 300 mm. The fabric shall be transversally directed to the road line and no junction between the fabric lengths shall be allowed; each completed panel shall be a separate piece of the fabric.

After the layer, the entire fabric will be smooth and free from wrinkles.

Upon the laying one part, the contractor will ask the Works Supervisor to inspect and approve the laying. The refill shall begin immediately after receiving approval.

The refilling shall start upon completion of the works, on the part which has been finished earlier and has been partially refilled. No equipment or vehicle will be allowed to move on the fabric coming out on the surface. The material will be poured only in the previously placed material and will be carefully distributed in the front to cover the fabric. Levels will be carefully checked each time to make sure that the fabric where the machines or equipment shall move or work has an absolute minimum coverage of 15mm. Following the compacting and approval of the first layer, a second layer of filling will be placed to bring the embankment to the level. Attention should be paid to the places where the level is above the original ground level, in order to ensure that the proper width of the embankment is set. The filling road sides will fit as needed to ensure appropriate width and the anchor length will be brought and stretched tensely to the top of the layer.

Refilling of the next embankment layer will begin once the anchorage lengths are placed properly. Refilling shall start from the center of the embankments, continuing straight so that the free ends of the extended/fixed lengths are properly placed below the refill before the action reaches the outer sides/edges of the embankment.
As soon and as practical as possible after completing the embankment construction at the required height, the protective clay layer will be placed to cover each piece of exposed area and to protect the filling/removal of sand from erosion.

Part J

Granular substrate

1. Description

This part covers the application of the granular substrate which shall consist of a suitable aggregate material that complies with the requirements of the following specifications.

2. Materials

Materials intended to be used as substrates will be crushed rock obtained from deposits of mass rock material that naturally crumbles, angled gravel, or round gravel that has been compacted to at least 60% of the material. This shall show a cut surface with no vegetation, foreign items and other harmful materials. It must not contain lumps or aggregates of a sufficient nature or quality, in order not to obtain a smooth surface.

The contractor must be fully responsible for the supply with sub grade materials.

1. Elevation

The material must comply with the following requirements for granular substrate:

Size of sieve (mm)	Percentage as per the weight

63.0	100
40.0	70 - 100
20.0	50 -85
10.0	40 - 75
4.75	30 - 60
2.36	20 - 45
1.18	15 - 37
0.075	4 - 15

2. Harmful substances

All aggregates will be reasonably free of clay grains, soft and friable parts, salt, alkalis, organic substances, adhesive layers, and other unspecified substances which may have undesirable features. The weight of harmful substances should not exceed the following percentages:

Coal and lignite(AASHTO T-113) 0.50%
Soft and friable materials (AASHTO T-112) ≤0.50%
Clay grains (AASHTO T-112) ≤0.50%
Coal and tar coal ≤0.5%
Free/empty shells ≤1.0%
Organic substances(Wet) ≤0.20%

3. Compacting

Compacting shall be performed by a vibrating roller and the compacting level shall not be less than 98%
Tolerances
Upon completion of the substrate, the upper surface of the final direction will be suitable in line and level within a tolerance of +.00 to - 40mm

4. Layer thickness

The thickness of the substrate shall be as required to achieve the specified level tolerances taking into account the current levels of the following layers.

Part K

Top layer and bitumen cover

1. Description

The entire work on the top layer and the bitumen coating, will be performed in accordance with the specifications and in accordance with the lines, dimensions, and notes indicated on the

sketches or as instructed by the Supervisor.

2. Equipment

The following equipment must be available and in good working order:

Distributor

The connector distributor used to distribute bitumen connectors must:

Be in good working condition and should be calibrated according to the common methods to determine the layer thickness.

Have a spray rod, where the outer nozzle of each end of this rod has an opening of at least 25% and not more than 75% larger than the other nozzles. All other nozzles must have uniform openings.

Have a spray rod where the distance between the opening centers of the outer nozzles of this rod, be equal to the width of the required application - with tolerances allowed up to 50 mm. If the main application covers less than the full width, the normal opening of the end nozzle on the joining line may remain the same as that of the inner nozzles.

Have no fuel leakage or connection disruption;

Have a straight and clean spray rod, with spray heads of the same type, which open simultaneously and do not leak when closed;

Have spray heads, all at the same angle as the spray rod and placed at the right level, in order to provide proper spray coverage;

Have nozzles arranged in such a way that the spray fans clean each other;

Have clean and undamaged sieves;

Be equipped with a special hand tube for spraying corners and other areas that cannot be reached by spraying rods;

Be equipped with pneumatic tires, which must have sufficient elastic width when coming into contact with the road surface, to avoid connection disruption or leaving a trail on the surface;

Be under the direct control of an operator approved by the Supervisor1and have a certificate of compliance with the required standards.

Water Spray

Efficient spraying equipment must be available in order to spray a uniform layer of water, at the approved speed, over the entire area to be laid with the main layer.

Rotary brush

It must be self-propelled or equipped with a suitable trailer, with pneumatic tires.

Various equipments

Other equipment should include hand brushes, reinforced paper for connectors, wires, nails and all other auxiliary equipment needed to perform the work efficiently and accurately.

Transportation tanks

All tanks that transport bitumen materials to be used in the project must be equipped with an apparatus approved for sampling.

Storage tanks

All materials of the main layer that have been stored in hot conditions must be stored in a container with a circulating system that works properly and have a safety cap. The maximum storage temperature should be according to the recommendation of the main layer material manufacturer.

In cases where the bitumen material must be measured by a storage tank, the latter, before being used, must be calibrated by a Specialist approved by the Supervisor.

Calibration

All distributors, transport and storage tanks that will be used in this work must be calibrated by a Specialist approved by the Supervisor and no distributor or tank must be used until it is satisfactorily calibrated.

Calibrations performed for distributors, transport and storage tanks can be accepted by a reliable and well-known company that deals with the calibration of tanks. Calibrations performed or approved by the Supervisor should be used to determine the quantity for each distributor and transport or storage tank.

3. Application

3.1. Weather and Other Conditions

No major layer shall be applied under the following unfavorable conditions:

During foggy or humid weather,

When it is about to rain;

When the wind blows so hard that it can cause uneven spraying;

After sunset;

2.2. Preparation

No more than 24 hours before spraying, the top layer should be brushed and cleaned of all excess and harmful materials, using a rotary brush and/or hand brushes. Brushing should be done carefully in order not to damage the coating.

Before spraying the materials of the main layer, the latter should be checked for surface compatibility and other specified requirements. Any section that does not comply with the specified requirements must be corrected.

A light water spray, sufficient to moisten the surface, can be applied uniformly to the layer, immediately before applying the main layer. If too much water is applied to the layer, the latter should be dried until a uniformly moistened surface is achieved.

The moisture content of the layer should not exceed 90% of the optimum moisture content for the material that forms the layer. The asphalt surface should be cleaned of all excess materials, dust and accompanying pollutants, either by using the rotary brush, or with high pressure air. Upon the advice of the Supervisor, if the surface becomes dirty with mud, animal feces or adhesive materials of this nature, it must be cleaned with water, by careful pressuring spray, or by spraying and cleaning with the rotary brush; if water is used to clean the surface, the nail/attached layer should not be sprayed until the surface is completely dry, except when emulsion is used. In this case, the surface may be wet, but there should be no visible water on it.

3.3. Application on site

Materials for the main and bound layer should be applied at a temperature that will be approved by the Supervisor. The exact temperature shall ensure uniform distribution and shall be determined by the Supervisor, after the approval tests to be performed by the Contractor.

The application rate of the top layer will depend on the surface type, but it will be sufficient to mature the soil as a whole and uniformly without additional material.
The application rate will be within the line:

$$0,8 – 2,0 \text{ kg/m}^2$$

The real application rate will be as advised by the Supervisor after performing the approval tests including testing for short sections.
Wherever possible, the prime coat will be applied to one or more roads evenly, over all road widths, allowing it to penetrate and conserve until traffic can drive on the surface without leaving traces of tires over the prime coat. All traffic will not be allowed on the surface until the condition is met.

Total surface width of the prime coat will be as shown in the Sketches or as described by the Supervisor and the edges of the paved surface will be parallel to the center line of the road.

In places where traffic cannot be deviated, the prime coat will be applied and it will allow to be penetrated as long as it is practicable before an aggregate layer is applied at a rate of approximately 0.0035m3 / m2.

If the prime coat is applied to more than one strip, permits will be for belt breakage of 100 mm.

Total width of the paved surface will be as shown in the Sketch or described by the Supervisor and the edges of the paved surface will be parallel to the central line of the road. If paving is applied to more than one strip, permitting will be done for belt breakage of 100 mm.

Before going on with the asphalting, the asphalt layer would have been dried. Traffic on paved surfaces will not be allowed except when required for construction.

3.4. Protection of Auxiliary Works

When the prime coat is applied near the pavement or other concrete surfaces (except where they should be covered with bitumen coating), it will be covered with thick cardboard or otherwise protected as approved by the Supervisor during application. Any bitumen material deposited on the concrete surfaces should be removed immediately.

The contractor must, at his own expense, replace all dirty ingredients that cannot be cleaned. Dyeing of stained surfaces will not be deemed an acceptable repair measure.

3.5. Maintenance and opening of traffic

In places where the aggregate is applied to the paved surface provided that the traffic is allowed, the Contractor shall maintain the layer and the primed surface throughout the period when the surface is open to traffic and shall repair all damage to the paved surface as instructed by the Supervisor.

3.6. Tolerances

The current spraying rate measured with the spraying temperature will not deviate from the required spraying rate as specified or ordered by the Supervisor, at the level of more than 0.06l / m2. The edges of the sprayed surface shall have a maximum deviation of 25 mm from the specified edge line.

3.7. Testing

The Contractor shall notify the Works Supervisor at least 24 hours in advance of his intention of spreading the prime coat or the rope layer, so that the current spraying rates can be ordered and/or verified by the Supervisor. Contrary to what has been previously accepted, the Contractor shall only spray when the Supervisor is present and the surface to be sprayed has been approved in writing. The distribution rate of the prime coat and the material of the other layer shall be checked at the intervals indicated by the Supervisor, but it shall not be less than two tests on each paving day.

SURFACE LAYERS REQUIREMENTS

Road layers consist of the following main parts:

a) The coating consisting of two layers: the upper consuming layer in contact with the rotation of wheels (moving loads) and atmospheric agents, and the lower connecting layer.

b) Foundation

c) Sub-base

d) Reinforcing layer

e) Ground (original or processed) according to the following figure.

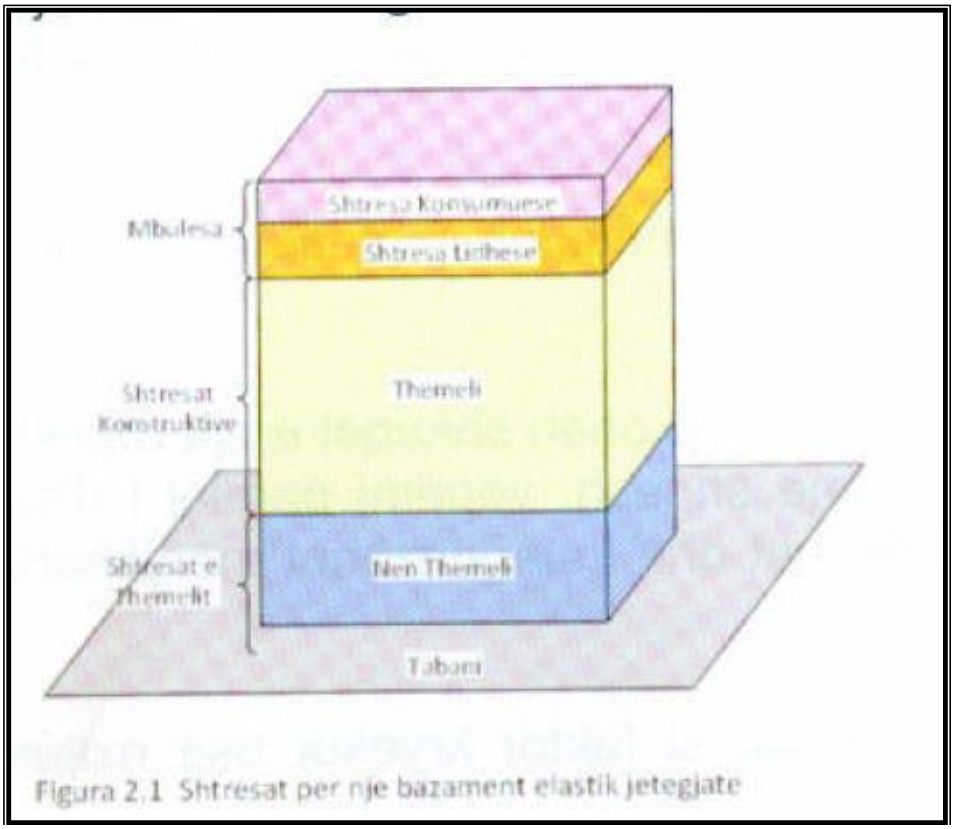


Figure 2.1. Layers for a long-lasting elastic base

Cover

Consumer layer

Connecting layer

Constructive layers

Foundation

Foundation layers

Sub base

Ground

A well-built road layer needs to have the following qualities:

▪ to provide good adherence

▪ To enable good drainage of surface water

To minimize vehicle noise

To resist cracks and crevices

To protect road layers under it

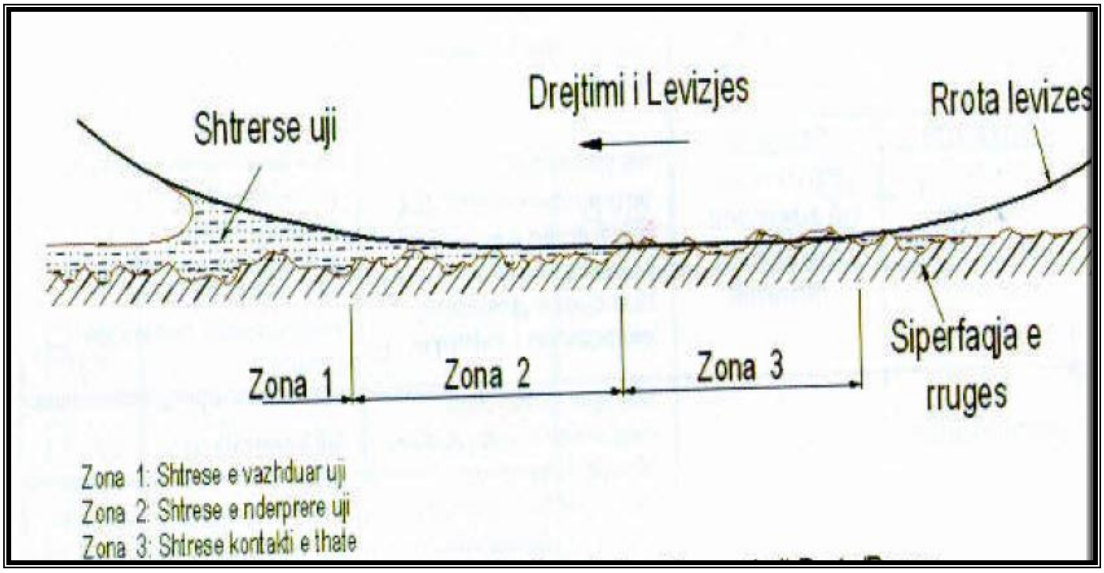
To require minimum maintenance

To be suitable for recovering and recycling

To be resistant

Road coating must have a special structure and quality in terms of vehicle wheels contact. As can be seen in the figure below, the surface of the road-wheel contact surface is divided into three areas:

- Area 1: where the surface water layer is uninterrupted;
- Area 2: where the water layer is dispersed leaving a thin water stream, which can be spread and penetrate to a part of the contact surface;
- Area 3: where the water layer is all removed and there is a good and "dry" tire contact with the road surface. In order to ensure water removal and thus the necessary adherence to a certain driving speed on the road, besides the qualities of the tire, in majority of cases, the road surface macro texture plays also an important role is also.



Accompanying figure: Wheel-Road interaction areas

Water layer
Direction of movement
Moving wheels
Area 1
Area 2
Area 3
Road surface
Area 1: Continuous layer of water
Area 2: Intermittent water layer
Area 3: Dry contact layer

EMBANKEMENT REHABILITATION

Rehabilitation of open shoulders aims at preparing a smooth and stable layer that:

- will not be deformed by loads;
- Has a high resistance to traffic and weather conditions;
- is impenetrable;

Part L

Surface Cover

1. Base correction

Once the first layer has been laid, the base shall be well checked for softness and precision in

leveling, elevation and cross section. Any base section that does not comply with the specified requirements will be corrected with the asphalt to be paid at the Contractor's expenses, until the specified requirements are met. The asphalt used for the correction of the base or sub-base will be the same mixture as specified for the top layer and the maximum to be used for the aggregate size shall be dedicated to the required thickness for correcting each case.

Furthermore, regarding base correction, the Supervisor has the right to order the removal and replacement of the layer or sections laid on the base and the substrate layers that do not comply with the specified requirements, instead of allowing the correction of works below the permitted standard of asphalt materials.

2. Surface cleaning

Once the prime coat is applied before the asphalt is laid, the surface shall be cleaned and dried to eliminate all hazardous materials.

In places where the prime coat is damaged, it shall be repaired manually by means of a brush, or by spraying the first material on the sections damaged.

The prime coat shall be dried completely before the asphalt is laid. The Contractor's program shall allow for delays until they are ready for laying the prime coat, the application rate, the base porosity, liquid mass composition, and the weather conditions.

The above positions shall be prepared by using asphalt cutting machinery, so that the cutting is in regular square or rectangular shape. The bottom of the created pothole should be cleaned well before emulsion spraying.

3. Application of the adhesion layer or emulsion spraying

After the vertically cut surfaces and the bottom of the potholes are cleaned, it is followed by adhesive layer or emulsion spraying. The contractor must be careful in providing the required quantity of emulsion to be used. This layer must be kept clean and the asphalt concrete to be used must be laid 2-3 hours later. If weather conditions cause any damage, the latter must be repaired before laying the asphalt.

4. Pothole filling with asphalt concrete

The asphalt concrete shall be dropped manually in the potholes. The minimum temperature of the material during its casting should be 150 degrees. Compacting of the cast layer shall mean the use of a vibrating cylinder of 1.5-2 tons, which is manually operated.

4.1. General

The mixture shall be spread on the street so that there is no massive lack of asphalt. The mixing temperatures shall be controlled by measuring an ordinary mass as soon as it is dumped off the truck, and the average temperatures encountered will not be less than 10 ° C below the specified mixing temperature in the table above. Adaptation of large wooden rods, feeders, funnels, etc., will often be checked to ensure a uniform distribution of the mixture. If there is dissolution, asphalt laying shall be interrupted immediately until the cause is found and corrected.

Addition and removal of the Material after laying shall not normally be permitted and the paver

materials shall be distributed with the exact values and levels required for the compacting thickness without finding potholes, or such leveling.

Operators shall not be allowed to walk over the uncompacted layer.

If possible, the paving should start from the end of the corners and the most-hidden edges of overlapping curves. The layers in the craggiest corners, of more than 5%, should always be overlapped. Distribution will be adjusted so that longitudinal connections do not coincide with the deep layers of the surface asphalt layer.

Paving should ensure a very precise automatic control of transverse levels and sections. In limited areas where paving machines cannot enter, the mixing can be done manually or other ways in order to achieve the specific results. Paving shall be carried out in such a way as to avoid cracks and to allow control at all levels.

The mixing capacity and speed of layer operation will be coordinated to ensure continuous paving and to avoid irregularities on the layer. Paving shall be interrupted when it rains or when the surface looks wet at the naked eye.

4.2. Overlay

In case of overlays, no straightening bars shall be required when pouring the mixture unless it is specified in the Works Supervisor requirements. In all cases, including leveling layers, the layer shall be made of traction bars by means of electronic machinery which provides a stable transverse drop and can eliminate irregularities.

4.3. Asphalt

Asphalt shall be laid in limited areas by means of small pavers, working tools, or other approved equipment. Its related space shall be filled with asphalt, leaving no gaps between new asphalt and existing layers. All the classifications regarding temperature, mixture composition, uniformity, etc., would be applied, and the layer thickness and control shall be so that the compacting requirements and surface tolerances would be perfect.

5 .Plant and machineries

5.1. General

All plants and machineries used for the works shall have adequate capacity and shall be in very good working conditions.

All plants and machineries to be used for the road works during the warranty works phase shall be free from any insurance, fuel or gas leakage, and no refills or services to any machinery shall be allowed while this machinery is on the road.

5.2. Binder distributor

The binder distributor used to spray bitumen must:

- be in working conditions and be calibrated according to the methods for determining the layers' thickness.

- have a spray rod out of the probe at each end of the spray rod. It must also have an opening of no more than 25% or not more than 75% except other probes.

- Have no fuel or binders leaks;

- Have spray rods, with spraying heads of the same type, which open simultaneously and do not leak when closed;

- Have spray heads, spraying at the same angle as the spray rod and placed at the right level, in order to provide proper paving;

- Have the sheets not to be mixed up with one-another;

- They must have pneumatic brakes with sufficient friction width when touching the road in order to avoid border breaks or create potholes on the surface;

- Be under the direct control of an operator approved by the project manager based on references, in writing, or based on a certificate authorized by the representative of the Road Authority.

- The contractor shall provide a test method on site to ensure that the binder distributor has sufficient reserves to maintain the required speed at the strongest turn where the sprayer has not been able to intervene, and obtain a uniform distribution of the mixture.

- The test determines the most optimal level of spraying, and then this level shall be better adjusted before any spraying. Inadequate application of the binder shall not be accepted.

5.3. Stone spreaders

Stone spreaders shall enable regular spreading of stones of the same specific dimensions to a width ranging between 0.75 meters and 2 meters or more and shall also allow the change of the application value within the specified tolerances, and to spread uniformly in both the universal and longitudinal directions.

Spreaders that do not have a propulsive force will be of the type that can stick very quickly on the back of the trunks, and as the stones are spreading, can intervene while pulling back.

5.4. Rollers

Various rollers are needed in the construction site for performing the works in order to maintain proper working time. At least a pneumatic roller is needed:

Pneumatic brake rollers

Pneumatic brakes rollers must have a compaction force of their own, with a very smooth flat profile with pneumatic brakes of uniform dimensions and diameter. The roller's mass should not be less than 20 tons (unloaded) and they shall operate up to 15 tons upon the Supervisor gives a second order.

The rollers must have all the necessary tools to keep the wheels wet and clean during the intervention.

The roller wheels must have the necessary space for the roller switch to catch the entire plot that is equal to the rotational width of the machine. Total intervening rate and brake pressure can only be changed upon the orders of the Works Supervisor. The pressures of each brake must not be more than 35 kPa from each other.

Iron wheel cleaning rollers

Iron wheel cleaning rollers have their own propulsive force, and have a mass between 6 and 8 tons. They must have all the necessary tools to clean and lubricate the wheels. The roller wheels will fit to cross the entire area, passing only a roller, with a width equal to the rotational width of the roller.

Iron wheels rollers

Iron wheel rollers will have a three-wheel drive force or bike rollers with a mass from 6 to 8 tons. They shall have the necessary tools for cleaning and lubricating the wheels. The required roller mass shall be approved only by the Supervisor. No iron wheels roller shall be used without the approval of the Works Supervisor.

Additional Requirements

The type and number of rollers will be approved by the Works Supervisor for each type of guarantee and the proposed program.

No warranty works shall be performed if the required rollers are not on site or in working conditions.

5.5. Brushes

The friction brush shall have the size, type and mass that removes all stones spread on the surface and it shall not dump any stones from the binder.

Rotary brush

The approved rotary brush, complete with the traction tool, fitted with smooth pneumatic brakes, and must be present at all times during the works.

5.6. Preliminary coating facility

Stones can be sprayed by any suitable machine that is able to cover all the stones evenly.

5.7. Different machines

Adequate machineries for capturing and hauling aggregates and binders must ensure that they properly and continuously move and apply bituminous materials as specified. The contractor shall provide all the necessary auxiliary machineries and working tools to perform the work as well as possible.

Fire extinguishers to extinguish bitumen fires started on site, along with appropriate machineries to give the first aid against bitumen burns.

The supervisor shall be responsible for requiring the backup plant if there are any doubts about the malfunction of the machineries provided.

6. General Restrictions and Requirements

6.1. Weather restrictions

Minimum temperatures of the road surface in which the spraying of different types and levels of binder will be done as follows:

Binders with Bitumen

- leveling – bitumen penetration 25°C
- MC-800 leveling – bitumen penetration 10°C
- MC-3000 leveling– bitumen penetration 10°C

No binder layer shall be removed whenever the road surface temperature decreases below the above temperature for the binder in question, or, in the opinion of the Works Supervisor, it shall definitely decrease below the required temperature before spraying with binder.

No bitumen work shall be carried out during any foggy or rainy weather, and when there is strong wind. The above temperature shall rise from 3 ° C to 6 ° C as instructed by the Supervisor.

When cold winds blow hindering the performance of the works, no warranty works and especially spraying with binder shall be performed in no way.

6.2. Mixer composition

No layer shall be applied until the mixture composition that has reached the maximum up to 50 mm at the base, is less than 50% of the mixers composition as determined by the Supervisor. No other layers shall be applied immediately after rain on the existing crack and/or on the highly porous surface in order to attach the mixer to the paving structure. The deadline can be postponed 24 hours or more if advised by the Supervisor.

6.3. Other restrictions

The curing period will be applied as follows to make the following treatments, before applying the base layer/as paving as specified in the Project Specifications:

- Texture with water and clay material 6 weeks

•	Immediate disposal of water and of these materials	12 weeks
•	Paving cracks	2 weeks
•	Repair of large portholes	6 weeks

Until another order is approved by the Supervisor, who shall have other future evidence, the Contractor shall proceed with the spraying program on each working day at 15.00 hrs.

6.4. Preparation of areas to be paved (carpet)

General

Areas to be paved on the base shall be cleaned of dust and dirt, sticky fuels or other harmful materials that can destroy the base layer.

New carpets to be built

The paving shall be carried out again in the areas that need a base or new shoulders, the surfaces shall be checked if they comply with the surface tolerances and all other specified requirements. Any section that does not meet the established requirements will either be corrected in advance or removed and rebuilt before it is paved.

Existing surfaces to be repaved

Existing roads that need to be repaved must first be ordered by the Supervisor.

6.5. Setting boundaries for work sites

New jobs

The contractor shall limit the area of the base primer to be laid by spotting the power lines at each end of the length specified for paving.

Works to be repaved

Immediately after the prime coat or after being sprayed with binder, the central line of the road will be lined with a fiber or textile compacting up to 3 mm thick, well secured with rivets, at any interval of 15 m straight and intervals of 5 m in turns, across the existing surface. This textile shall be left in a position to be ready for all subsequent interventions.

7. Connections

All connections between the sections near the construction works shall be made by cutting the layer as soon as it is filled with the material. The extra or unnecessary material shall be removed immediately. A cutting tool shall be necessary to cut the longitudinal connections.

The connections shall be made both for the angles and the parallel ones in the central line, as well as for the connections in the final layer where possible, corresponding to the section lines.

Before adding a new layer on the existing one, the existing layer shall be coated with a thin layer of bitumen of the same type used for the covering layer, according to the instructions of the Construction Supervisor, or the layer shall be fitted with a gas burner to heat the surface of the existing layer.

The weep holes shall be equipped with a mesh which has the same material and density as the rest of the asphalt. All joints shall be marked with a chalk in order to distinguish during the cutting process.

The outer edges of the asphalt layer shall be shortened along the shoulder and parallel to the central line, to obtain the final width, as shown in the Drawing that accompany the requirements, within the limits.

Any accidental splashing on the existing works in the joints, shall be removed by absorption with the brushes towards the works not yet compressed, in order to avoid deficiencies in the joints. No matter how much you stop and block the laying process due to mixing, the Contractor shall always form a proper connection according to the above conditions, in conformity with the instructions of the Construction Supervisor.

8. Compression

The mixture should be rotated as quickly as possible after it has been processed with a vibrator, steel wheels and pneumatic tire rollers with drawbar-pull in a predetermined sequence which has been approved during the testing process (sampling). Such a rotation shall be applied for as long as it is effective and does not result in any deficiencies. The use of pneumatic tire rollers with drawbar-pull for non-graded and non-homogeneous binders shall be evaluated during the testing (sampling).
The more rollers, the best, in order to ensure the specified layer density and the required material. During surface rolling, the steel wheels shall be kept moistened with enough water to avoid the overloading of the material.

After the compression of the longitudinal and edge joints, the longitudinal rolling shall take place from the edges gradually moving towards the centre of the road, except the overlevelled turns or in areas which have a straight cross-section and when rolling starts, it shall start from the bottom-up, using the upper arm to bring it up, touching any previous traces, in order to cover the entire area in its entirety. As the roller power declines, the rollers shall have a low but uniform speed (not more than 5 km / h) with the roller compressing on the nearest layer, until it is graded accordingly to compress the sharp ends.

The asphalt layer should stay untouched during the application of pneumatic rollers with drawbar-pull until the temperature of the asphalt is under 100 ° C. The three-wheeled rollers, which have a large diameter, are preferred to be tyred rollers and can be used with drawbar-pull pneumatic rollers to provide asphalt pulling and avoiding spilling and waste on the steel wheels.

Regarding the mixers of non-homogeneous binders, it is recommended to add a detergent with a concentration of 1 to 3,000 in water in order to use wet tires of pneumatic rollers, limiting towing. The order of rollers to be used for compression shall be decided by the Contractor to ensure complete paving with a density up to or greater than 97% (minus the percentage of the hollow space) in the approved mixture, theoretically with the maximum density.

The contractor shall use calibration in order to proceed with the supervision the during compression operations. In addition, the approved supervision undertaken for compression operations regarding the completion of the works by the Supervisor shall be resumed on the compressed layers. This supervision shall be based on the samples obtained from the compressed layers.

The following requirements shall generally apply to the rolling and compression process:

- The material shall not be dispersed excessively in longitudinal and transverse directions, especially when the gears are changed, and when the rollers stop or start working.
- There should be no cracks and no brush hairs should fall on bottom layer which may be broken.
- The density shall be uniform in the entire paving area and throughout the depth of the layer.
- Rolls should not stay on the asphalt layer before it is completely compacted and cooled in the normal temperature. Rolls shall never be left anywhere in the area where asphalt has just been laid.
- In restricted areas where special rollers cannot be used, compression shall be performed with mechanical hand-held machines or vibrating rollers that are previously approved. The density described in the application shall be applicable to the entire remaining part, over the entire thickness of the layer, without respecting the compression method.

a. Section Testing/Sampling

Before the Contractor starts paving any asphalt or surface layer, he must prove(by testing on a paved surface of 300 m)that the machinery and processing they intend to use will not be in conformity with the specified requirements.

b. Protection and Maintenance

The Contractor must protect the asphalt surface from any damages until the works are finally approved by the Employer, and the Contractor must maintain the asphalt surface until the

maintenance certificate is issued.

Any damages to the final asphalt surface or any deficiencies that may lead to any problems must be fixed by the Contractor at his own expense.

Levelling

The finished asphalt surface should not be below the predetermined level and must not be more than 10mm higher than the predetermined level at any case.

The surface level shall be checked by levelling instruments, initially used with a frame that includes 5 transverse positions of the carriageway with regular intervals of 15 meters on the surface all the road. The positioning of such sample sections should be done on the basis of Project Management guidelines and should be in conformity with the control requirement used by the Contractor to mark the levelling of the surface. In addition to the sample levelling, levelling should be performed at any point where according to a visual inspection it gives the impression that the surface may be unlevelled.

Width

The width of the finished asphalt surface should not be later than what the project says in the Drawing in each position and in no place should there be a deviation outside the lines shown in the Drawing from more than 50 mm.

Thickness

The thickness of the surface layer must be within the limits of the predetermined drawing. The thickness must be in conformity with the specified requirements in the Design.

Failure to comply with the designed restrictions

(1) When it fails to meet the minimum basic requirements for thickness or when it fails to meet the minimum level requirement (not below the standard in the drawing) this may no way be acceptable and will reduce the cost of the Contractor, either by removing and replacing the layer which is below the standard or by applying an additional layer. In the case of additional layer, the content, thickness and material must be approved and supervised by the Construction Supervisor, but at no case shall the additional layer be less than 20mm in sand asphalt material, or 35 mm with concrete asphalt. In the case of a 35mm layer of asphalt concrete, a new asphalt mixing project must be provided using aggregates up to 18mm in thickness, in conformity with the relevant requirements. When the additional material is applied, this should be done for the entire width of the road for a road length of not less than 100 meters and an additional section of at least 10 meters long for sand asphalt and 20 meters length for concrete asphalt. Nothing else shall be modified, besides the extra material, so that the space between the sections is less than 300 meters. In this case, additional material must be laid along the entire length of the road.

(2) When the surface is elevated but meets all the requirements for uniformity set out above and conforms to all general requirements for the sewage system, it shall be acceptable in the areas where additional considerations shall be made (e.g. intersection with existing asphalting) In cases when the Supervisor decides to suspend the construction works and request that these

works be demolished and replaced, it should be done in accordance with such standards.

(3) When the final thickness conforms to the given requirements but fails to achieve uniformity, it shall be considered acceptable but it may be followed by a financial penalty. When the level of defects exceeds the acceptable maximum, the layer must be reduced as a failure to meet the required thickness.

According to the circumstances, a sample section should be selected from the area where there is a deviation/deformity, 3 meters straight from the end, which does not exceed 20mm. In such cases, there shall be a leveling of not less than 10 meters of the entire width of the finished asphalt area, which shall be removed and shall be replaced within the accepted standards of surface uniformity.

At no case should a surface with many defects be approved. When the total irregularities in all sections exceed 7mm every 100 meters of the road, the area should be reduced and it is considered a failure to meet the required thickness as defined above.

Where the laying of the surface fails in relation to the uniformity requirement but it can be accepted through a financial penalty in accordance with the Standards below, this penalty shall be defined as follows:

The precision in millimeters should be determined regarding the maximum values of all irregularities exceeding 5mm in each section of 100 meters in each affected section. 30mm shall be removed from this total and the final result shall be divided by 10; the result shall be represented as a percentage of the 100 meters of road.

For example. The total of all maximum irregularities in the 100-meter-long test/sampling section is 102mm. We shall remove 30 mm and leave 72mm.

The nominal value to be reduced for an area of 100 meters is a coefficient of 7.20%.

9. Characteristics, requirements and construction works

9.1 Description

The section covers all materials, construction plant, and requirements for receiving treatments or bitumen coatings in the road in all positions indicated in the Drawing.
Surface treatments consist of applying bitumen coating to the road followed by aggregate spraying in the case of single coating and repeating this in the case of double surface coating, in the areas indicated by the Drawing.

9.2 Materials

Bitumen Binder

The bitumen binder shall meet the requirements approved by the Supervisor.

Straight paving with Bitumen

Straight paving with bitumen according to the Albanian Standard

Spraying and adsorption properties of properly laid bitumen may be improved on site by sprayers / cutting tools, at approved amounts of hard paraffin, in accordance with the approved procedures.

Levelling

The levelling shall match the requirements set out in the table below for the aggregates to be used:

9.3 Cutting bituminous layers

Maximum amounts of paraffin can be added with the permission of the Construction Supervisor for most of the asphalt concrete bitumen which depends on the temperatures of the road surface at the time of spraying. Smaller quantities than those shown may be used if the test/sampling conditions allowing proper absorption between the binder, the aggregate and the existing surface. The best cutting tool is the hard paraffin but also the oil or kerosene can be used to cut bitumen according to the Engineer's instructions.

9.4. Weather restrictions

The minimum of road surface temperatures at which the spraying of different types and levels of binder shall be done is as follows:

Binders with Bitumen

- levelling - bitumen coating 25°C
- MC-800 levelling - bitumen coating 10°C
- MC-3000 levelling - bitumen coating 10°C

Whenever the surface temperature of the road decreases below the above-mentioned temperature indicated for the binder in question, or, in the opinion of the Supervisor, it shall definitely decrease below the required temperature before spraying with the binder, thenno binder layer shall be applied.

No bitumen work shall be carried out during the foggy or rainy weather, and when the cold wind blows, the above temperatures shall rise to 3 ° C to 6 ° C as instructed by the Supervisor.

When cold winds blow that may interfere with the work itself, no warranty and especially binder spraying shall be carried out.

9.5. Mixers content

No layer shall be applied until the mixture content reaches a maximum of 50 mm on less than 50% of the mixture content as determined by the Supervisor. No other layer shall be applied immediately after the rain on the existing cracked part and / or on the surfacewhich results to be very porous in the mixer. A 24-hour delay or any delay may only apply if approved by the Supervisor.

9.6. Other restrictions

The scraping period shall be applied as follows to do the following treatments, before applying the base coat / in the form of paving as this is specified in the Project Requirements:

- Texture with water and clay material 6 weeks
- Spray of water and the materials 12 weeks
- Repair of cracks 2 weeks
- Repair of large holes 6 weeks

Until a second order by the Supervisor who shall be provided with further evidence from sampling, the Contractor shall proceed with the plan, spraying on each working day at 15.00.

9.7. Preparation of areas to be laid (carpet)

General

The areas to be laid shall be previously cleaned from dust and dirt, spilled fuel or other harmful materials that can destroy the base of the layer.

New carpets to be built

Where there is a need for a base or new shoulders the paving shall be resumed, the surfaces shall be checked for compliance with the surface restrictions and all other requirements that have been specified. Any section that does not comply with the requirements set forth, shall either be repaired or removed and rebuilt before it is laid.

Existing layers to be renewed

Existing layers that require renewal must first be ordered by the Supervisor.

9.8 Setting borders in the construction site

New construction works

The contractor shall limit the area to be laid by means of line shelf dividers.

Works that need to be renewed

Immediately after the first layer, the centre line of the road shall be lined with a fibre or textile adhesive up to 3 mm thick, well secured with rivets, at any interval of 15 m on the straight road and an interval of 5 m in the edges, across the existing surface. This textile shall be left in a position to be ready for all subsequent interventions.

9.9 Opening for Traffic

The supervisor shall be responsible for determining the section of the road to be laid, so that traffic is not congested for the public.

The road shall not be open for traffic until the binder dries up enough to hold the ballast so that it is not stuck in the wheels of cars.

The contractor shall not allow any construction machinery to cross the road just after laying the asphalt as it may cause damage to the asphalt. The Contractor shall establish a speed limit signal in accordance with the instructions of the Construction Supervisor.

9.10. Defects

According to the opinion of the Construction Supervisor, when there is a significant loss of road track, due to the sliding of the road, and when all the Requirements have not been well noticed during the course of the Construction works, the Contractor shall be liable for such defects, because he has not correctly used the reference values, or in case of any other error or defect coming from the Contractor, then the Supervisor shall order repair works which shall be performed at the expense of the Contractor, including the supply, layers, collection of materials on site, removal of the material reserved for corrective processing. The Contractor shall in any

case be liable for the maintenance of the Road throughout the Routine Maintenance Period.

9.11 Construction works in the existing sections

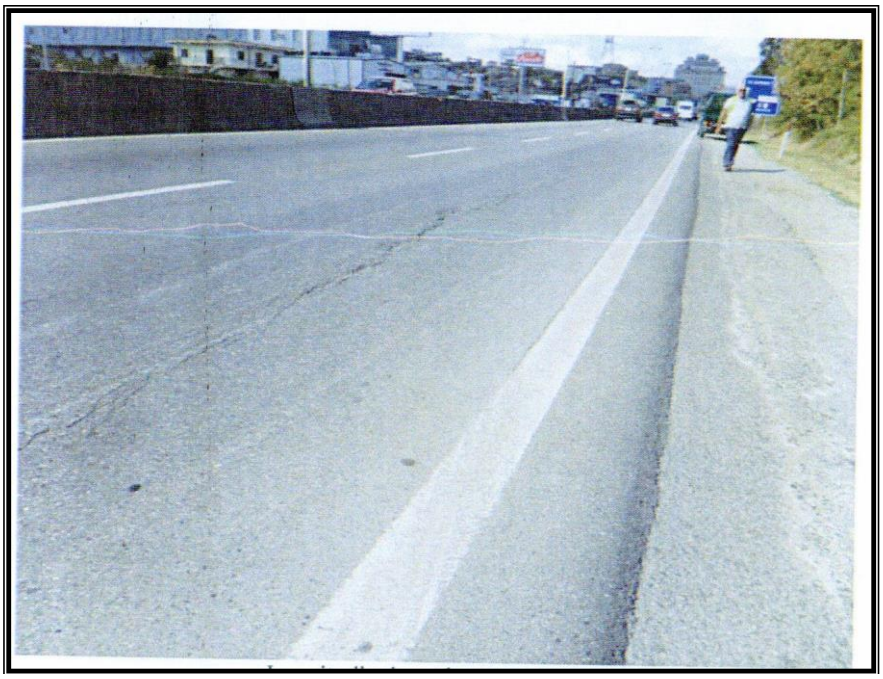
The final asphalt layer shall be uniform in texture, with no holes or pits and there shall be no waste materials or bitumen spills.

Any area that shows any signs of spillage after it is opened for public traffic shall be subjected to repair works which shall be undertaken in such a way the colours, textures, and the final layer with shall be well-processed.
The final base layer shall have no porosity or any other type of valence that can be followed by unjustifiable deformations and rises, and it does not matter if the distance is too small between deformations that can later lead to a subsequent crack.
The edges of the layer shall match a maximum deviation of 15 mm from the specified edge line.

10. Repair of cracks

-10.1. Longitudinal cracks

The formation of cracks in the layer should be avoided in order to stop the penetration of atmospheric water into the layers of road construction, causing water freezing during the winter and the development of later pits.
Cracks along their entire length should be treated in this way: cleaning them with a compressor and filling them with bituminous adhesive.
Examples of longitudinal cracks in the following pictures.



10.2. Cracks (longitudinal and transverse)

The surface should be treated as follows:

- Cleaning the surface with air compressor
- Spraying with hot bituminous liquid
- Distribution of the 3/8 mm fraction and compression to the level of the existing layer, without creating cessions.

Example of cross-section area of the cracks

Example of crocodile cracking but also layer coating

10.3 Roadside repair

Damaged and deformed edges of the layers shall be repaired as follows:
- Cutting the edge in width up to 50 cm
- Removal of cut materials
- New formation of cut edges
- Surface cleaning
- Supply and extension of concrete asphalt including the compression for complete levelling of the repaired layer.

Part M

Concrete canals for drainage and underground drainage

1 Description
Work under this Section shall consist of constructing concrete drainage canals of the types shown in the Drawing and installing underground drainage.

It also includes the clause for connections and any mergers needed to obtain the construction of connecting pipes from host basins, Land Drains, canals and other features that may be shown in the Drawing and as may be required by the Supervisor.

2. Planning Construction Works
The Contractor shall not start the construction works with the canals until the Supervisor gives a

written approval for the works to be carried out. The contractor shall also program the right time to perform the manhole works, or before starting this work must provide accurate drainage to perform the works.

3. Compliance with restrictions

All works and materials for the construction of concrete manhole and canals shall be made in accordance with the dimensions and restrictions in order to reduce the labour force that does not work conform to the standards provided in the relevant Requirements. There shall be no payment for drainages that do not comply with the required standards given in the Drawing or the instructions of the Construction Supervisor and thus it may be instructed to be demolished and rebuilt at the expense of the Contractor.

4. Materials

4.1. Reed bed of the sewage system

Material for the reed bed of concrete canals (including sand laid on the carpet if required and / or as shown in the Drawing) must comply with the requirements given below:

Category A –in-site material compressed and shaped to absorb structures through good distribution.

Class B – compressed gravel with a certain form which can be easily absorbed by the structure by means of distribution in accordance with the sub-base material.

Category C - thin layer of concrete or concrete carpet which must comply with the requirements of the Concrete section.

4.2. Concrete

The concrete used for all the construction works described in this Section must meet Level 20 (C) as shown in the Drawing or as instructed by the Supervisor and must comply with the requirements of the Concrete Section.

***4.3.* Reinforced concrete**

All reinforced concrete shall immerse into rods in accordance with the requirements and guidelines based on the Road Construction Standards in Albania.

5. Installation

Materials shall be transported in such a way as to ensure distribution to the site of installation without causing any damages.

The contractor shall dig and prepare foundations for the concrete canals and shall be responsible for all their irrigation during construction. Support and / or material support in accordance with the Drawing or as required by the Supervisor.

6. Underground drainage

Underground drainage shall be installed directly below the concrete canals as shown in the Drawing or as ordered on site by the Supervisor. Drains shall be dug towards the lines and

levels shown in the Drawing.
Unless decided differently, the underground drainage should be completed before anything is done and as soon as possible before the asphalt paving works. The covering material shall be made in accordance with the quality of material under the base as agreed with the Construction Supervisor.

7. Cleaning of manholes

Garbage and other debris accumulate at the entrances to the manholes, which in turn affect water discharge. In order to restore their full capacity, obstacles and impurities must be removed manually, collected, transported and emptied at the landfill previously determined by the Supervisor.
Cleaning of the edges of canals and drains should include:
Removal of all waste materials and return of canals and roadside drainage to the normal function.

8 . Approval of Works

The Contractor shall not initiate the construction works with the canals until the Supervisor gives his written approval for the works to be carried out. The contractor, at the same time, plans to perform manhole works, or before starting this work he must provide accurate drainage to perform the works.

Part N

Cleaning and existing drainage

1. Description

This section covers the requirements and procedures for cleaning and existing drainage system, as well as the roadside drainages that are part of the construction.

2. Open drainages

When it comes to open roadside drainage systems, they shall be cleaned by removing all waste and sediment, in compliance with the directives of the Supervisor.

All materials resulting from cleaning and the open drainages, ditches and roadside drainages shall be deposited in previously approved landfills or in the case of toxic and hazardous materials, shall be operated in accordance with the Environmental Management Plan. Where necessary, the waste material shall be separated immediately to be used in the surface layers (clay layer). The processes described in this material shall always protect the existing drainage structure against damage.

3. Concrete Ditches

3.1 Description

This section covers the requirements and procedures for cleaning ditches and existing open drainages, roadside drainages, concretes and projections of entrance roads that are concreted on site, with a road bank prepared according to the lines levels dimensions and types shown in the drawing. Where shown in the Drawing, the works shall be included in the construction of the base layer.

3.2. Materials

3.2.1. Base materials

If a base layer is specified in the Drawing, or if it is ordered by the Supervisor, then the material complies with the requirements and clauses of these Requirements for the type of material required.

- The concrete shall be of the brand as required in the Drawing and shall be in accordance with the Albanian or international standard.

- Cast steel

Cast steel rod shall comply with the requirements and Standard Drawing.

3.2.2. Filling the pre-scales of connections

The first fillings must be made in accordance with KTZ until otherwise ordered by the Supervisor.

4. Construction methods

4.1 General

The excavation shall be done for the required depth, and the foundations shall have the shape specified in the Drawing and shall be compressed in accordance with the surface area in question. All waste material shall be removed and replaced. All works shall be in correct line and level within 3 mm.

4.2. Discharging the concrete in the construction site

The moulds shall be made of steel or a material with a timbre content of at least 50 mm. They shall be unwrapped and be strong enough to withstand spills from the discharge of concrete. The moulds shall be placed securely in line. Concreting shall be done in compliance with the requirements of KTZ.

The feeding pipe in front of the mould shall comply with the specifications shown in the Drawing. They shall fit in the positions shown in the Drawing before pouring the concrete.

Concrete areas between the connection spaces shall be divided into blocks with transverse cuts, which go up to 30% of the depth of the upper part of the construction, where there is a need for intervention in the Drawing.

The edges of the surface and the transverse cuts work well with a special tool formed to round the edges to a radius of 10 mm.

The base layer of concrete shall stay untouched for a period of 72 hours, in accordance with the Technical Implementation requirements. During the treatment period, protective works shall be carried out to protect passenger and car traffic.

4.3 Surface requirements

Curving on the sidewalks shall be tested for minor irregularities with a 3-meter trajectory stretched along the sidewalks, both at the top of the surface and along the top. Where a ditch or protective manhole is included, this should also be tested with a trajectory extending over the surface of the ditch that is parallel to the frame. In the 6mm surface variation there shall be no inconsistencies across the trajectory.

Part P

Metal Barrier Dividers

Barriers technically represent a safety structure, the purpose of which is to protect vehicles that come off the road, in curves and due to the bad weather conditions.
Their installation includes the supply, transport and installation of barriers in accordance with the requirements of the project on road equipment.
Barriers can be one-sided and two-sided.

The works include the supply and installation of a steel bar (E-beam) for barriers in areas close to traffic that need to be protected as well as bridge barriers. The works include the supply and formation of both straight and twisted elements for the protection barriers.

The steel material shall be in compliance with the requirements set forth in the Drawing.
All metal bars, irons and fittings shall be made by using hot galvanizing according to the requirements of S SH: S SH EN.

The installation place is illustrated in the Drawing or decided on the site by the

Construction Supervisor.

Part T
Traffic signs

1. Description

According to this section, the works consist of the fabrication of the sign plates and the installation of the traffic signs as well as their supporting posters in the places indicated in the Drawing or as ordered by the Supervisor.

All signs and materials shall be meet the requirements of the Road Code and its implementing acts.

2. Sign details

All Materials used for these works shall be in accordance with the Materials described in the Requirements given below and with the dimensions shown in the Drawing.

1. Specification

The signs to be installed shall be as follows:

- Regulatory
- Warning
- Guiding

2.1. Shapes and Colours

The above signs and colours shall comply with the National Standards and the drawing requirements; the later shall be taken into account in the event of a conflict. In the absence of any signs in the national standard that has been applied it shall be sized and designed in accordance with the norms of the Road Code and the Road Signs Manual as decided by the Supervisor.

2.2. Signalling system

The parameters of the signalling system shall only be in accordance with the Road Code

2.3. Messages and wording

Verbal communication shall be as short as possible. Most of the information shall be represented in adhesive posters / signs which are easily visible. The supervisor shall approve the sign messages and wording at least one month before the signing process begins.

The wording shall be in capital letters indicating the titles as well.

a. Reflective Cover

All reflective covers / mirrors shall comply with the Road Code

.

Daylight Colouring (x, y, Y)

Chromaticity coordinates and the entire retro reflective cover factor must be consistent with Table A below.

Retro-reflection coefficients (RA)

The values in table B are the minimum coefficients of retro reflection that are shown in candela / foot / unit of luminance (lux) / m2 (cd / lx / m2).

Testing / sampling for Retro-reflection coefficients

the 'retro-reflection coefficient' must be determined by an instrumental method that is in accordance with ASTM E-810 "testing method for the retro-reflection coefficient in retro-reflective covers" and for E-810. Rotation values 0 ° and 90 ° on average determine RA in Table B.

Table A –Minimum and maximum values and reference standards for colours*

Color	**x**	**y**	**x**	**y**	**x**	**y**	**x**	**y**	**Daylight visibility of the colour (Y%)**	
									Min	**Max**
white	0.305	0.305	0.355	0.355	0.335	0.375	0.285	0.325	40	-
yellow	0.487	0.423	0.545	0.454	0.465	0.534	0.427	0.483	24	45
red	0.69	0.31	0.595	0.315	0.569	0.341	0.655	0.345	3	15
blue	0.078	0.171	0.15	0.22	0.21	0.16	0.137	0.038	1	10
Green	0.03	0.398	0.166	0.364	0.286	0.446	0.201	0.794	3	9

* The four chromaticity elements coordinate the specific the acceptable colour, in the case of the CIE 1931: standard colorimetric system measured with the standard illumination source D65.

Table B - Minimum Retro-reflection coefficient, RA (cd / lux / m2)

40° Entrance Angle [2]			
Observation angle 1			
	0.2°	0.5°	1.0°
White	380	275	80
Yellow	300	220	60
Red	98	70	20
Green	45	32	9
Blue	22	17	4.5
30° entrance angle [2]			
Observation angle 1			
	0.2°	0.5°	1.0°
White	225	135	45
Yellow	180	100	35
Red	65	32	11
Green	28	16	6
Blue	14	8	3

40° entrance angle [2]			
Observation angle 1	0.2°	0.5°	1.0°
White	90	35	10
Yellow	70	27	8.8
Red	26	10	3
Green	9.8	3.5	1.6
Blue	4.5	1.5	0.8

1 The angle of observation (Divergence) is the angle between the angles of illumination and the angle of observation.
2 The input angle (frequency) is the angle between the illumination angles and the retro reflective angles. Retro-reflective angles are the perpendicular axes for the retro-reflective area.

2.4 Health and Safety Information

Read all the health and first aid rules found on Security Material Sheets or the label of the chemical product before transporting them.

2.5. General Opinions on the Construction Works

The Strength of Diamond Grade Signaling and those with High Reflective Intensity depends on one side on the composition of the subtract and compliance with the recommended procedures for application. The contractor must follow all the instructions of the manufacturer regarding the application and shall be responsible for any defects arising from application or adhesive errors.

3. Cleaning

Signs that require cleaning should be wiped and rinsed with water and then washed with a cleaning solution and a sponge or a brush. Avoid the pressure that can damage the surface of the signs. Rinse with water and then wash and do not use ingredients and solutions to clean the signs.

4. Standard Positioning

Signs shall be individually divided into specific positions depending on the road shape. However, in case there is a need to group the signs, they shall be grouped accordingly.

Signs shall be positioned to optimally optimize the night visibility and to minimize the effects of moisture in accordance with safety factors. Signs shall be positioned in such a way as not to interfere with each other. They should not hide the appearance of objects from the other side of the road.

5. Signal visibility

For the best visibility of the signals, a reasonable space between the driver and the signal must be guaranteed.

The logical process that the leader goes through must be:

-perception of the presence of a signal;
- logical connection to road signs;
-recognition of shape and colour;
-reading;
- implementation of the required or expected behaviour.

6. Traffic Signs Positioning

Vertical signs are placed, as a rule, on the right side of the road
You can also set them:
-in traffic dividing islands;
-on the carriageway;
-on the left side of the road;

Signs placed on the side of the road (side signals) should have the distance between the vertical edge on the side of the road and the edge of the sidewalk:

minimum 30 cm;
maximum 100 cm.

Sign posts should be fixed at a distance of not less than 50 cm from the edge of the sidewalk.
In the presence of metal barriers, sign posts may be placed on the barriers, provided that the sign does not exceed the size of barrier itself.
The distance from the ground, referring to the final height of the sign, ,except for the portable signs, should be:

- minimum 60 cm;
- maximum 220 cm.

On urban roads, due to special environmental conditions, the signs can be placed even at higher distances, however not more than 450 cm.
On urban roads, on sidewalks or pedestrian-reserved roads, they should have a height with a min. of 220 cm, with the exception of traffic lights.
In uniform sections of the road, when possible, the signs should be placed at the same height.
A portable or temporary form of traffic signs may be allowed in the event of:

-justified reasons for the construction works;
- emergency environmental situations;
-special traffic situations;
- road construction sites;
-work equipment, fixed or portable.

7. Lining

7.1 Description

This section shall describe the reference posters indicating the distance in miles along the side of the road. These shall be provided and installed in locations and sizes that are consistent with the dimensions and drawings shown in the Drawing or as required by the Supervisor.

b. Materials

Such signs shall be made with stainless steel metal bars or other materials that comply with the given Requirements, as approved by the Construction Supervisor. Reference lines shall be aligned with the Requirements and dimensions shown in the Drawing.

c. Installation

1. Positioning

The signs indication distance in miles shall be placed vertically in the position shown in the drawing. Generally, they shall be placed at least 1.0m from the back of the shoulder. In cases when this is not done in practice, the Supervisor may indicate that the sign shall be installed at the edge of the right side of the road.

2. Construction.

The signs shall be placed vertically in the position shown in the Drawing, and when it is fitted with the concrete block, it must remain completely intact for at least 48 hours after the concrete has been discharged.

The area around the signs shall be filled in the final layer of the levelling using approved materials for layers, not exceeding 150 mm. Each layer shall be wet and compact units entirety.

Part Y

Road surface marking

1. Description

This section shall describe the reference posters indicating the distance in miles along the side of the road. These shall be provided and installed in locations and sizes that are consistent with the dimensions and drawings shown in the Drawings or as required by the Supervisor.

Each of these materials shall be required to be applied in order to inform road users about temporary road curves or to allow road deviations to comply with the requirements of this Section but which are considered to be included by the Contractor as part of his obligations under the Control of Safety and Traffic and that are not valid to receive additional costs in accordance with this Regulation.

Illustrative figure: Examples of mountain road markings during the BB pilot project

2. Materials (in compliance with the Code Regulation)

1. Paint painting for traffic

The paint shall be used to match the design requirements for ready-made White and Yellow Mixers for coloring traffic lines. The drying time of the paint shall not be more than 30 minutes.

All paint shall be transported in large containers that shall be completely lined with paint that shall be weighed for gallons, the volume of ink content shall be in gallons, colours, rations, groupings and the corresponding code number. There shall be a confirmation of the composition of the pigment in percentage, the proportion of the pigment to the vehicle, and the name and address of the manufacturer to be marked as well.

Any kind of paint or enamel, which despite the Inspections and approvals given at the factory point, the hardness or staining in the containers so that it cannot be broken with one stroke, then you shall give up casting the uniform paint and diluting. Any paint or enamel that looks thick to apply on the road shall be cancelled, even though it conforms to these Requirements in every aspect.
All paints shall be distributed throughout the project, and shall be used without any diluents or other solvent material.

2. Glass sections

These sections shall comply with the standards of European Union model (adopted in the Albanian standard) for glass sections used to increase the reflection of traffic paints. The amount of projections shall be used as instructed by the Project Manager on the basis of the evidence made by the Contractor.

3. Testing/sampling

Before applying the paint, a test must be done. The test shall be submitted for approval, if it is approved then it shall be used as a 'standard' which determines the future decision-making to perform the painting works. All types of paint used shall be identical to the ones used in the test in colour and quality. The code numbers shall be used to supply and obtain the designed paints.

A samples cluster shall be provided and tests must be done and approved before the paint is applied on the road. Once this paint has been applied and approved, the contractor shall be notified by the Supervisor to determine the date on which the intervention shall begin.

4. Road line marking machines

The contractor shall use a line marking machine which provides the expected result on the road and it is important that the line painting be as uniform as possible –considering both the thickness of the coating and the line length. The machines used shall meet the requirements for the intended purpose.

The movement measuring unit shall be appropriate to distribute the paint evenly with precise movements at predetermined speed, thus producing a uniform coating.

The line marking machine shall be of the spray type and shall be able to spray paint at the required spray amount, without diluting the paint. The paint tank shall be equipped with a mechanical mixer and the engines shall be fitted with valves which automatically apply the distribution lines. The engines shall be equipped with a mechanical dispenser with a sprayer and shall distribute the material as uniformly as possible to achieve the required standard. Each engine shall have suitable line markers - using both metal and air spray.

A defective line marking etc. maybe corrected by using sand or any other type of mechanical means as decided by the Construction Supervisor as necessary to remove the defective paint without damaging the asphalt surface.

The application of hand paint shall not be accepted except for very areas which are so small that it is impossible to enter/use the machine, with the special approval of the Construction Supervisor.

5. Details

5.1. Delineation

The delineated points are to be stabilized at appropriate intervals in order to use the marking signs. If it is necessary to achieve this very accurately, then a clean line should be determined for such delineations.

On tangent sections and curves up to 1 deg. The delineation of the center and edge will deviate from the real line by more than 25mm. In curves that surpass 1 deg. the maximum permitted deviation will be up to 50 mm. In addition, the outer edge of carriageway delineation will be uniform with a tolerance for the correct position of 2mm in direction of street center up to 50mm away from the road center line. The general delineation will not have any breakage or deviation along the entire length or width.

5.2. Dimensions

There will be no type of road delineation in less than the specified width and it should not exceed the specified width in more than 12.5 mm. The length of the delineated segments for broken lane lines and spaces between segments may vary plus or minus 250 mm unless there is over-tolerance and under-tolerance in lengths that need to be compensated for both.

5.3. Correction values

Any correction of variations or delineation of signs will not be interrupted. If it is necessary for a delineation, it should be done for around 3m length for each of the 12mm necessary for the correction.

In case a delineation is required again, it should be done in turns in the real position with a value of at least 7m for each 25mm corrected. Beyond these tolerances, the delineations will be removed and re-applied.

5.4. Application time

The delineation should be conducted during daylight hours to be completed in time in order to be dry before sunset.

5.5. Weather restrictions

No delineation will be conducted when the surface is wet or in case of winds that may disperse the spraying.

5.6. Surface preparation

The surface to be lined will be cleaned by compression or air compressors or other effective methods, immediately prior the application process and shall be thoroughly clean and dry.

All plants or trees that are being tested will be removed before the start of delineation.

5.7. Paint emulsifier

The paint shall be mixed with the emulsifier in the paint machine and no diluents shall be

used. Before each working day, the spray heads and connectors shall be cleaned with paint thinner or any other suitable cleaning detergent.

5.8. Application

The delineation shall be of a specified width, clean, with real edges and without any form of bending or cracking along the entire length of the road. A uniform layer of paint shall be applied to the entire part which requires paint and there should be no stains or splashes outside the line. Any delineation which is no uniform and not pleasing to the eye should be corrected during the day or night.

The minimum application value of the paint shall be as follows:

- 100mm solid delineation: - 39 L/km.
- 100mm broken delineation: - 14.6 L/km.

Different width delineation: - direct ratio of all these.

6. Protection

6.1. New delineations

The delineation that has just been applied including edges shall be well protected until it gets completely dry to allow vehicles to pass without causing damage to their tires. When necessary they must be traversed by a pilot vehicle that should be used to protect the paint from traffic circulation.

6.2. Warning signs

In cases when the painting occurs during traffic hours, a temporary sign shall be put before each intervention and extra signs shall be put in front of the delineation machine. Warning signs shall be present only during the delineation operation and these signs shall be ready whenever necessary.

The Contractor shall accurately level the warning signs, ensure a sufficient number of flags for the signs, and take all necessary measures to protect the application of liquids and public safety. Cones, protective erasures “Z” or similar protection equipment shall be placed during the whole new delineation to prevent traffic at intersections. Such equipment shall not cause damage to traffic circulation in the event such objects accidentally fall down.

All protective equipment shall be removed no later than sunset to enable traffic movement during the night.

Where delineation is applied in new roads or roads without traffic, the contractor shall take the necessary measures to ensure that the delineation is not affected by any kind of traffic on the site until the area is completely dry and ensure it is not used by traffic on the site until the work is delivered or the traffic is completely opened.

6.3. Number of Traffic Lanes

With the approval of the supervisor, the Contractor may be permitted to restrict traffic in one lane for short term interventions so as to not affect traffic control and to not

unreasonably delay normal traffic.

6.4. Intersections and cross-sections

Accurate safety measures shall be taken in cross-sections and intersections, and some roads of the project will be blocked or only their intersections for those places where special permission has been obtained.

6.5. Repair or damaged areas

Each section with large damages in delineations resulting from traffic or a similar nature shall be repainted at the expense of the Contractor.

6.6. Corrective measures

All painted delineations that have not been performed in accordance with the specifications, including permitted tolerances and apparent requirements, or that have been deleted or damaged by traffic or similar circumstances shall be corrected at the expense of the Contractor. All paint spills shall be removed at the request of the Project Manager. The paint shall be removed by any means, as approved by the supervisor, and it shall not damage the road sub-base. When it is deemed necessary to correct a deviation that has exceeded the permitted tolerance of the road, that part of the delineation shall be removed and corrected with paint according to these Specifications.

6.7 Responsibility for Notification

The supervisor shall be notified at least 14 days before the delineation application. Prior to the notification, the Contractor shall get the approval from the supervisor in the name of the supplier and the materials that shall be used. The notification shall include details of the lot numbers and products to be used.

7. Types and positioning

The straight delineations shall be made in accordance with the following drawings and general requirements:

Central (white)delineations

Central delineations shall be white and solid or sloping lines as shown in the drawings.

The width of the delineation will be 100mm. The center delineation will be 150mm wide and will be used for dividing multi-lane roads.

Delineation of road contours (white):

Delineation of road contours will be a single solid line of 100mm width.

Sidewalks for pedestrians (white):

All cases: (2.0 m width) – 600 mm lanes width, 600 mm division.

Stop lines (white):

The stop lines will be solid and 400mm wide.

Crossing lane (white)

The crossing lanes will be 200mm wide.

8. Asphalt lines

8.1Description

This section includes the supply and installation of retro-reflective raised pavement marker, in the center and on the side of the lane as shown in the drawings or as indicated on site by the supervisor. The aims is to provide positive guidance during nighttime to ensure horizontal installation and other signals.

8.2 Materials

1. General

Read all health risks, preventive and first aid descriptions in the Material Safety Data Sheet and/or the label of the product chemicals, before treatment or use.

In addition, refer to the above-mentioned material for information on the organic volatile composition of chemical products. Consult local regulations and authorities for possible restrictions on the content of the product.

2. Categories

Category A**,** Class "B" of signs will be used unless otherwise stated in the drawings. The Contractor will propose specific retro-reflective raised pavement marker and adhesives to be used with samples, data from manufacturers and examples of using the same model and type, and adhesives, elsewhere in similar climate conditions. Once the approval has been granted, no change in type, model or manufacturer shall be permitted without the further approval of the supervisor.

3. Adhesives

Adhesives can be made of bitumen, epoxy, type of epoxy that can be quickly installed depending on the manufacturer's recommendations. The adhesives shall be the type recommended by the manufacturer for use on the surface of bituminous roads. Data sheets should describe in detail the application procedures and materials to be used.

The supervisor shall take random samples of the load in accordance with standard procedures.

4. Machines

Equipment that have dual-type units of thermostatically controlled water heaters should be used by using heat-transferred oil or electrically controlled heating boilers to install bituminous adhesives that are applied with heat.

The Contractor should demonstrate the effectiveness and stability of the connection system. Prior to the installation, the supervisor that have not been implemented in accordance with the requirements or that fail to be glued or any other manner shall be replaced/re-attached by the Contractor at no additional cost.

5. Preparing the surface

In general, and subject to manufacturer's recommendations:

Apply adhesives to the bonding surface (not the marker) so that 100% of the bonding surface is covered, in accordance with the recommendations of the adhesive manufacturer. Apply sufficient adhesive to ensure that when the marker is pressed down on the adhesive, the adhesive will come out around the entire perimeter of the marker.

Remove immediately the excessive adhesive from the bonding and exposed surfaces. Soft solvent wet wipes recommended by manufacturers may be used to remove adhesive from exposed surfaces. Do not use any other solvent. If any adhesive, floor marking material or other adhesive or foreign material is attached to the reflecting part of the marker, the marker should be replaced by the Contractor at no additional cost.

6. Installation

• Do not place markers on longitudinal or transversal joints or on pavement joints.
• Do not place markers on existing asphalt signs, such as paint, thermoplastic, or preformed tapes.
• Do not place markers during rainfall or immediately after rain. Follow the instructions of the adhesive manufacturer.
• Do not allow traffic circulation over the markers immediately after installation. Provide proper protection until the adhesive is sufficiently placed to prevent traces or movement of markers. Refer to the adhesive manufacturer's instructions.
• Do not use epoxy adhesives containing solvents as they tend to disperse on bituminous road surfaces.
• Follow the adhesive manufacturer's recommendations regarding the application temperature and weather requirements.

7. Positioning

The RPM shall be set in accordance with the following drawings and general requirements:

Center positioning (yellow marker) in:
• Space 26 m, where 5m / 8m / 5m are center broken lines (for example rural areas)
• Space 18 m, where 3m / 6m / 3m are center broken lines (for example peripheral areas);
• Space 9 m, where twin barrier lines are located (for example turns);
• Space 6 m in areas that intersect with schools;
• None in urban areas**.**

Locations of side lanes (white markers) in:
• Except spaces 12 m:• 4 m space through sharp turns (only the outer side);
• No major interruptions through the entrance

8. Acceptance

All RPMs shall be in place and accepted with preparation prior to the opening of the road to traffic.

Any RPM that fails in adhesion or alignment within the Liability Period for Defects shall be replaced at no additional cost. If more than 10% of markers fail in adhesion or alignment during the Liability Period for Defects, the Liability Period in relation to elevated pavement signs will be extended for 12 months, period during which the Contractor will remain liable to replace all such markers at his cost.

Part Q

Concretes for structures & other uses

1. Description

This section includes materials, mixtures preparation, mixing, transporting, relocation, consolidation and placement of concrete required for work. It also covers the concrete formwork and reinforcement.

2. Definitions

Structural concrete is any class of concrete which is used in reinforced, prestressed (pre- or post-stressed) or reinforced concrete construction subject to stress.

Non-structural concrete is composed of materials complying with the specifications, but for which no strength requirements are specified, and which is used only for filling voids and similar purposes where it is not subject to significant stresses.

A formed surface is the process of concrete wall into formwork.

Unformed surface is a horizontal surface or tilted produced by hand or mechanical mastar, trowel or float for the required level and its finish.

A pour refers to the operation of placing concrete into any mould, bay or formwork etc., and also to the volume which has to be filled. Pours in vertical succession are also referred to as lifts.

3. *Concrete Materials*

3.1. General

The Contractor shall provide to the supervisor the full details of all materials he proposes to use to obtain concrete. These details shall include but are not necessarily limited to the type of material, required standards and specifications (According to Albanian National Standards or European Standards) origin source (plant, quarries, or others) etc., conform to the requirements of this specification. Materials containing concrete shall be certified from the source and shall comply with the requirements of this specification.

No concrete shall be placed on the surface until the supervisor has approved the materials of which it is composed. The approved materials shall not be altered or replaced with other materials without the written consent of the supervisor.

3.2. Cement

Permitted types and basic material specifications
Acceptance of cement shall be based on the certified analysis of the manufacturer’s test results that fulfill the requirements and specifications for the type of cement.

The certificate of cement tests shall be provided to the supervisor. If such certificate is not made available, or when required by the supervisor, the Contractor shall provide samples for testing of cement and it should be analyzed in compliance with the requirements for that type of cement, without additional costs of the employer.

When required by the supervisor, except tests required in this specification, the Contractor shall ensure that samples of cement are taken from the manufacturer's factory and are to be tested by an independent testing authority, without additional costs.

The contractor shall keep notes of all data related to production, distribution, testing and usage of cement in works and shall submit it to the supervisor in two copies.

3.3. Aggregates

General
All natural cement materials (fine, coarse and others) for all cement classes and aggregates shall be in compliance with the AS, and the contractor shall test all samples as described and as many times as the Supervisor may request to ensure that the concrete materials are constantly in accordance with these standards.

Testing
As soon as possible after receiving the approval of the supervisor to start working (and before concrete operations are due to commence) the Contractor shall submit on site samples of concrete materials, representative of those proposed for works, and samples shall be prepared in accordance with the testing methods established in AS. Every sample shall not be less than 50 kg. Materials for fine cement and 100 kg weight for materials of coarse cement and these shall be tested in accordance with the specifications. Cement materials shall not be used in works until the results of samples are presented to the supervisor and the written approval has been provided.

Washing
Cement materials may be washed only with clean fresh water from an approved source.

> The Contractor is obliged to provide appropriate environment for the storage and coordinate the supply of water in the defined time in order to not cause problems to other consumers.

3.3. 1 Fine aggregate

General
Fine cement aggregates shall be clean and durable and of natural sand, crushed gravel sand or of crushed hard rock sand conform to AS. All materials shall pass through a 10mm sieve and the quality must comply with the specifications. In order to achieve an acceptable quality, it may be necessary to mix materials from more than one source. Fine

concrete materials only for mortar must comply with AS.
Quality
The quality of coarse aggregates for cement is required to fulfill the percentages as stated in the following table in a content that does not exceed 1% and shall not exceed 2.36 mm size in sieve. The percentage exceeding 75 micros in sieve shall be determined by the methods specified in ES.

Other requirements

Total content of chloride and sulphate:

The total chloride content, expressed as chloride ion, arising from all ingredients in a mix including cement, water and admixtures shall not exceed the following limits expressed as percentage of the weight of cement in the mix:

For reinforced concrete: 0,3 percent in 95 percent of all test results providing no result is more than 0,5 percent.

The total sulphate content, expressed as SO3, of all ingredients in a mix including cement, water and admixtures shall not exceed 0,4 percent of the weight of the cement within the mix, whichever is smaller.

The percentage of aggregates
From the start of works the Contractor shall submit the type of machine for concrete compression, machine intended to be used in different parts of work and shall receive the approval from the supervisor. The Contractor shall prepare the aggregate in the required grades, fulfilling the following requirements:

- Cement, aggregates and water shall be in compliance with AS and specifications attached to the maintenance contract.

- Cement shall have the material composition as shown in AS.

- The water content for each aggregate shall be such as to give the required result (compression factor). Where different application methods for the same concrete level are required, different adhesion factors will be taken into account, and then a separate mixture shall be prepared for each case, to meet the requirements for the clause of this specification.

4. Mixing test
The Contractor shall present to the supervisor testing of aggregates of each class for concrete. The actual percentages shall be determined based on the evidence of prepared mixtures from the Contractor and performed with the used materials for works. Each set shall be not less than half meter cube in weight before being mixed in a mechanic mixture approved to be used in works. Three special sets of cement shall be prepared for each aggregate testing.

The prepared mixers that meet such requirements as set out in these specifications for a particular class of concrete will need approved mixtures of the same concrete class and the Contractor shall only use approved mixers where that concrete class is specified, and shall not commence without obtaining written permission from the supervisor. If a change is made in the materials or in the materials percentages, the supervisor will request further evidence of the mixers and proofs of the concrete cubes before granting the permit.

The Contractor shall provide sufficient time in his program and perform tests in the mixture and for the preparation and testing of the compression of those cubes that have been taken to the site. In order to meet all requirements of these specifications, a failure of concrete mix may occur and in this case the supervisor shall consider the fact that it remains important to start the production of that concrete class before enabling and achieving the results of sample concrete cubes from another concrete class, then he shall consult the Contractor and decide to determine an interim invoice to be used until the results of the concrete cubes test results are known, all additional costs shall be borne by the Contractor.

The supervisor shall approve any concrete invoices if they are carried out in accordance with the specifications mentioned above.

The Contractor shall ensure that the quoted materials are prepared for that concrete class, that the specified nominal percentages and current adjustments as shown by the concrete invoices shall prepare the resistance of the specified cubes and at the desired time to work.

5. Concrete quality check

1. Control from the supervisor and approval of materials, etc.

Before placing any concrete, the Contractor shall send all materials and storage and mix methods included to be used for concrete to the supervisor in compliance with the requirements of this specification. The materials delivery in the construction site as determined by the supervisor shall be tested and analyzed to ensure that they are in accordance and the tests shall be performed before the intended use in order to allow the results to be studied and materials to be approved, modified or refused by the supervisor. The contractor shall remove from the site all rejected materials without delay and at its own cost. The permission to use any material shall not be construed as an approval of its source, and no acceptance shall be construed as a continued approval.

2. Independent test cubes

The Contractor shall plan for the supervisor to be present during the sampling of the concrete and production, storage and care of the cubes to ensure that there is a full agreement between him and the supervisor that the said cubes are fully acceptable with the test cubes. If the Contractor fails to plan the presence of the supervisor when required, or refuses to do so, the cubes produced for this purpose will not be accepted as test cubes.

Part Y

Mortar works for structures

1. Goal

This section covers the supply of materials and construction of walls with stone and mortar.

2. Materials

Stone

The stones shall be of durable nature and taken from quarry or excavation and be angular in shape. If boulders are used, they shall be broken into angular pieces. The stone shall be sound, hard free from iron bands, spots, sand holes, flaws, shakes, cracks or other defects. At least 80% of the stones, except those used for crushing, shall have individual volumes of more 0.01 m^3. Representative samples of stone intended for use in the works shall be submitted for the Engineer's prior approval. Further representative samples shall be submitted for approval whenever there is a change in the type or strength of rock that the Contractor intends to use in masonry work.

Mortar

Mortar for masonry shall comply with the requirements for these materials.

Where mortared masonry work is necessary, it shall be filled again or covered with a temporary layer, the mortar joint shall be closed as a wash for works with stones in the vicinity. Where there is mortared masonry the mortared joints will remain exposed to take the approval of the Engineer, and excess mortar shall not be plastered over exposed stonework.

Cemented surface

Where there are mortar structures a cemented surface, connection up to the surface will be placed at a depth of 10mm before the concrete is laid in the first layer.

3. Cemented stones placed on retaining walls

All stones shall be carefully placed to obtain a joint of stones of not less than 0.9 m^2 for the exposed top. All stratified stones shall have measures not less than 150 mm x 150 mm in the exposed top and not less than 450 mm in length or in the width of the wall, whichever the smallest.

After the stones have been laid, all spaces between them shall be filled with strong rock fragments, crushed rock or gravel of which not more than 15% shall pass through a 19 mm sieve. The material shall be carefully hand tamped into place. The cement shall consist of 1 part Portland cement in 3 parts volumetric sand mixed with sufficient water to produce the desired consistency. The small spaces between the stones shall be completely filled with cement throughout the entire thickness of the stones after which the surface shall be swept with a stiff broom. Cement operations on rocks shall progress from the bottom towards the top.

For cement interventions a 50 mm bed of mortar shall first be placed on the prepared ground surface. The cement shall be bedded in the mortar and the method of laying completed as described above such that after grouting there shall be no voids in the completed layer.

Part Z

Concrete prefabricated culverts and pipes

1. Description

This section includes the supply and placement of prefabricated culverts and pipes as used in the culvert construction shows in the drawings of the contract.

2. Materials

All concrete works shall be carried out in accordance with the requirements of section 27 of this Specification.

Prefabricated pipes for culverts, enclosure units and rectangles to be produced only by an experienced manufacturer approved by the Supervisor. S-shaped connection pipes shall be prepared according to these specifications.

The bed and the filling of the structures shall meet the requirements of AS or ES, and or the requirements of the unified international standards.

All damaged, broken, cracked, corroded or other damaged units will be repaired at the request of the supervisor, if according the opinion of the supervisor this is not possible, they should be removed and replaced with undamaged units.

Culvert units that are thinner than the specified thickness shall be cancelled.

3. Installation

Installation and filling shall be done in accordance with the specifications given above.

The culverts that will be placed on the site and the installation method and construction of culverts shall be approved by the supervisor before construction.

The bed shall be made as shown in drawings.

A minimum cover depth shall be maintained above the pipe before vehicles are allowed to pass through the culvert trench. The minimum depth of the cover shall be done as shown in drawings and with the approval of the supervisor.

Part U

Bridge surfaces

1. Description

This section includes requirements for bridge surfaces and culverts as shown in drawings of the contracts or as instructed from the Project Manager.

2. Thickness

The bridge surface material should be kept in the minimum of 50mm (2”) sand asphalt protection layer.

The total thickness of the surface layer in culverts shall change in different positions, the composition of the culverts surface shall be of the type:

-As for bridges where the upper culvert solet is close to the level of the final road layer, or
-As for normal roads below the depth of the upper culvert solet.

WINTER MAINTENANCE

INTRODUCTION

In winter the weather is unpredictable, with variable intensity over more or less long periods of time and requires a flexible approach to service provision. Travel conditions and road safety during winter are quite limited by snow and ice. All measures taken to counteract the effects of ice and snow can be described as Winter Maintenance Services. Firstly, they include:

- preliminary measures (snow fences, snow signs)
- snow cleaning
- avoidance of frost
- measures against ice
- removal of falling stones and debris from the road
- provision of salt or alternative materials
- monitoring and reporting system of conditions.

Snow cleaning includes tasks for the crumble and transport of the removed snow. Unlike water, snow can be compressed but it is not elastic. When the snow compresses it retains its shape. **For this reason, it is very important to remove it on time**. The Winter Maintenance Service is in the best interest of road safety and, as a result, is very important for the national economy.

The role of Winter Maintenance Services is the reduction or elimination of barriers and risks in road traffic from snow.

2. DEFINITIONS

When the roughness of the road surface is reduced due to ice or snow then we have frost conditions. These appear suddenly and without warning and often only in certain areas.

Depending on the circumstances, the following frost situations may occur on the road and as such are defined and used in the Contract:

Frozen snow– this situation is caused by snow compressed by vehicles, stepped snow or frozen mud

Frosts – occur when atmospheric moisture falls on the circulating surface of the road and freezes

Ice – appears when existing moisture freezes (also described as wet and frozen areas)

Black ice – homogeneous layer of ice caused by icy rain or rain falling on the frozen surface of the road.

3. SERVICE PRIORITIES

For treating the road surface in general, salt shall be used on all paved roads, while small stones or sand shall be distributed on gravel roads. Care should be taken to use the minimum amount of necessary material to overcome adverse conditions.

3.1 Main interurban roads

Highways should be given special priority, regardless of the problem or event that may occur. In case of damage or breakdown of equipment, assistance and support should be provided by neighboring areas to ensure provision of maintenance services at the required level on this road.

The road section shall have at least two lanes cleared along its entire length. The road section should always be passable and able to provide safe traffic circulation, relying on careful driving of drivers. Ice should be removed all the time from the moment it shows up and throughout the entire road section.

Cleaning should begin with the onset of snowfall, night or day, and should continue until the end, so that there is no traffic disruption; and in cases of extreme weather conditions, national roads should have priority in being cleaned, even if such requires the mobilization of most of the equipment available for snow removal.

3.2 Streets with aggregate

These streets should be cleaned from snow or ice, day and night, along their entire length. The road section must first be cleaned to a width of 3.0 – 3.5 m. The extra width to allow overtaking must be cleaned every 300 to 500m, i.e. at short enough distances to allow drivers visibility of the extra width.

Within two days from the first cleaning operation, an additional passage must be cleaned to a width of at least 5 meters, also ensuring that the expanded and clean surface has the same level.

4. ANTIFREEZE MATERIALS

The following materials are appropriate to withstand frost conditions:

- harsh materials
- ice melting materials
- antifreeze chemicals

Using harsh materials, frost can be reduced but not completely avoided. Ice melting materials can soften and remove frost. The distribution of the harsh material can be applied to mechanically increase the friction (harshness) on the circulating surface of the frozen road; Ice melting materials have physical effects.

4.1 Harsh materials

The following materials may be used to soften the ice on the circulating surface:

Broken stones or fractions with size up to 5mm for normal roads. For mountain roads with thick layers of snow, larger fractions are recommended. The frozen road should be treated with fine pebbles.

Gravel should not contain binders or greasy substances, slag and other industrial processing products.

A volume of **150** g/m² is required to achieve the softening effect. The effect of the distribution of harsh materials depends on the granular composition, formation, surface and stability of the minerals. The larger the volume of broken stones (the more edges) the better.

4.2 Ice melting materials and their effect

Salt can only melt the ice if a salt and water solution is formed. This solution is created when salt comes in contact with ice or snow and when salt absorbs humidity.
Depending on the saturation, the solution will not freeze until certain sub-zero temperatures.

The melting process is delayed by reducing the salt concentration and the temperatures drop. Temperatures at the efficiency limit and reduced humidity affect the melting process to start.

The characteristics of salt affect its efficiency. The composition of grains is important for the application and distribution process. Fine grains provide a rapid melting of the surface, long-term effects are limited. Harsh grains that penetrate deeper lead to weakening of the compactness of snow or ice layers by the impact of traffic.
Nevertheless, the melting process may be delayed if the grains are too harsh or, if during distribution, the grains are thrown out of the circulating surface of the road.

Rock salt or melting salt shall not contain more than 5% of particles less than 0.16 mm in size or fragments larger than 5 mm.

Melting salt shall not contain water-resistant elements or other ingredients that would slow down the melting process.

The volume of distributed material is determined by a large number of factors.

Since the influencing factors are very complex and dependent on each other, it is not possible to give a fixed amount of materials for distribution in specific cases. Only intervals can be given in which the volume of distribution can fluctuate for special atmospheric conditions and in cases of frost.

The following quantities of distribution shall be observed:

Table**2**: Distribution quantities

Preventive distribution on dry/wet roads	5 up to 15 g/m^2
Preventive distribution on wet roads/before rain with frost	10 up to 30 g/m^2
Distribution for light frost and ice	5 up to 20 g/m^2
Distribution for black ice/after frosty rain	15 up to 40 g/m^2
Distribution for snow/frozen snow	15 up to 40 g/m^2

Larger values are especially necessary for low temperatures (approximately–15 C°), while lower values for light frosts and temperatures immediately after the freezing point.

5. MATERIAL STORAGE

5.1 Quarry materials

Quarry materials can be stored on open surfaces, although a covered space is preferred. This provides the opportunity to dry the humid material. The freeze which may occur when the storage is made in the open can be prevented if placed in a covered place. To avoid freezing in cases of open storage, melting salt can be added (ratio 20:1).

5.2 Melting materials

Salt should be stored under cover. If the salt is uncovered, it should be kept on a dry, insulated floor. It should be covered with raincoats or a plastic tray.

6. WINTER MAINTENANCE EQUIPMENT

6.1 Distribution Vehicles

For the distribution of the above-mentioned materials, trucks with a carrying capacity of at least 6 tons must be used. Trucks should not be overloaded and should perform regular services (min. for every 5000 km) to be in good service conditions.

6.2 Distribution equipment

The material is distributed by an automatic distributor connected to the vehicle. The melting salt shall be distributed behind the vehicle to achieve uniform distribution as well as to avoid the adhesion of salt to the wheels of the vehicle.

There are two types of distributors in use:

a) A trailer which is composed of a container and a dispenser: the quantities of salt which must be dispensed, are adapted in the regulator, while the distribution width at the speed of the rotating plate is not changeable.

b) The distribution board mounted on the truck: the amount of salt to be distributed and the distribution width depend on the speed of the rotating plate.

6.3 Clean Equipment

Snow cleaners (snowplows)

Efficient snowplows (raisins, knives) should be used to clear the snow. Steel snowplows should be used, which are easily mounted on the front of the truck. The joints should be raised and lowered pneumatically or hydraulically.
The width of the snowplow should be at least 0.40 m greater than the width of the vehicle. Thus, the width of the snowplow is 2.90 m for the passing part of the road. Narrower plows should be used for pedestrian paths and bicycle lanes.

Plows with curved or angular edges raise the snow from ground level. As the snowplow moves forward, the snow layer rises high from the edge and is accumulated along the side of the road. This creates side walls that need to be removed especially in places where they are expected to collapse or in narrow parts of the road.

The motor capacity of vehicles used for assembling snowplows must be adapted to the general snow conditions and the location. This capacity shall be between 73.5 kW(100 KF) and 190 kW(260 KF).

Two types of snowplows can be used:

- one-sided plug – that cleans the snow on one side
- double-sided plug – that cleans the snow on both sides.

7.3.2 Snow brooms

For light snowfall, up to 5 cm, in spaces which cannot be cleaned by snowplows, the circulating surface of road can be cleaned with snow brooms. These can be mounted on the front or rear of the vehicle.

7. PROVISION OF WINTER MAINTENANCE SERVICES

7.1 Preparatory work

7.1.1 General

In order to ensure the functioning of winter maintenance services from the beginning of this period, the following measures shall be taken:

- Collection of distributive materials; at least two-thirds of winter consumption shall be accumulated before the winter period starts.
- Control of winter maintenance equipment and vehicles.
- Placement of snow signaling signs (colored signs in black/yellow)
- Placement of ice warning signs at dangerous points
- Drafting of cleaning and distribution plans
- Drafting of the work program
- Workforce guidance and training

7.1.2 Snow signaling signs

On open locations and/or when heavy snow is expected to reduce the visibility of the roadside, yellow and black snow signs should be placed approximately 50 cm away from the area to be cleaned. The distance between the signs depends on the curvature of the road, in other words within straight sections the distance should not be more than 100 m, at turns < 100m. If necessary, the signs should be placed on each side of the road. Snow signs should be placed as soon as possible, and their installation should be completed no later than mid-November.

7.*2 Visible Clothes and Marking of Vehicles and Equipment*

The Contractor workers must wear visible clothing during work. This is more than necessary because winter maintenance is mostly done in the dark. Winter maintenance vehicles must be equipped with two rotating, flashing, yellow warning lights and marked with warning signals. They must be red and white and made of reflective material.

If the standard long headlights are covered by mounted plows (snowplows) then the vehicle must be equipped with additional lights at such a height that the road is well lit during normal passage and during snow clearing.

7.3 *Warning signs for ice in extreme risk areas*

As based on long years of experience, the contractor must ensure the placement of warning signs for slipping on specific surfaces of roads, which are prone to ice on those parts of the road which are usually ice-free.

7.4 *Distribution*

Previously ice was fought using reinforcing materials. In the interest of ensuring the ever-increasing volume of road traffic safety, the use of ice-melting salts has increased and has been useful since ice conditions can be avoided or removed by achieving long-term success.

Illustrative figure: Manual salt distribution

Ice-melting salts can also boost the economy of winter maintenance units as with fewer vehicles and personnel it can be distributed in longer sections of the road for a shorter time. Ice-melting salts have the greatest effect on busy traffic routes.

Illustrative figure: Salt thrown on the road surface

As mentioned above, reinforcing materials can be distributed on paved roads.

The manual distribution of the material using shovels should be avoided because it is not possible to achieve the same distribution and the maximum volume of 40 g/m² may be exceeded.

If the asphalt is wet and temperatures are expected to drop, and the road is frozen then salt should be distributed. This will stop the formation of black ice.

Frozen rain can lead to the creation of a very dangerous layer of ice that constantly thickens. It is useless to take measures to counteract this type of ice during the freezing rain. Measures can only be taken when the frozen rain has stopped.

Ice ridges cannot be removed from ice-melting salt at low temperatures. Such ridges can only be removed mechanically using leveling vehicles or something similar. It is essential that the contractor owns such equipment and facilities.

The salt shall be immediately dispersed as soon as the snow begins to fall in order to stop its sticking to the road surface and to facilitate further snow removal. Cleaning should begin when the snow has reached a thickness of 3 - 5 cm.

Thick and compact snow which should be avoided at all costs cannot be removed with ice-melting salt. In this case, reinforcing materials must be distributed or leveling machines or facilities must be used. The distribution of salt in such snowy lanes should be avoided because holes and cracks can be formed.

7.4 Snow clearing

A snow layer can contain snow of various strength.
The effort that needs to be made to melt the snow increases according to its compression. The melting salts scattered in the snow remove the ability of the snow to be compressed on road surfaces and thus the creation of strong layers. Physical-chemical energy applied during salting reduces the volume of mechanical work to clear snow. This results in the following basic guidelines which must be strictly followed by the Contractor who will undertake the performance of the Winter Maintenance Services.

- The snow must be removed before it gets stronger or compressed by traffic.
- To facilitate cleaning, salt should be dissolved during snowfall (before cleaning) in order to avoid its compression to a strong layer.
- The snow should be cleaned as long as it is wet and not compressed. This will prevent the creation of a strong and compact layer.

- Snow clearing should start when its thickness is 3-5 cm. Roads with two lanes shall be cleaned from the right looking from the center of the passing lane in the direction of the journey. A wiper in each direction yields a cleared width of 5.50 m.
- Occasionally vehicles must stop to allow traffic behind them to pass.
- Bus lanes, parking areas and benches should be cleaned after passing the road.
- Snow clearing also includes cleaning the canals along the village roads.

7.5 Management and Reporting Requirements

The Contractor shall be responsible for having personnel 24 hours in service, as a main contact and reporting point. They shall maintain regular telephone/radio contact with all cleaning units and send a standard report three times daily to the General Road Directorate. This is required to report on the current state of roads and cleaning. This position should be reachable by the Traffic Police. Telephone and e-mail communication must also be established.
The Contractor shall ensure the availability of appropriate staff to conduct operations and they shall submit reports on the operations' development to the local personnel of the Employer who controls the contract.

9. Snow signs

The Contractor must be allowed to ensure and temporarily install snow signs in the national roads areas as designated by the Supervisor. In addition, snow signs must include the installation of snow chains signs.

Type, Materials and dimensions are as follows:

Pillar: wood column, 50x50mm or 60mm diameter, sharpened from an edge

Color: column to be painted in orange and black, alternating every 33 cm.

Length: Total length of the column, 1,60m, height 1.33m between the top of the column and the base (floor).

Gravel road maintenance and repair

1. Alternatives of gravel road repair

Gravel roads are often considered to refer to low type surface as the volume of traffic is low. This type of surface generally provides a low quality of service. The main structure of gravel roads consists of a gravel layer having an appropriate thickness and quality of the overlayer cover. The thickness of the gravel layer generally depends on the traffic volume, quality of the disposable gravel and existing soil of the overlayer. Structurally, gravel roads function as flexible layers. The structural capacity is achieved through the distribution of the load to the weaker sublayer. The main principle in designing the thickness of gravel roads is to ensure an appropriate thickness based on the traffic volume and strength of overlayers so the pressure that reaches the overlayer does not exceed it. In the majority of cases, a minimum of 100 – 150mm is required.

The gravel roads are common in rural regions with low volumes of traffic. If maintaining and paving is done in the correct manner, gravel roads ensures a structure with low cost, that might be able to serve conditions with low volumes of traffic. However, proper maintenance is the key to the performance of the surface type of this road.

Generally, to maintain and rehabilitate gravel roads, the following conditions/problems should be considered:

- Inappropriate cross sections. An appropriate and qualitative gravel road shall start in the crown form or shoulder, with a difference of 100 – 150 mm from center to borders.
- Improper lateral drainage
- Creases
- Dust
- Holes
- Gutters
- Free aggregates

Types of rehabilitation and maintenance recommended for gravel roads depend on the types and harshness of problems identified in layers.

Flattening of surfaces

As illustrated in the following table, the flattening of the gravel surface is necessary periodically to restore the proper crown and to eliminate holes, creases etc. When paving a gravel road (especially during spring or when the moisture is at optimum) 50 – 100 mm of the gravel should be loosened and reshaped to provide the necessary crown and eliminate surface irregularities. In dry conditions, only a slight flattening should be performed, and care should be taken not to disturb any of the crusts.

Resurfacing with gravel

As time passes, the thickness of the gravel layer is significantly reduced due to dust and push of the gravel towards banks and ditches. In these cases, it is necessary to add a new layer of gravel to the road surface. The aggregate material must meet the duration requirements, whether for the repair of a road with an existing gravel surface or for a road with new gravel surfaces. The thickness of resurfacing with gravel varies from 75 to 150 mm.

Dust control

Flattening and compaction of a new gravel surface will help maintain a compact and impermeable layer, which may have some dust problems. When dusting occurs, it can be minimized through water application or stabilizing an agent on the surface. Water will only provide short-term solutions and is rarely advisable, except in specific cases on short sections of the road, unlike stabilizing agents which provide long-term solutions.

Channel clean - up

Road channels play a key role in providing adequate drainage for gravel roads. It is important that they are properly designed and free of vegetation and debris. The end of the ditch should always be one step below the sublayer and the degree of the ditch length should be 1% or more, if possible, to ensure good drainage. Channels should be cleaned periodically. This work is mainly done with a motor grader. However, on some roads, either the bed is very limited, or the channel slope is too steep to allow the use of a motor grader.

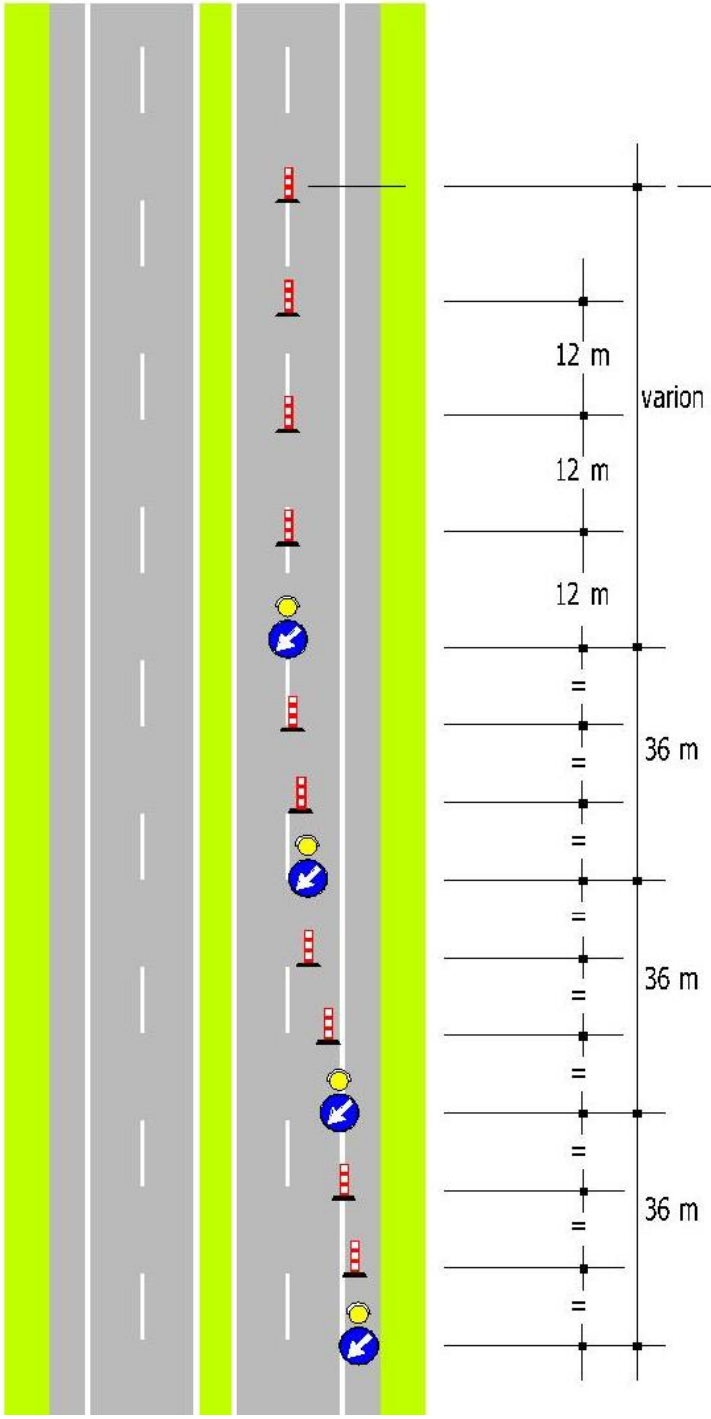
Channel erosion is also a problem. To prevent erosion the following techniques may be used:

- Geotextile and rock lining in the trench
- Construction of trench dams, which will reduce the flow rate in the channel
- Letting grass grow at the end of the channel
- Channel extension to lower the flow and slow down the flow rate of water

MAIN TEMPORARY SCHEMES FOR TRAFFIC MANAGEMENT DURING THE CONSTRUCTION WORKS

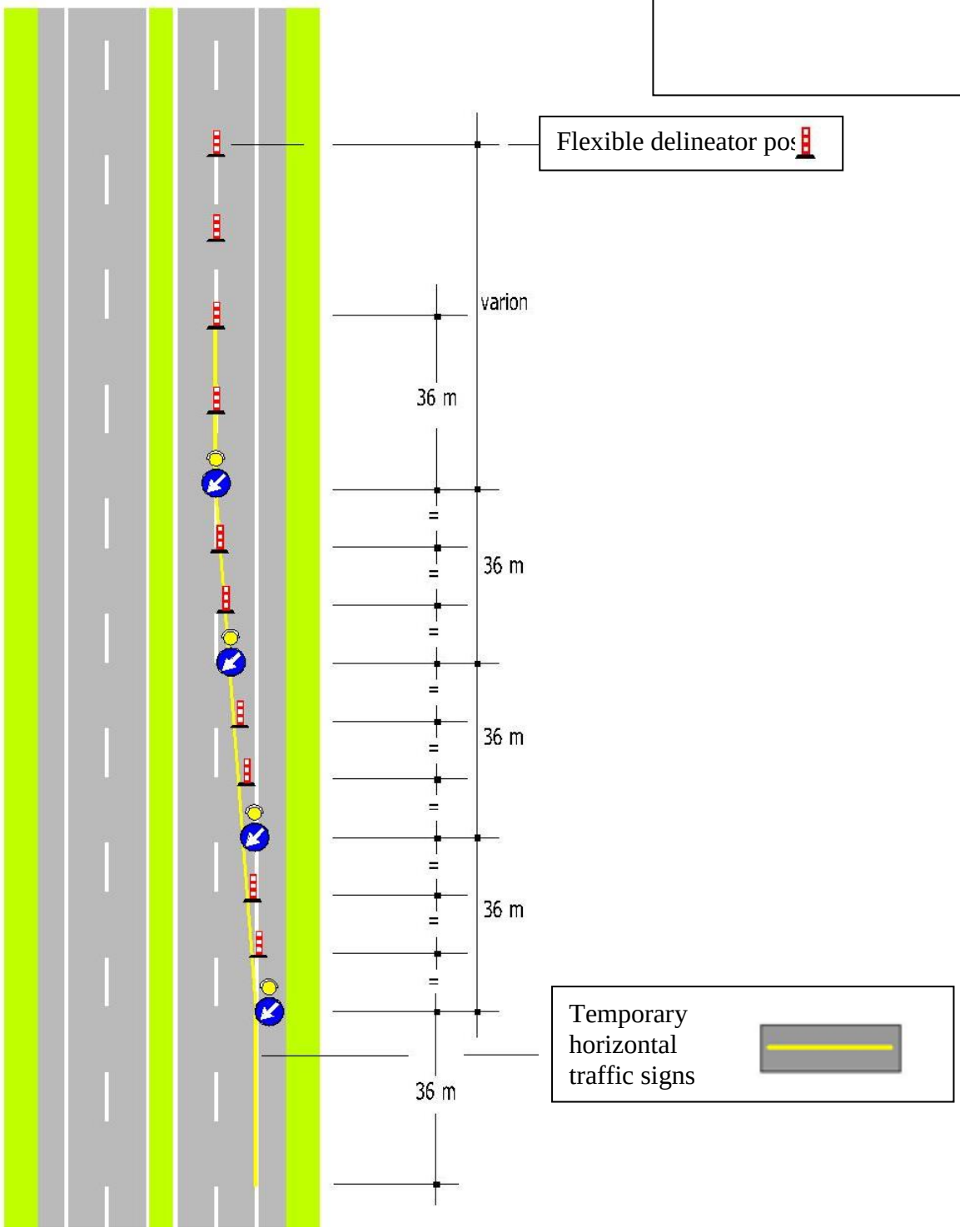
SCHEME 1b

Scheme on complex works lasting from three to seven days.



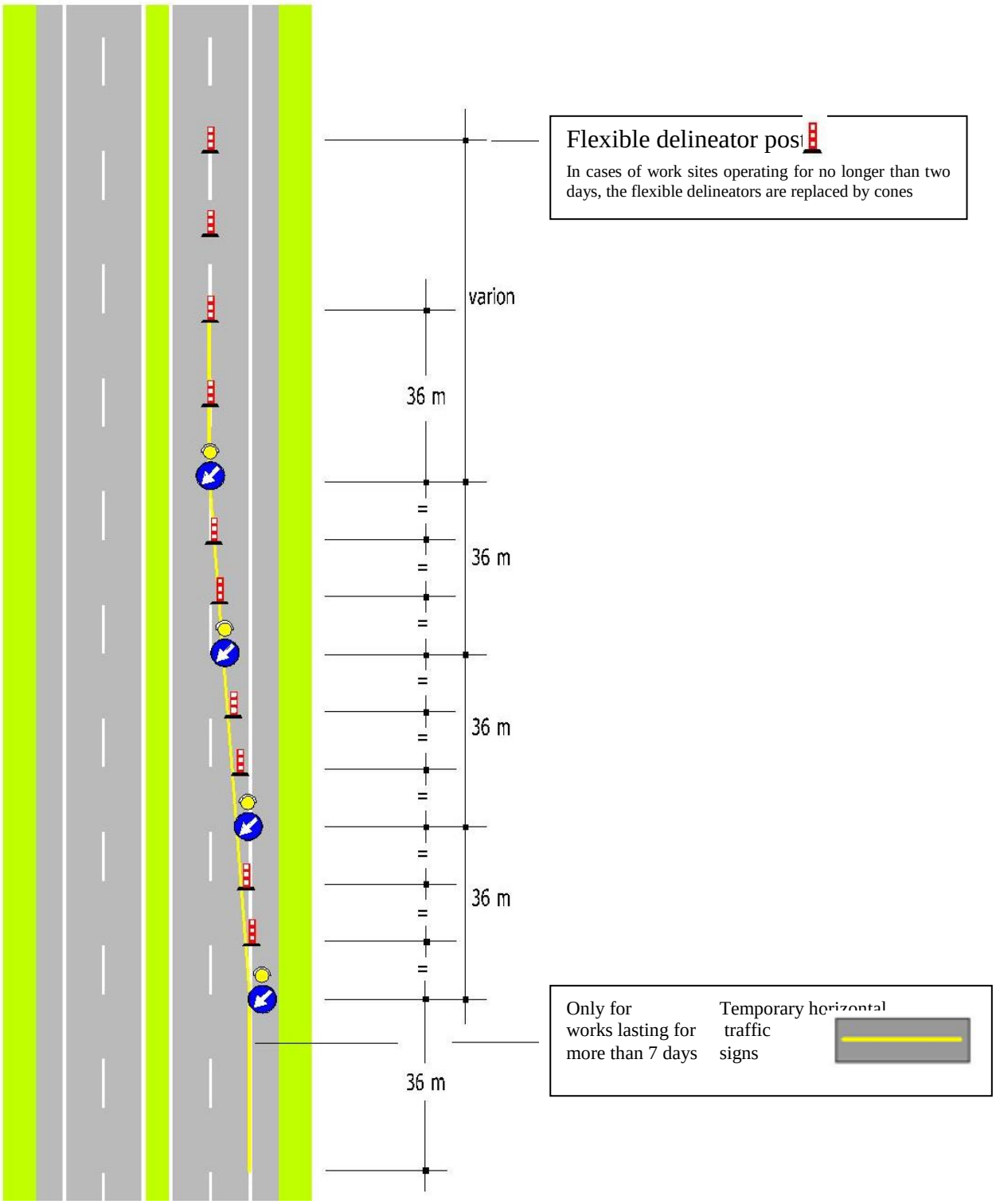
SCHEME 1c

Scheme on works lasting for longer than seven days.



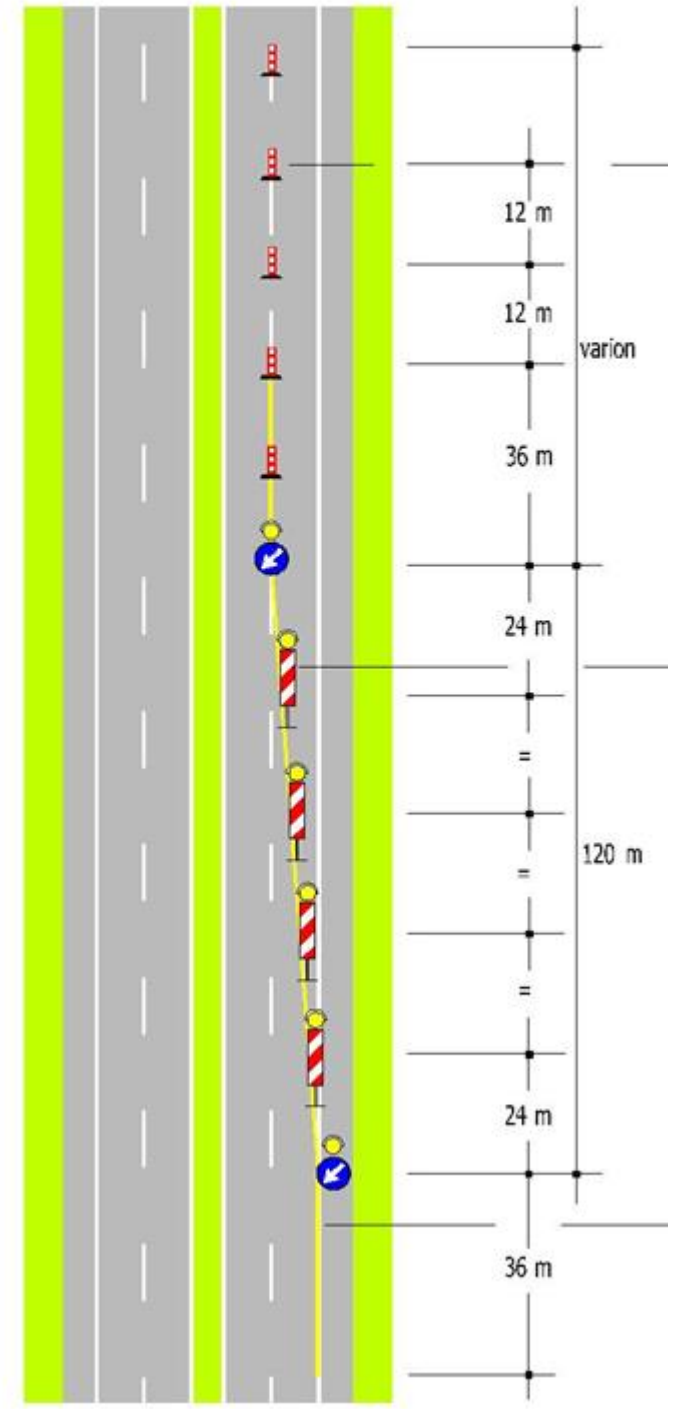
SCHEME 2a

Scheme on driving lane closure in a two-lane carriageway



SCHEME 2b

Scheme on driving lane closure in a two-lane carriageway (alternative hypothesis of scheme 2a for work sites operating for longer than two days)



Flexible delineator pos

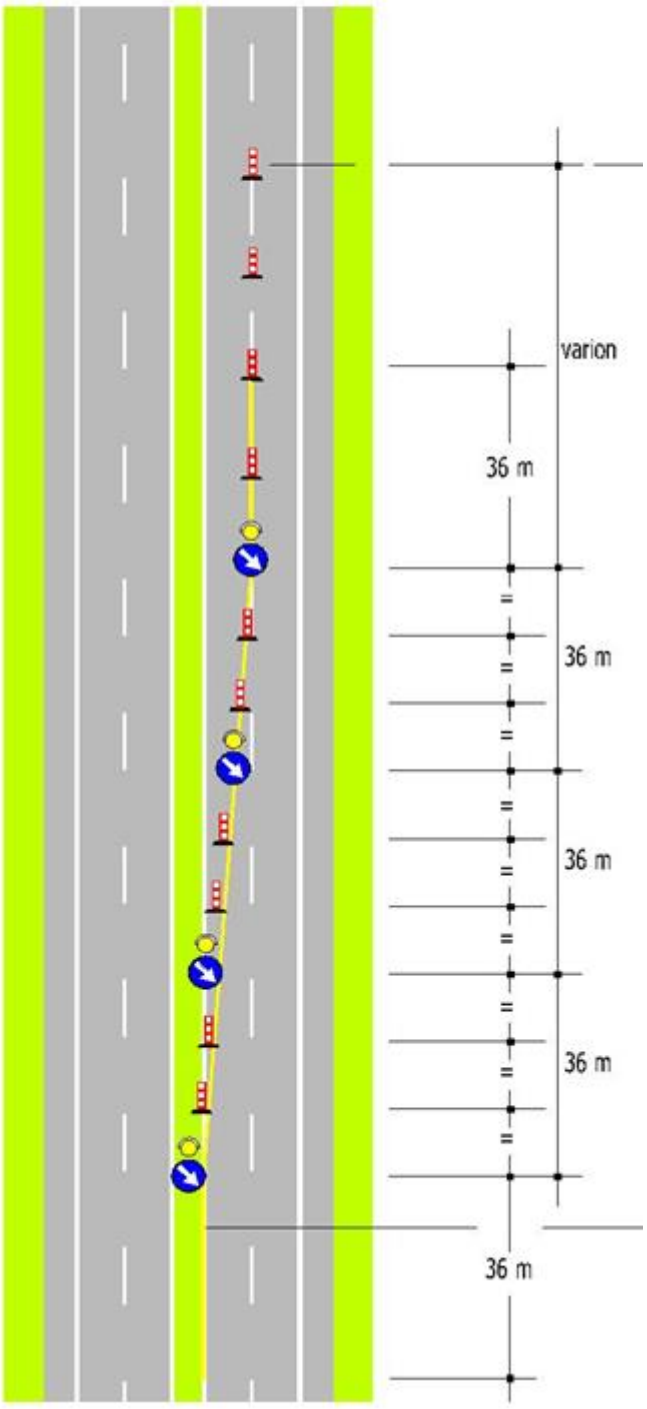
Vertical road signs accompanied by flexible delineator pos

Only for works lasting more than 7 days

Temporary hc traffic signs

SCHEME 3a

Scheme on
driving lane
closure in a two-lane carriageway



Flexible delineator post

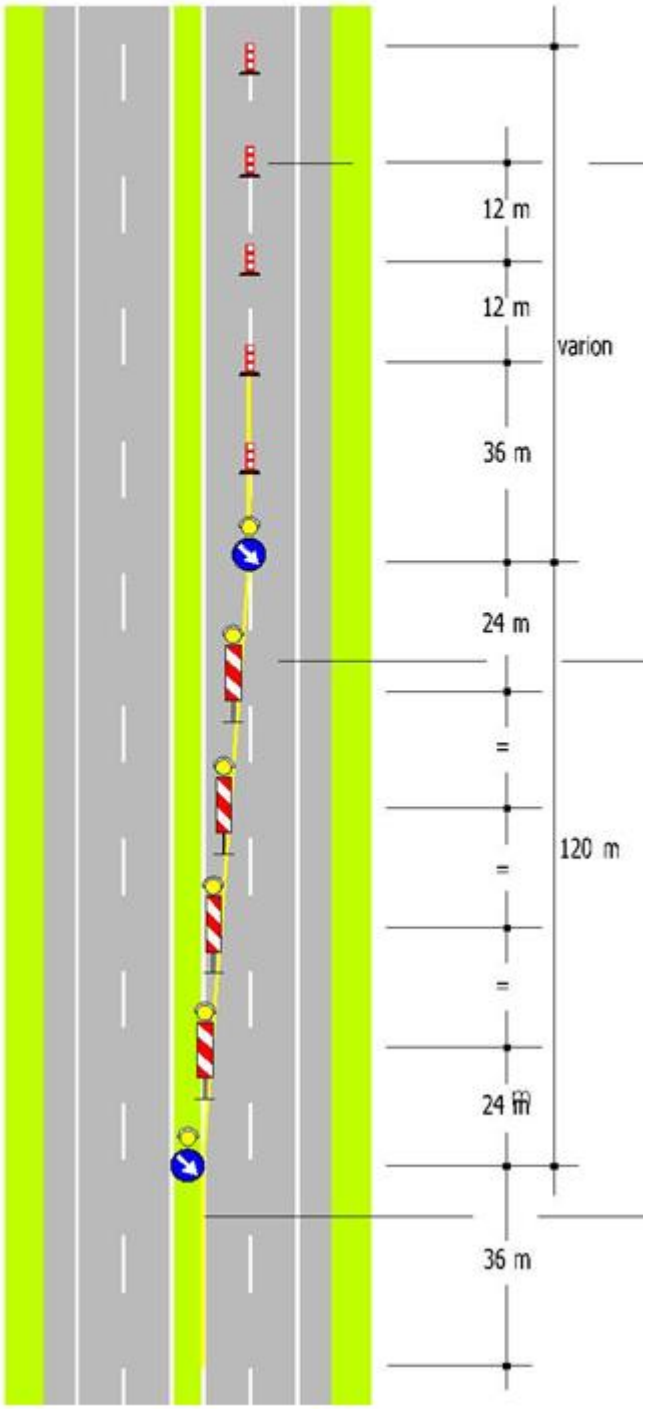
In cases of work sites operating for no longer than two days, the delineator posts are replaced by cones

Only for works lasting for more than 7 days

Temporary horizontal traffic signs

SCHEME 3b

Scheme on driving
lane closure
in a two-lane carriageway
(alternative hypothesis of scheme 2a for work sites operating for longer than two days)



Flexible delineator pos

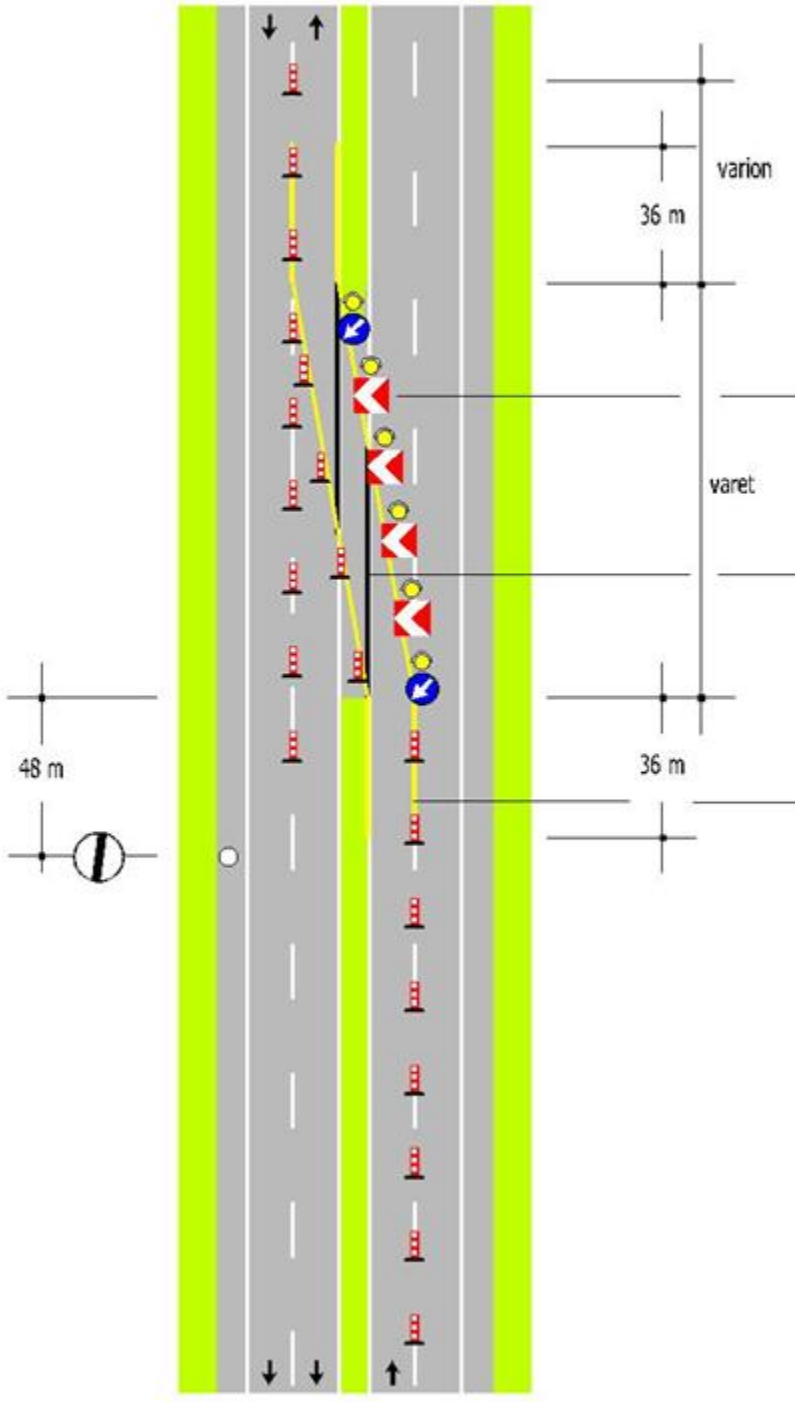
Vertical road signs accompanied by flexible delineator post

Only for works lasting for more than 7 days

Temporary h traffic signs

SCHEME 7b

Scheme for the redirection area in a two-lane carriageway for works lasting for longer than two days



Modular diverter for temporary curves

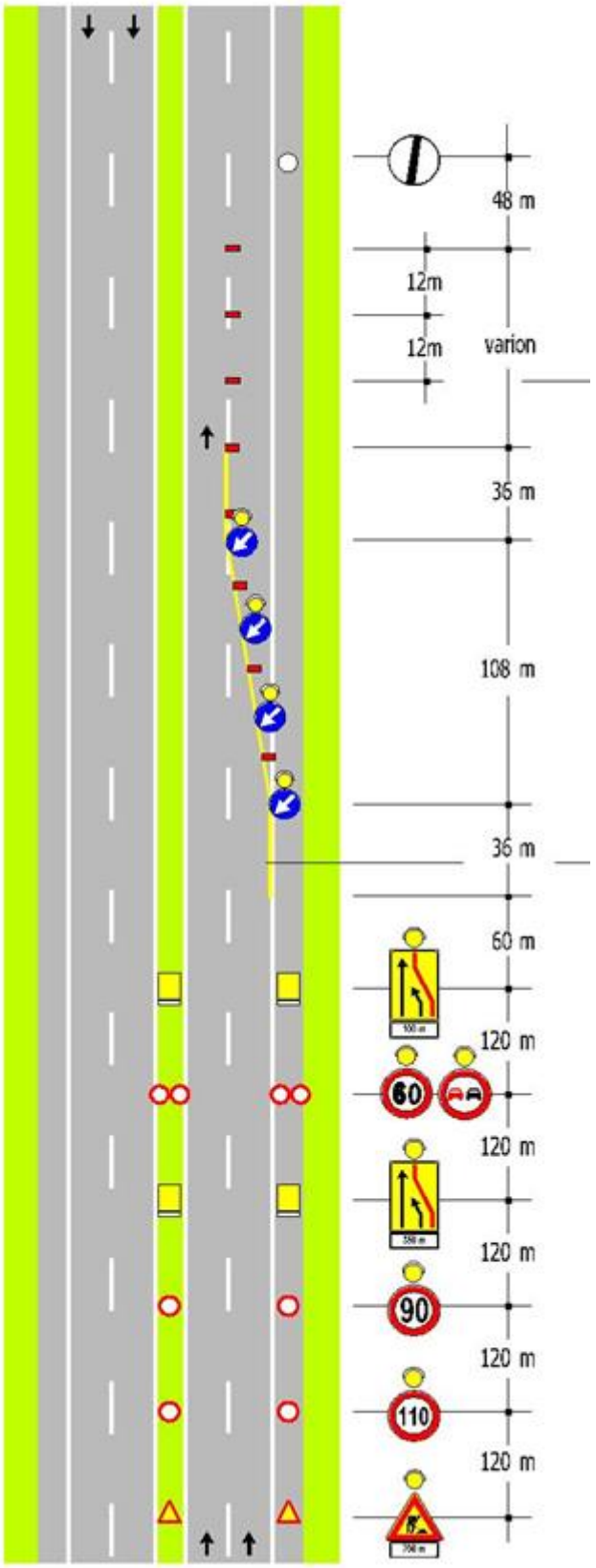
Covers of temporary horizontal traffic signs only for works lasting for >7 days

Only for works lasting for more than 7 days

Temporary h traffic signs

SCHEME 16

Right lane closure in a two-lane carriageway

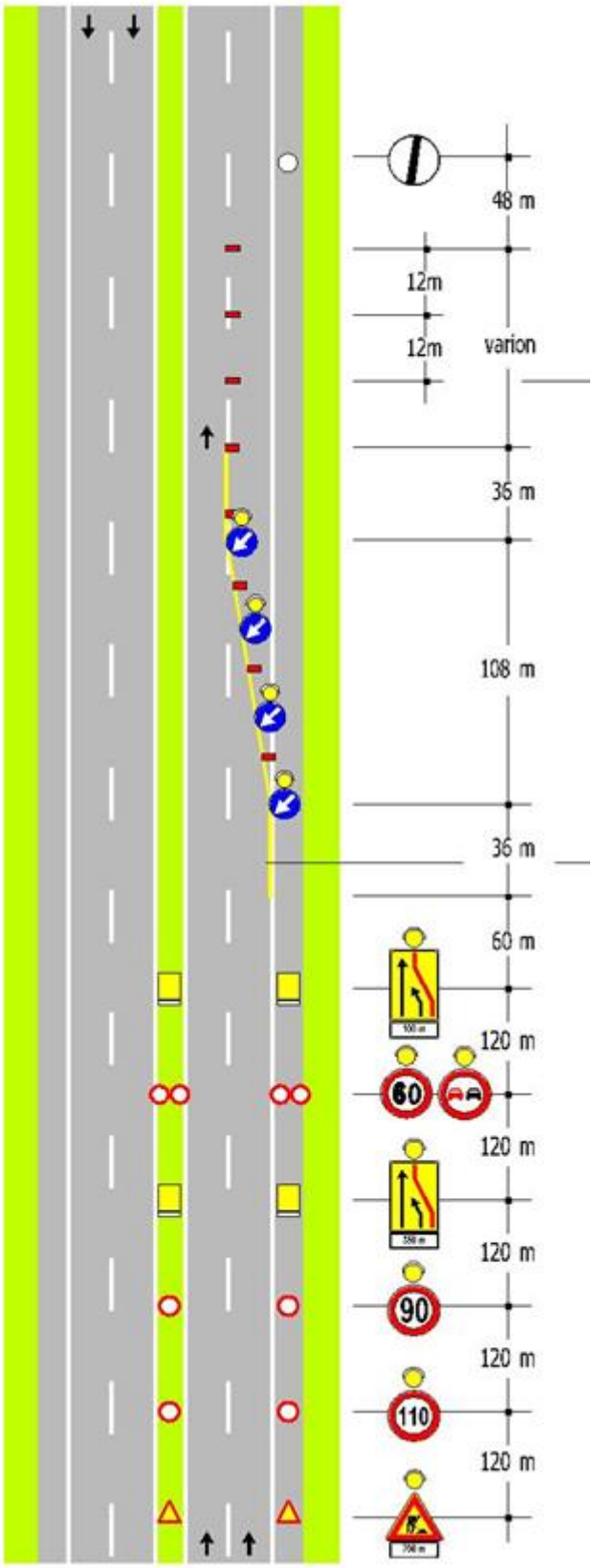


On works lasting
- < 2 days — cones
- > 2 days — flexible delineator posts

Only for works lasting more than 7 days — Temporary horizontal traffic signs

SCHEME 16

Right lane closure in a two-lane carriageway

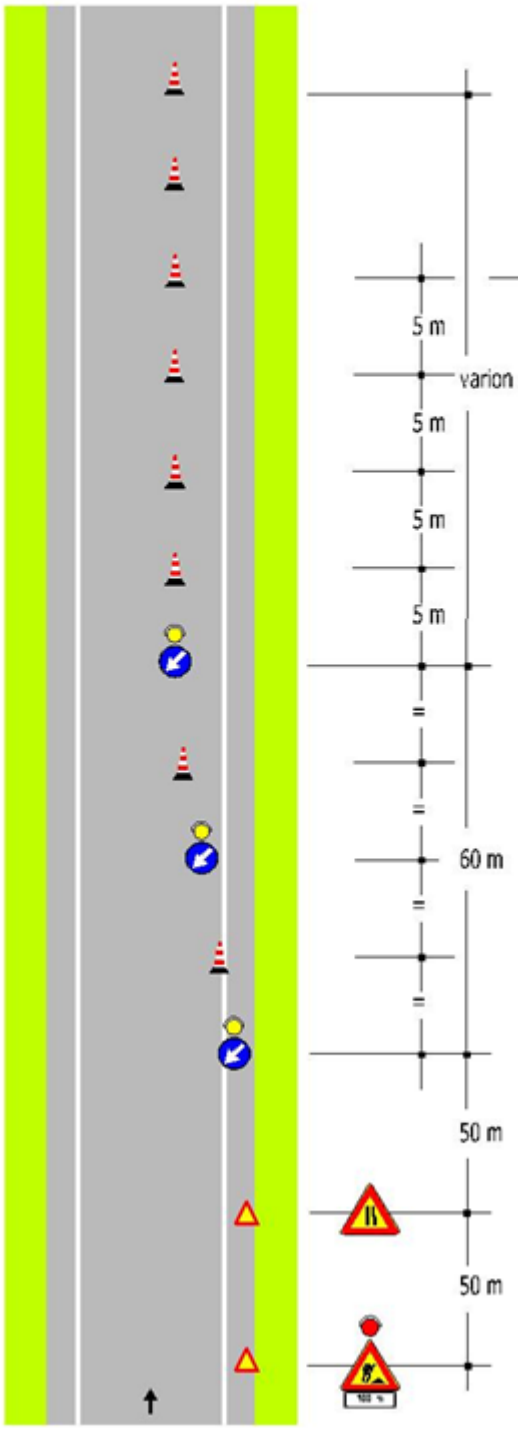


On works lasting for
- < 2 days cones
- > 2 days flexible delineator posts

Only for works lasting more than 7 days
Temporary h traffic signs

SCHEME 37

Narrowing the carriageway in a one-way street

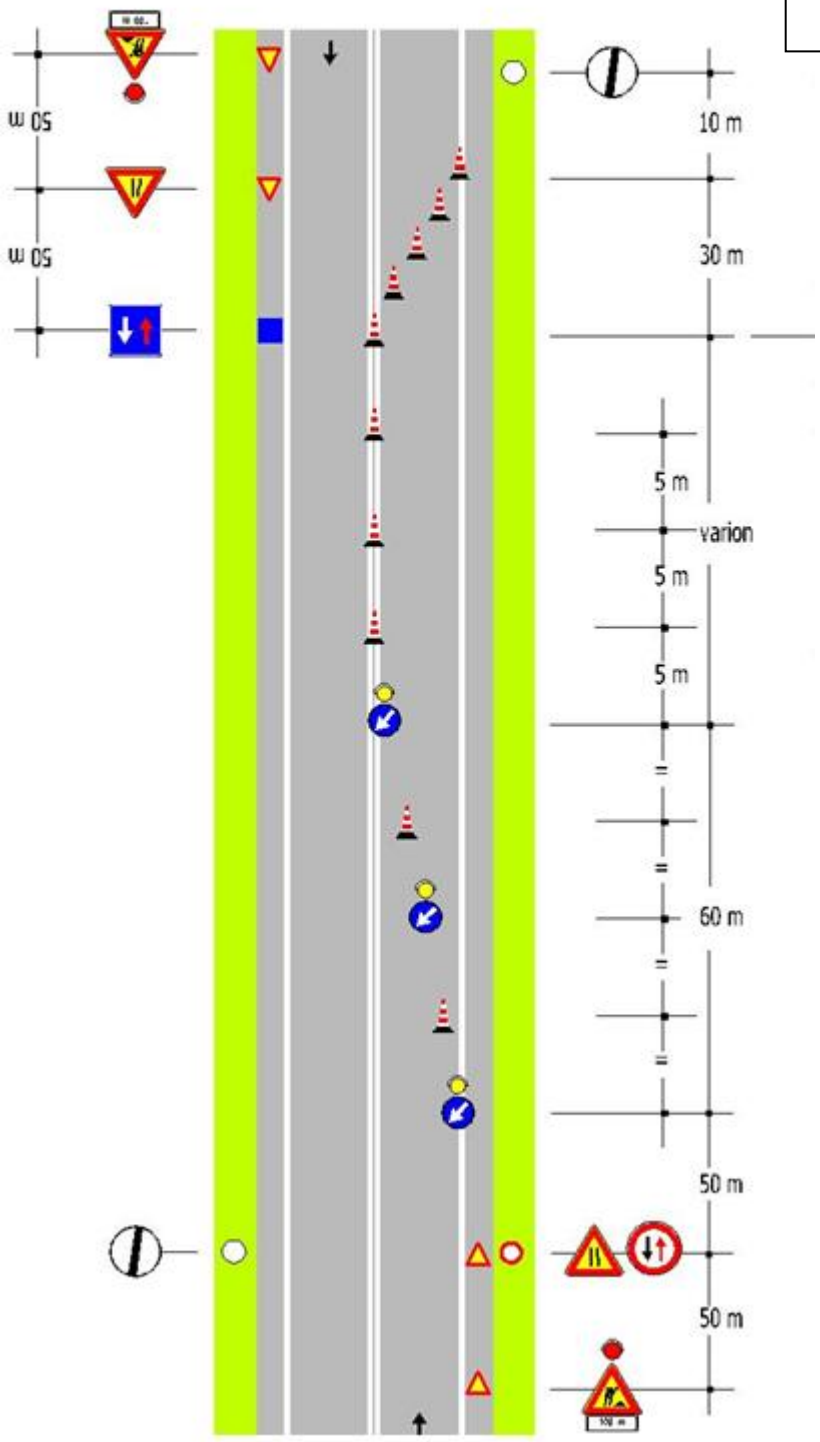


Cone 

In cases of work sites operating for longer than two days, cones are replaced by flexible delineator posts

SCHEME 38

A semi-carriageway closure in a two-way street



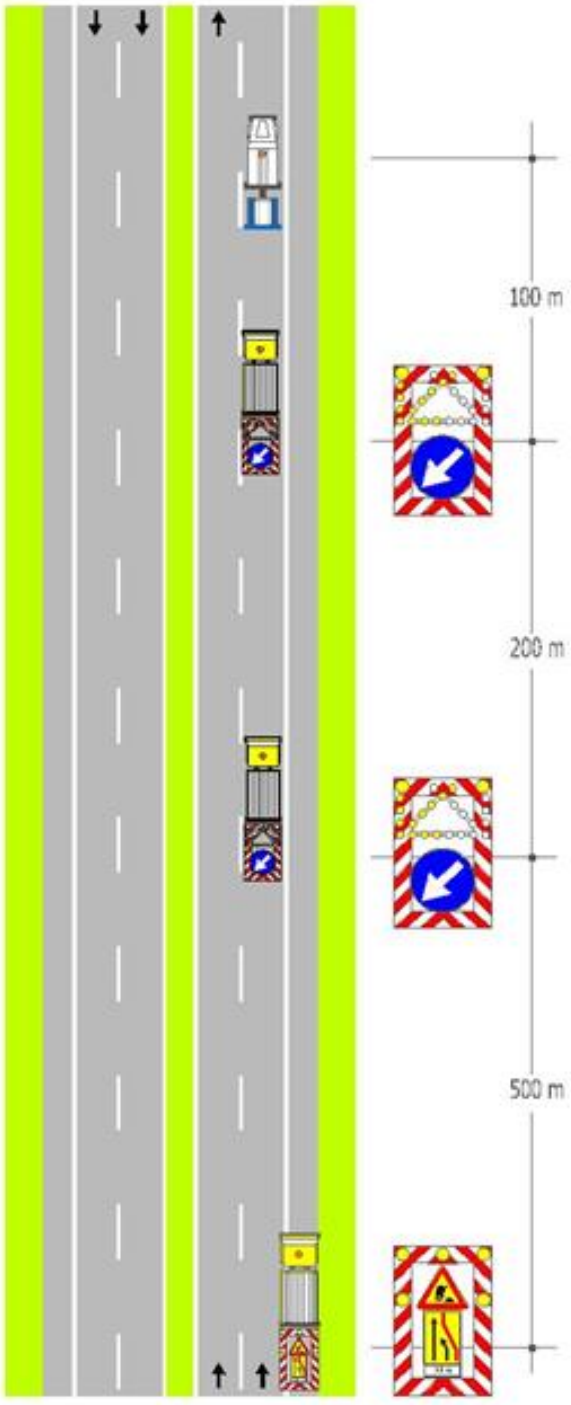
Cone 

In cases of work sites operating for longer than two days, cones are replaced by flexible delineator posts

Note: this solution applies to work sites operating for no longer than 7 days, where extremes are visible, length is up to 50 m and the traffic is low,
otherwise, the unique alternate route should be controlled by people or traffic lights.

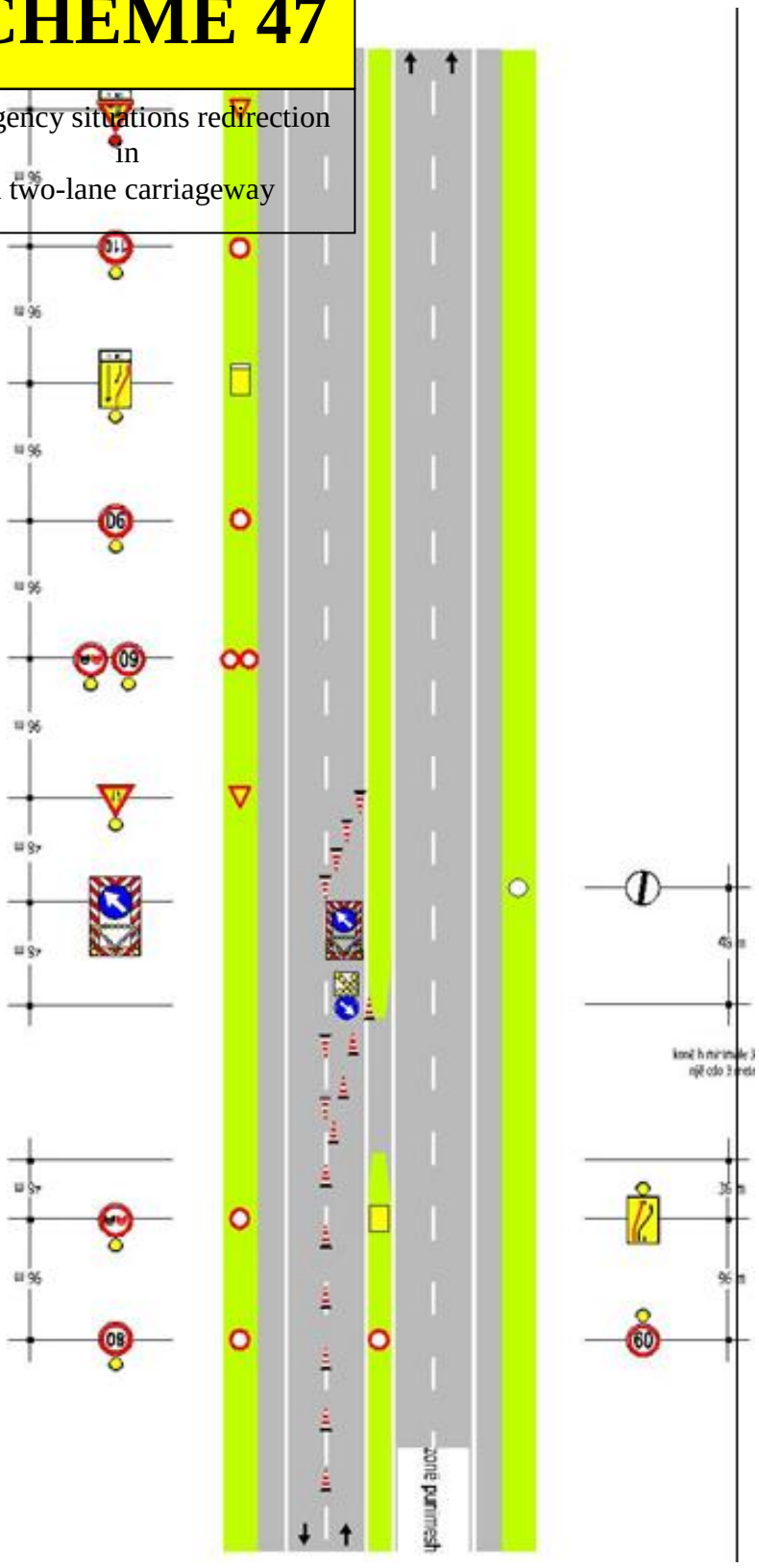
SCHEME 41

Mobile traffic signs for protecting special equipment used for works, controls, survey, and rapid verifications in a two-lane carriageway, right lane closure.



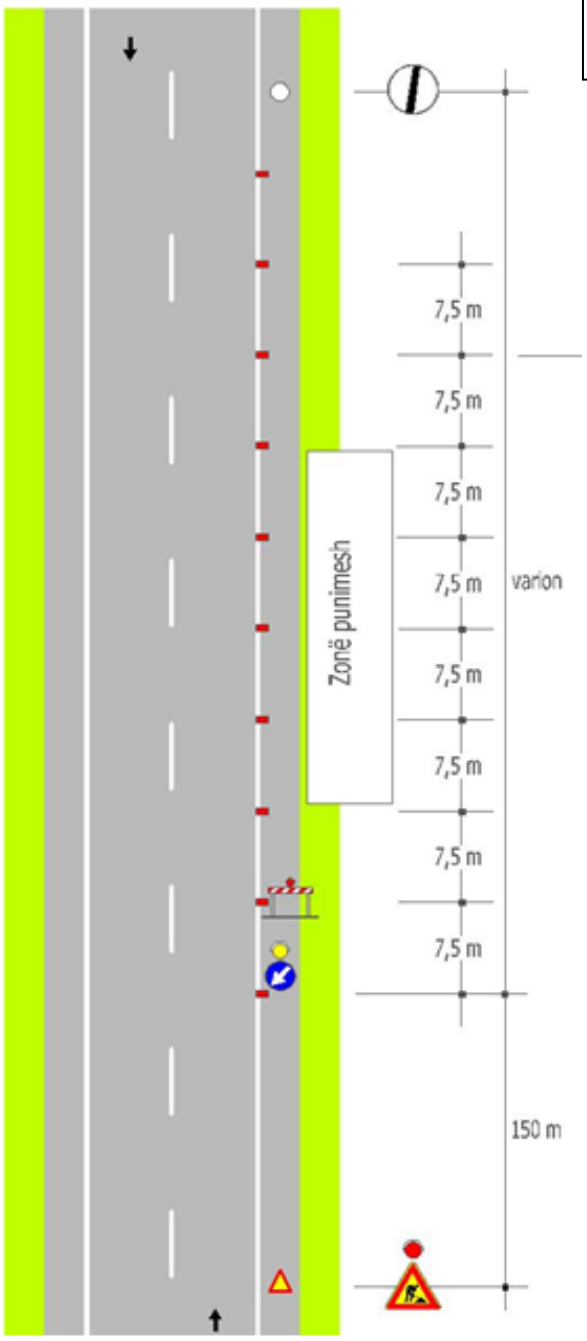
SCHEME 47

Emergency situations redirection
in
a two-lane carriageway



SCHEME 60

Works on the shoulder side

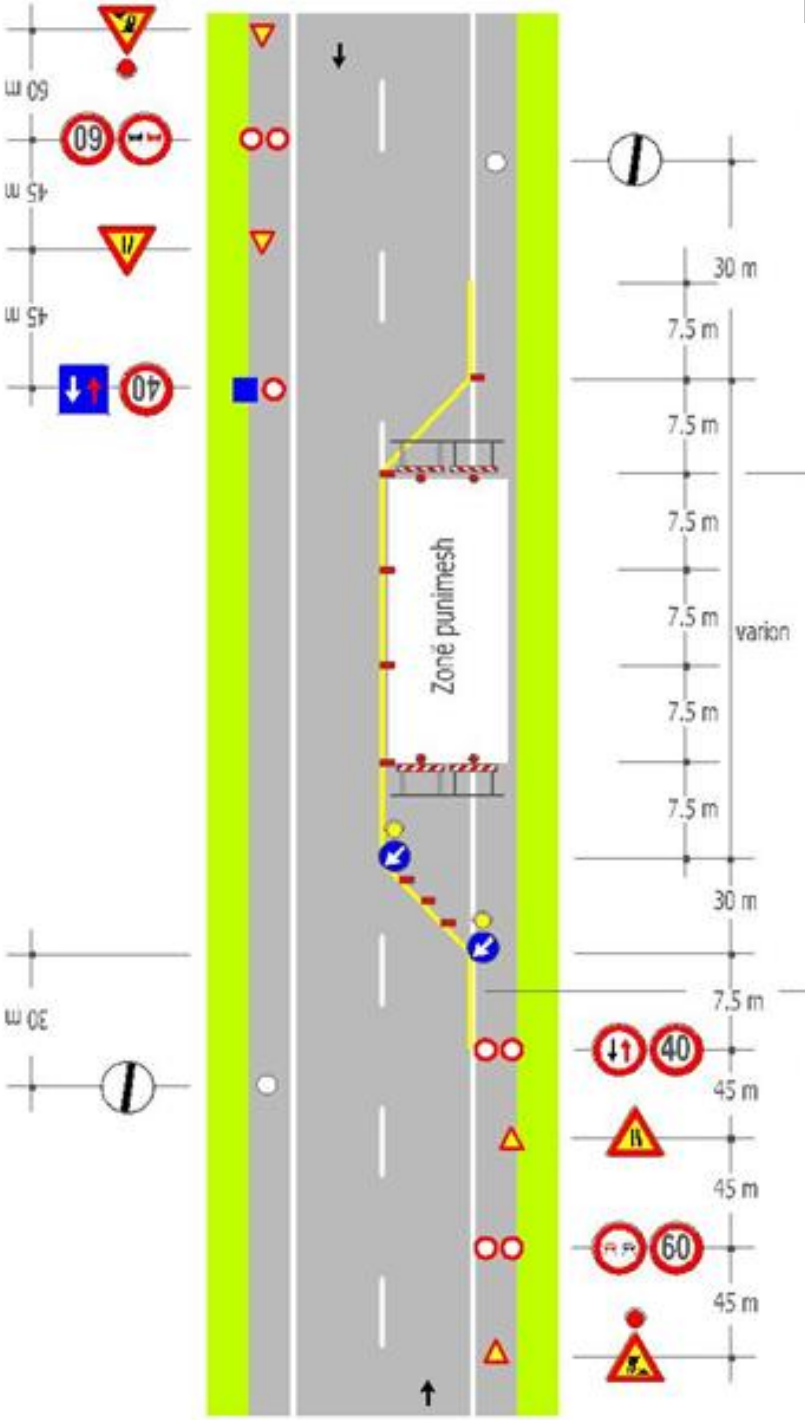


On works lasting for
- < 2 days cones
- > 2 days flexible delineator posts

SCHEME 64

Works in an alternate route carriageway

Note:
For the remaining carriageway with a width lower than 5.60, an alternate route should be applied



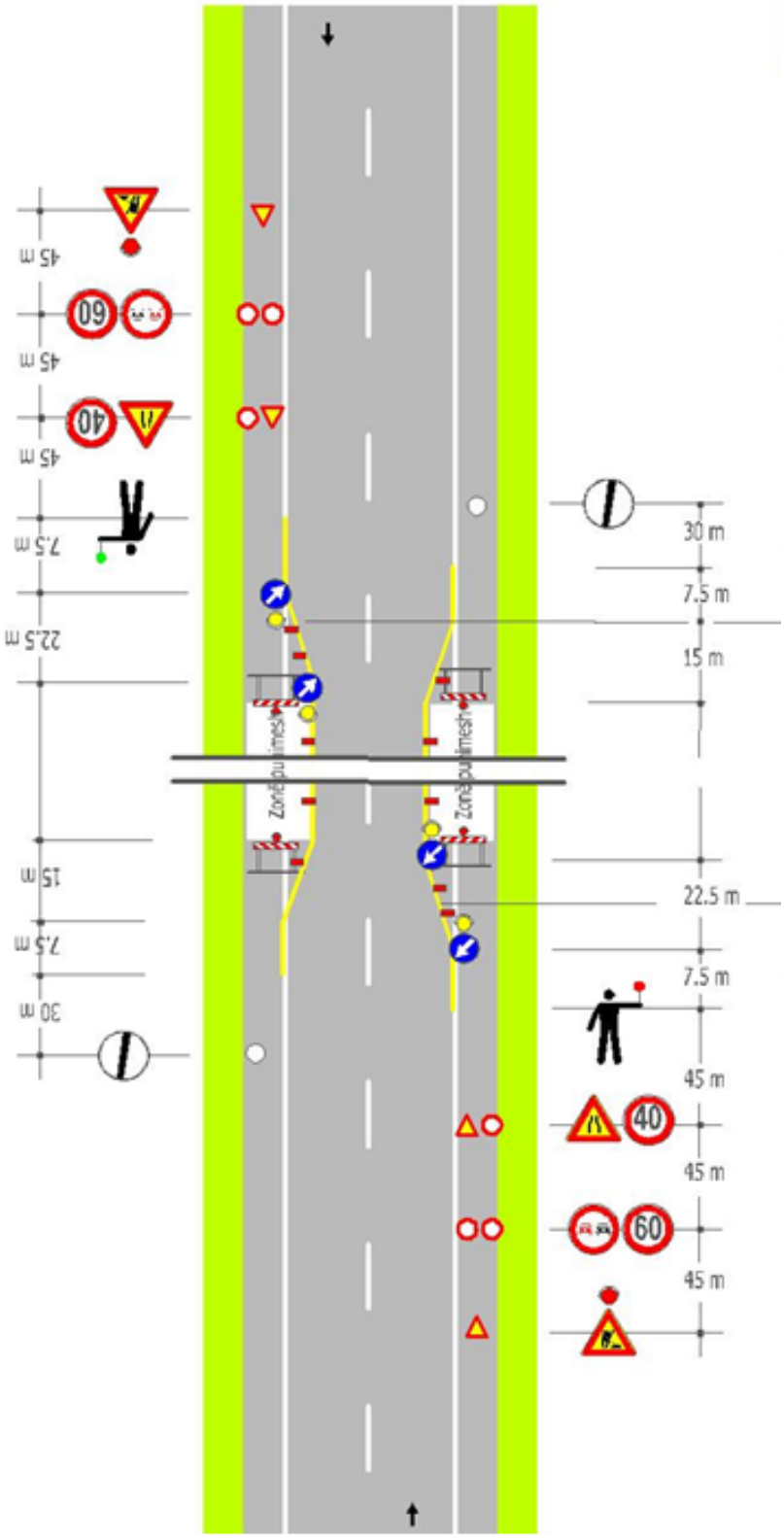
On works lasting for
- < 2 days cones
- > 2 days flexible delineator posts

Only for works lasting more than 7 days Temporary h traffic signs

SCHEME

Works in an alternate route carriageway controlled by a person with a table

Note:
For carriageways with a width lower than 5.60, an alternate route should be applied



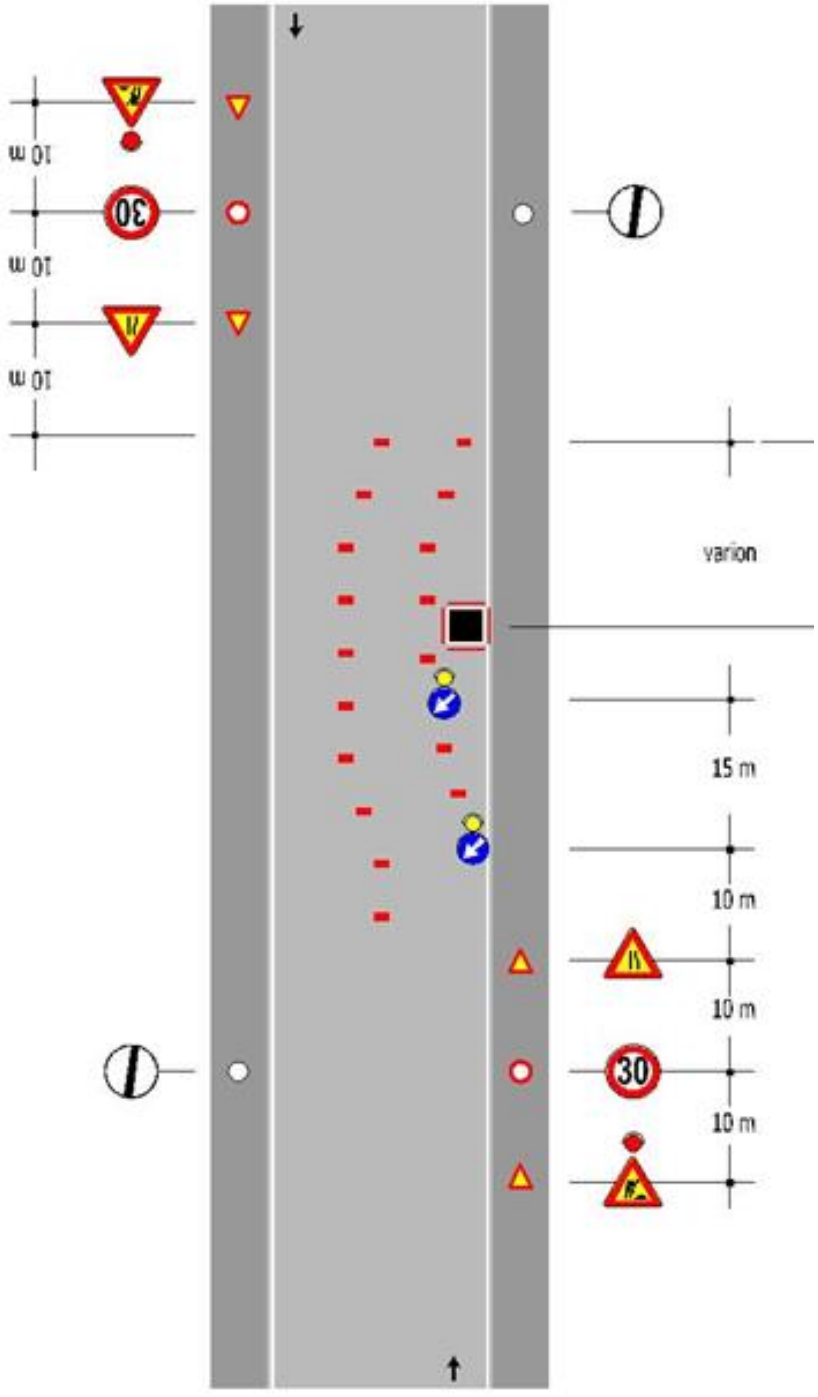
On works lasting for
- < 2 days cones
- > 2 days flexible delineator posts

Only for works lasting more than 7 days Temporary horizontal traffic signs

SCHEME 73

Opening of a top, gate or culvert at the border of the carriageway for works lasting no longer than 7 days.

Note:
For the remaining carriageway with a width lower than 5.60, there is no need to stop the opposite alternate route



On works lasting for
- < 2 days cor
- > 2 days flexible delineator posts