

**Bidding Document for Procurement of
Small Works National Competitive Bidding**



**Procurement of Works for Road Safety Improvements and Access
Roads of the Existing E-60 Highway (km28 – km114 Natakhtari – Agara
section)**

NCB No: EWHIP-4/CW/NCB-06

Project: Fourth East-West Highway Improvement Project (EWHIP-4)

Project ID: P130413

Credit No. IDA5245-GE; IBRD 8263-GE

**Roads Department of the Ministry of Regional
Development and Infrastructure of Georgia
(Part 2)**

Country: Georgia

Issued on: December 05, 2017

Part 2

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Section II - Bid Data Sheet (BDS)

A. Introduction	
ITB 1.1	<p>The number of the Invitation for Bids is : EWHIP-4/CW/NCB-06</p> <p>The Employer is: Roads Department of the Ministry of Regional Development and Infrastructure of Georgia</p>
ITB 1.1	<p>The name of the bidding process is: ROAD SAFETY IMPROVEMENTS AND ACCESS ROADS OF THE EXISTING E-60 HIGHWAY (Km28 - Km114 NATAKHTARI - AGARA SECTION)</p> <p>The identification number of the bidding process is: EWHIP-4/CW/NCB-06</p> <p>The number and identification of lots comprising this bidding process are: <i>N/A</i></p>
ITB 2.1	The Borrower is: <i>Georgia</i>
ITB 2.1	<p>The name of the Project is: <i>Fourth East-West Highway Improvement Project (EWHIP) (P130413)</i></p> <p>The estimated cost of proposed works is GEL 8,130,161.00 including all taxes, duties and other governmental levies as elaborated under clause ITB - 14.7. However, it is the responsibility of the bidder to submit a bid price, which could be below or above the estimated cost, based on the current market prices and any other factors which may influence the pricing of the proposed works.</p>
ITB 2.1	Loan amount: <i>USD 93.75 million</i>
ITB 4.1	Maximum number of members in the JV shall be: 3 (three)
ITB 4.4	<p>A list of debarred firms and individuals is available at the Bank's external website: www.worldbank.org/debarr</p>
B. Bidding Documents	
ITB 7.1	<p>For clarification purposes only, the Employer's address is:</p> <p>Requests for clarification should be submitted through the Georgian E-Government Procurement System.</p> <p>Requests for clarification should be received by the Employer no later than: 7 days prior to the deadline for submission of bids.</p>

ITB 7.1	The Employer will promptly publish its response at the Georgian E-Government Procurement System.
ITB7.4	A Pre-Bid meeting <i>shall not</i> take place. A site visit conducted by the Employer <i>shall not be</i> organized
C. Preparation of Bids	
ITB 10.1	The language of the bid is: <i>English</i> All correspondence exchange shall be in <i>English</i> . Language for translation of supporting documents and print literature is as given above.
ITB 11.1(b)	The following schedules shall be submitted with the bid: <i>Priced Bill of Quantities</i>
ITB 11.1 (h)	The Bidder shall submit with its bid the following additional documents: <ul style="list-style-type: none"> • <i>Bidders shall submit partners'/shareholders' decision empowering Director of the company to sign the bid on behalf of the bidder. If the bid is signed by any other person, other than a director, the bidder shall submit a written Power of Attorney authorizing the person to sign the bid on behalf of the bidder. Failing to meet such requirement the bid shall be rejected.</i> • <i>Details of any JV arrangement, including agreement or draft agreement ((i) stating that all parties shall be jointly and severally liable, and (ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution (iii) stating the proportions of works to be carried out by each member and (iv) details of financial arrangements between the parties;</i> • <i>Time schedule</i> • <i>Work program</i> • <i>Work methodology</i>
ITB 13.1	Alternative bids <i>shall not be permitted</i> .
ITB 13.2	Alternative times for completion <i>shall not be permitted</i> .
ITB 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: <i>N/A</i>
ITB 14.5	The prices quoted by the Bidder <i>shall not be</i> subject to adjustment during the performance of the Contract. Bidders shall indicate bid price in electronic field in Georgian E-Government Procurement System, failing to do so, will result in rejection of such bid.

ITB 15.1	The prices shall be quoted by the bidder in: <i>Georgian Lari (GEL)</i>
ITB 18.1	The bid validity period shall be: <u>90 days</u> after the date specified for submission of bids.
ITB 18.3 (a)	The Contract price shall be adjusted by a factor: The inflation rate used for local currency shall be 28 days prior the date of Bids submission deadline. The source of inflation rate shall be: National Statistics Office of Georgia – www.geostat.ge
ITB 19.1	<p><i>The Bidder shall furnish a bid-securing declaration.</i></p> <p><i>The Bid-Securing Declaration shall be for the following period of time: 1 year starting on the date of the bid opening stated in ITB 21.1.</i></p> <p><i>Bidders are reminded that the format of the Bid-Securing Declaration should be in accordance with the form of Bid-Securing Declaration included in Section 4.</i></p> <p><i>For bids submitted by a JV bidder shall carefully read ITB 19.8 as failure to comply with this ITB may be grounds for bid rejection.</i></p>
ITB 19.3 (d)	Other types of acceptable securities: <i>None</i>
ITB 19.9	If the Bidder incurs any of the actions prescribed in sub paragraphs(a)or (b)of this provision, the Borrower will declare the Bidder in eligible to be awarded contracts by the Employer for a period of 1 (one) year.
ITB 20.1	In addition to the original of the bid, the number of copies is: <i>N/A</i>
ITB 20.2	<p>The written confirmation of authorization to sign on behalf of the Bidder shall consist of:</p> <p><i>(a) Bidders shall submit partners'/shareholders' decision empowering Director of the company to sign the bid on behalf of the bidder. If the bid is signed by any other person, other than a director, the bidder shall submit a written Power of Attorney authorizing the person to sign the bid on behalf of the bidder. Failing to meet such requirement the bid shall be rejected; and</i></p> <p><i>(b) In the case of Bids submitted by an existing or intended JV an undertaking signed by all parties (i) stating that all parties shall be jointly and severally liable, and (ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution (iii) stating the proportions of works to be carried out by each member and (iv) details of financial arrangements between the parties;</i></p>

ITB 21.1	<p>Bidders <i>shall submit</i> their bids electronically through Georgian E- Government Procurement System.</p> <p>Government procurement procedures SHALL NOT apply for this procurement. Bid submission and bid opening will take place electronically using Georgian</p> <p>E-Government Procurement System with certain modifications. Major modifications to the Georgian E-Procurement System are:</p> <ul style="list-style-type: none"> - Functionality of the three round safe-Reverse auction is removed. Rounds will not be applicable. - The estimated cost of the contract is disclosed in the E-Procurement system and bidders can submit a bid price, which could be below or above the estimated cost, however pricing the bid is the responsibility of the bidder, which shall be based on the current market prices and any other factors which may influence the pricing of the proposed works. <p>Please note that bidding is conducted under National Competitive Bidding (NCB) procedures as specified in the World Bank’s Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loan sand IDA Credits & Grants by World Bank Borrowers, January 2011, revised July 2014 (“Procurement Guidelines”).</p>
ITB 21.2 and 21.3	N/A
ITB 22.1	Bidders shall follow the electronic bid submission procedures of Georgian E- Government Procurement System.
ITB 22.1	Bidders <i>shall submit</i> their bids <i>electronically</i> through Georgian E- Government Procurement System

ITB 25.1	<p>ITB Clause 25.1 is modified to read the following:</p> <p>Bid opening will take place electronically using Georgian E-Government Procurement System with certain modifications. Major modifications to the Georgian E-Procurement System are:</p> <ul style="list-style-type: none"> - Functionality of the three round safe-Reverse auction is removed. Rounds will not be applicable. - The estimated cost of the contract is disclosed in the E-Procurement system and bidders can submit a bid price, which could be below or above the estimated cost, however pricing the bid is the responsibility of the bidder, which shall be based on the current market prices and any other factors, which may influence the pricing of the proposed works. <p>The Minutes of the Bid Opening will be uploaded in the E-Procurement System following the bid opening.</p>
ITB 25.3	<p>The Letter of Bid and Priced Bill of Quantities are to be initialed by representatives of the Employer–N/A</p>
E. Evaluation and Comparison of Bids	
ITB 34.3	<p>Contractor’s proposed subcontracting: Maximum percentage of subcontracting permitted is: <i>40% of the total contract amount</i></p> <p>b) Bidders planning to subcontract more than 10% of total volume of work shall specify, in the Bid Submission Form, the activity (ies) or parts of the works to be subcontracted along with complete details of the sub-contractors and their qualification and experience. The qualification and experience of the sub-contractors must meet the minimum criteria for the relevant work to be sub-contracted failing which such sub-contractors will not be permitted to participate.</p> <p>c) Sub-contractors’ qualification and experience will not be considered for evaluation of the Bidder. The Bidder on its own (without taking into account the qualification and experience of the sub-contractor) should meet the qualification criteria.</p>
F. Award of Contract	
ITB 43.1	<p>The Adjudicator proposed by the Employer is:</p> <p>GEORGE BEGIASHVILI (GEORGIAN)</p> <p>Partner</p> <p>Begiashvili & Co. Limited</p> <p>39 GAMSAKHURDIA AVE., SUITE 42,</p> <p>TBILISI, 0160, GEORGIA</p>

TELEPHONE: (995 32) 251 454; 251 455

FACSIMILE: (995 32) 934 906

www.gbcolaw.com

The hourly fee for this proposed Adjudicator shall be 120 (ONE HUNDRED AND TWENTY UNITED STATES DOLLARS).

The biographical data of the proposed Adjudicator is as follows:

EDUCATION:

September 1982 - June 1987

Tbilisi State University (Tbilisi, Georgia)

Faculty of Law

B.Sc. in Law

September 1987 – June 1988

Moscow Lomonosov University (Moscow, Russian Federation).

Law Department

Ph.D. in Law

WORK EXPERIENCE:

Since October 1995

Employer: Law Firm Begiashvili& Co. Limited (Tbilisi, Georgia)

Position: Director / Partner

May 1994 - July 1995

Employer: Law Firm Nabarro Nathanson (London, UK)

Position: Associate (Georgian consultant)

November 1993 - April 1994

Employer: International Trade Firm “AGIO” (Moscow, Russian Federation)

Position: Legal Consultant.

Section III - Evaluation and Qualification Criteria

This section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders if the bidding was not preceded by a prequalification exercise and post-qualification is applied. In accordance with ITB 35 and ITB 37, no other methods, criteria and factors shall be used. The Bidder shall provide all the information requested in the forms included in Bidding Forms.

Wherever a Bidder is required to state a monetary amount, Bidders should indicate the national currency. If any amounts are in foreign currency equivalent national currency using the rate of exchange specified by the bidder will be determined as follows:

- For construction turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year (in which the amounts for that year is to be converted) was originally established.
- Value of single contract - Exchange rate prevailing on the date of the contract.

1. Margin of Preference – NOT APPLICABLE**2. Evaluation**

In addition to the criteria listed in ITB 35.2 (a) – (e) the following criteria shall apply:

2.1 Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section VII (Works Requirements).

2.2 Multiple Contracts – Not Applicable**2.3 Alternative Completion Times – Not Applicable****2.4 Technical Alternatives – Not Applicable****2.5 Specialized Subcontractors – Not Applicable****2.6 Non-conformities, Errors, and Omissions:**

Pursuant to ITB 30.3, the adjustment shall be made using the following methodology: Subject to provisions under ITB 14.2 if: i) an item is not listed in the priced Bill of Quantities i.e. the item is missing or the item is listed and priced but it is non-conforming to the requirements of the bidding document; or ii) a component under the scope of work or a condition in the bid is non-conforming to the requirements in the bidding document; and provided that the Bid is determined substantially responsive notwithstanding non-conformance under i) and ii) above, the average price of the item or component quoted by substantially responsive bidders will be added to the bid price and the equivalent total cost of the bid so determined will be used for price comparison. If the cost of the non-conforming component or condition in the bid cannot be determined from other substantially responsive bids, the Employer will decide the price to be added for this purpose and for comparison of bids based on his own knowledge or as obtained from other sources.”

1.6 Additional Qualification Criterion

Bidder shall demonstrate that it has the capacity to handle the contract for the proposed works, while executing any outstanding works the bidder has already committed with the Employer or any other agencies. The Bidder shall submit the outstanding works in the form CCC (Current Contract Commitments/Works in Progress) with the bid.

"The Bidder's capacity is calculated as follows: $AT1 = AT2 - OW$

Where:

AT1 – The bidder's Available Annual Capacity (cumulative amount of contract(s) that can be

awarded to the bidder)

AT2 - Average Annual Construction Turnover of the Bidder as submitted in FORM FIN 3.2

OW – Annual Value of Outstanding Work including contracts awarded but work not yet started as submitted in Form CCC.

The bidder shall complete this table:

	GEL
Average Annual Turnover (AT2)	
Annual Value of Outstanding Work (OW)	
Available Annual Capacity (AT1)	

Notes:

“For contracts with intended completion period not exceeding 12 months, and/or for contracts with remaining intended completion period not exceeding 12 months, the sum of REMAINING Balance Works will be taken into account while determining Bidders’ Annual Capacity (AT1)”.

1. Qualification

Eligibility and Qualification Criteria				Compliance Requirements			Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
1. Eligibility							
1.1	Nationality	Nationality in accordance with ITB 4.3	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with
1.2	Conflict of Interest	No conflicts of interest in accordance with ITB 4.2	Must meet	Must meet	Must meet	N/A	Letter of Bid
1.3	Bank Eligibility	Not having been declared ineligible by the Bank, as described in ITB 4.4, 4.5, 4.6 and 4.7	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.4	Government Owned Entity of the Borrower country	Meets conditions of ITB 4.5	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.5	United Nations resolution or Borrower’s country law	Not having been excluded as a result of prohibition in the Borrower’s country laws or official regulations against commercial relations with the Bidder’s country, or by an act of compliance with UN Security Council resolution, both in accordance with ITB 4.7 and Section V.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
2. Historical Contract Non-Performance							
2.1	History of Non-Performing Contracts	Non-performance of a contract ¹ did not occur as a result of contractor default since 1st January, 2012.	Must meet requirement ⁶	Must meet requirements	Must meet requirement ²	N/A	Form CON-2

1 Nonperformance, as decided by the Employer, shall include all contracts where (a) nonperformance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Nonperformance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Nonperformance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

2 This requirement also applies to contracts executed by the Bidder as JV member.

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
2.2	Suspension Based on Execution of Bid Securing Declaration by the Employer or withdrawal of the Bid within Bid validity	Not under suspension based on execution of a Bid Securing Declaration pursuant to ITB 4.6 or withdrawal of the Bid pursuant ITB 19.9.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Bid Submission Form
2.3	Pending Litigation	Bidder’s financial position and prospective long term profitability sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Bidder	Must meet requirement	N/A	Must meet requirement	N/A	Form CON – 2
2.4	Litigation History	No consistent history of court/arbitral award decisions against the Bidder ³ since 1 st January, 2012	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Form CON – 2

³ The Bidder shall provide accurate information on the letter of Bid about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last five years. A consistent history of court/arbitral awards against the Bidder or any member of a joint venture may result in disqualifying the Bidder.

Eligibility and Qualification Criteria							
No.	Subject	Requirement	Single Entity	Compliance Requirements			Documentation
				Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
3. Financial Situation and Performance							
3.1	Financial Capabilities	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements estimated as GEL 1,400,000.00 (one million four hundred thousand Georgian Lari) for the subject contract(s) net of the Bidders other commitments	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN – 3.1, with attachments
		(ii) The Bidders shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.	Must meet requirement	Must meet requirement	N/A	N/A	
		(iii) The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements acceptable to the Employer, the last 3 years (2014, 2015 and 2016) shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.	Must meet requirement	N/A	Must meet requirement	N/A	
3.2	Average Annual Construction Turnover	Minimum average annual turnover of GEL 12,150,000.00 (twelve million one hundred fifty thousand Georgian Lari) calculated as total certified payments received for contracts in progress and/or completed within <i>the last 3 years (2014, 2015 and 2016), divided by 3 years.</i>	Must meet requirement	Must meet requirement	Must meet twenty five percent (25%) of the requirement	Must meet forty percent (40%) of the requirement	Form FIN – 3.2
3.3	Minimum Available Annual Capacity	Minimum Available Annual Capacity of GEL 8,130,161.00 (eight million one hundred thirty thousand one hundred sixty one Georgian Lari) calculated as specified in Section III.	Must meet requirement	Must meet requirement	Must meet twenty five percent (25%) of the requirement	Must meet forty percent (40%) of the requirement	Form FIN – 3.2 and Form CCC

Eligibility and Qualification Criteria							
No.	Subject	Requirement	Single Entity	Compliance Requirements			Documentation
				Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
4. Experience							
4.1(a)	General Construction Experience	Experience under civil works contracts in the role of prime contractor, JV member, sub- contractor, or management contractor for at least the last three (3) years starting 1st January, 2014.	Must meet requirement	N/A	Must meet requirement	N/A	Form EXP – 4.1
4.2 (a)	Specific Construction & Contract Management Experience	(i)A minimum number of similar ⁴ contracts specified below that have been satisfactorily and substantially ⁵ completed as a prime contractor, joint venture member ⁶ , management contractor or sub-contractor between 1st January, 2014 and bid submission deadline: at least one (1) contract for roads construction/reconstruction/modernization/rehabilitation with a minimum value of GEL 6,500,000.00 or two (2) contracts for roads construction/reconstruction/modernization/rehabilitation with a minimum value of GEL 3,600,000.00.	Must meet requirement	Must meet requirement ⁷	N/A	N/A	Form EXP 4.2(a)
4.2 (b)		N/A	N/A	N/A	N/A	N/A	N/A

4 The similarity shall be based on the physical size, complexity, methods/technology and/or other characteristics described in Section VII, Work's Requirements. Summation of number of small value contracts (less than the value specified under requirement) to meet the overall requirement will not be accepted.

5 Substantial completion shall be based on 80% or more works completed under the contract.

6 For contracts under which the Bidder participated as a joint venture member or sub-contractor, only the Bidder's share, by value, shall be considered to meet this requirement.

7 In the case of JV, the value of contracts completed by its members shall not be aggregated to determine whether the requirement of the minimum value of a single contract has been met. Instead, each contract performed by each member shall satisfy the minimum value of a single contract as required for single entity. In determining whether the JV meets the requirement of total number of contracts, only the number of contracts completed by all members each of value equal or more than the minimum value required shall be aggregated.

5. Personnel

The Bidder must demonstrate that it will have the personnel for the key positions that meet the following requirements:

No.	Position	Total Work Similar Experience (years)	In Similar Works Experience (years)
1	Team Leader/Project Manager	5	3
2	Road engineer	5	3
3	Geodesist	5	3
4	Structural Engineer	5	3
5	Road Safety Specialist	5	3
6	Electric (Electro Engineer)	5	3

The Bidder shall provide details of the proposed personnel and their experience records in the relevant Forms included in Section IV, Bidding Forms.

6. Equipment

The Bidder must demonstrate that it will have access to the key Contractor's equipment listed hereafter:

#	Name	Meas. Unit	Quantity
1	Safety Barrier Road Fence installation machine of guardrail	unit	2
2	Milling machine	unit	1
3	Grader	unit	1
4	Bitumen heater tank and spreading	unit	1
5	Crane	unit	1
6	Pneumatic hammer	unit	3
7	Paver/finisher	unit	1
8	Excavator	unit	2
9	El. vibrator	unit	2
10	Concrete mixer	unit	3
11	Combined roller	unit	2
12	Vibrating roller	unit	1
13	Smooth-wheel roller	unit	1
14	Pavement marking device	unit	1
15	Water tank	unit	1
16	Dump truck	unit	4

17	Truck	unit	2
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The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section IV.

Section VII - Works Requirements

Specifications

SECTION 1, GENERAL REQUIREMENTS

1. Scope

The specification defines the standards and quality of materials and workmanship to be used in the Project.

This Specification shall be read in conjunction with all the other documents forming the Contract. Any ambiguity between the documents forming the Contract shall be referred to the Project Manager for clarification in accordance with the Conditions of Contract.

The Contractors shall be deemed to have acquainted themselves with the requirements of all current statutes, ordinances, by-laws, rules, regulations or other instruments having the force of law in Georgia including without limitation those relating to protection of the environment, health and safety, importation of labour and training, taxes, duties, royalties and other levies.

Acceptance of Work

1.01.01 Conformity with Contract and Project Requirements

If any Clause or Sub-Clause in the Specifications includes a reference to International standards, the requirements of Local standards must be satisfied in first place. International standards might be used if they ensure equal or higher quality and are accepted by the Project Manager. The standards referred to are listed in the Annex of these Specifications.

References to standard test methods and other recognized standards authorities refer to the methods in effect on the date of solicitation for bids. Equipment, materials, or workmanship meeting other standards which ensure equal or higher quality than the standard specified will also be acceptable.

Perform work according to the present specification and the project (further “Project”) requirements. Perform all work to the lines, grades, cross-sections, dimensions, and processes or material requirements shown on the plans or specified in the contract or design documents.

Plan dimensions and contract specification values are to be met unless a variance is allowed by the Project Manager. Perform work and provide material that is uniform in character and meets the specified requirements.

Acceptable work conforming to the contract will be paid for at the contract unit bid price unless otherwise stated in the specifications or conditions of contract. Three methods of determining conformity and accepting work are described in the Subsections ‘Technical Inspection’, ‘Certification of Compliance’ and ‘Measurement or Tested conformance’ inclusive. The primary method of acceptance is specified in each Section of work. However, work may be rejected at any time it is found by any of the methods not to comply with the specifications and drawings.

Work that does not conform to the project and contract requirements or to prevailing industry standards where no specific contract requirements are noted, shall be removed and replaced at no cost to the Employer.

As an alternative to removal and replacement, the Contractor may submit a written request to the Project Manager to:

Have the work accepted at a reduced price, or

Be given permission to perform corrective measures to bring the work into conformity.

The request shall contain supporting rationale and documentation. When standard manufactured items are specified, (such as fence, wire, plates, rolled shapes, pipe conduits, etc. that are identified by gage, unit weight, section dimensions, etc.) the identification will be considered to be nominal weights or dimensions. Unless specific project and contract tolerances are noted, established manufacturing tolerances will be accepted.

1.01.02 Technical Inspection

Acceptance is based on technical inspection of compliance of executed works with the contract documents and prevailing relevant technical standards. Payment for work during the course of the project will be made as the work progress providing that it meets the conditions of the plans and specifications

1.01.03 Certification of Compliance

Provide materials, fabricated products and structures (further in text “materials”) from a manufacturer with an effective testing and inspection system. Require the manufacturer to finish documentation of the testing and inspection systems with a Certificate of Compliance that states the work complies with all contract requirements.

Require the manufacturer to furnish a “product certificate” for material commercially produced to a standard specification. The manufacturer shall clearly mark the material or package with unique product identification. Only one “product certificate” may apply to all the supply of material or product incorporated into the project for the one type of manufactures described.

Require the manufacturer to furnish a “product certificate” for material that:

Is custom made for the project, or

(b) Is produced or shipped in bulk and therefore not readily identifiable as to manufacturer and product, or

(c) Has a specific contract requirement.

A “product certificate shall accompany each shipment of material and place of manufacture as well as the lot number or other means of cross referencing to the inspection and testing system. Furnish specific test results on material from the same lot upon request

Materials or assemblies accepted on the basis of a Certificate of Compliance may be sampled and tested at any time. If found not to be in conformity with the contract requirements, all the materials or assemblies will be rejected weather in place or not until the items in place are tested and approved by the Project Manager.

Measurement or Tested Conformance

Provide all necessary production processing and control performance of the work so that all of the work complies with all the contract requirements.

Results from inspection or/and tested used to support acceptance of the work incorporated into the project shall have values within the specified tolerance or specification limits. When no tolerance values are identified in the contract, the work will be accepted based on customary manufacturing and construction tolerances.

Measurement and Payment

Measurement methods

Accepted work will be measured according to the metric (SI) system.

Unless otherwise specified, measurement will be made when the work is in place, complete and accepted. Measurement will be made for the actual quantity of work performed, or to adjusted or specified limits (staked limits) if not measurement. Structure will be measured to the neat lines shown on the plans or to approved lines that have been adjusted to fit field conditions.

The “measurement” subsections detailing specifics and exemptions for measuring work are described under each Section.

1.02.02 Measurement Terms and Definitions

Unless otherwise specified, the meanings of the following terms are as follows;

(a) Provisional sum. Perform the work only when authorized by written order. The work will be measured and paid for at agreed unit prices, or lump sum price, as established in the order authorizing the work. When the unit bid price is designated "provisional sum", the quantity is designated as "All".

(b) Contract Quantity. The quantity to be paid for is the quantity shown in the Bill of Quantities. The quantity will be adjusted for authorized changes that affect the quantity or for errors made in computing this quantity. If there is evidence that a quantity specified is incorrect, submit calculations, drawings or other evidence indicating why the quantity is in error and request, in writing, that the quantity shall be adjusted.

(c) Cubic meter. The volume which will be measured by the average end area method as follows:

(1) Take cross section of the original ground and use with design or staked templates or take other comparable measurements to determine the end areas. Work outside of the established lines or slopes will not be measured.

(2) If any portion of the work is acceptable but is not completed to the established lines and slopes, take re-measure cross section or comparable measurements of that portion of the work. Use these measurements to calculate new end areas.

(3) Compute the quantity using the average end areas multiplied by the horizontal distance along a centerline or reference line between the end areas. Deduct any quantity determined outside the designed or staked slope limits.

Where it is impractical to measure material by the average end area method, other methods involving three dimensional measurements may be used.

(d) Cubic meter in the hauling vehicle. The cubic meter volume will be measured in the hauling vehicle using three dimensional measurements at the point of delivery. Use vehicles bearing a legible identification mark with the body shaped so the actual contents may be readily and accurately determined. Before use, mutually agree in writing on the volume of material to be hauled by each vehicle. Vehicle carrying less than the agreed volume may be rejected or accepted at the reduced volume.

Level selected loads. If leveling reveals the vehicle has been hauling less than the approved volume, all material received since the last leveled load will be reduced by the same ratio as the current leveled load volume is to the agreed volume.

Material measured in the hauling vehicle may be weighed and converted to cubic meters for payment purposes if the conversion factors are mutually agreed to in writing.

(e) Each/unit number. One entire unit. The quantity is the actual number of units completed and accepted.

(f) Litre. The quantity may be measured by any of the following methods:

- Measured volume container
- Metered volume. Use an approved metering system
- Commercially packaged volumes

When asphalt material is measured by the litter, the volume will be measured at 150 C or will be

corrected to a volume at 150 C using recognized standard correction factors.

(g) Hour/month. Measurement will be for the actual number of hours/months ordered and performed by the contractor.

(h) Linear meter. Measurement will be from end to end parallel to the base or foundation upon which the item is placed.

(i) Lump sum. No direct measurement will be made. The bid amount is complete payment for all work described in the contract and necessary to complete the work for that item. The quantity is designated as "All". The estimated quantities of lump sum work shown in the contract are approximate.

(j) Kilometer. 1000 linear meters. Measurements will be horizontal along the centre line of each roadway, approach road or ramp.

(k) Kilogram. The weight measured according to subsection 'Weighting Procedures and Devices'. If sacked or packaged material is furnished, the net weight as packed by the manufacturer may be used.

(l) Square meter. Longitudinal and transverse measurements for area computations will be made horizontally. Where a pavement structure course is measured by the square meter, the width of measurement will be the top design width of the course plus allowable curve widening, not including side slopes. The length will be the distance measured horizontally along the centerline of each roadway, approach road or ramp.

(m) Station. 1000 linear meters Measurements will be horizontal along the centre line of each roadway, approach road or ramp

(n) Ton. 1000 kilograms. Measurement will be according to subsection 'Weighting Procedures and Devices' No adjustment in contract unit price will be made for variations in quantity due to differences in the specific gravity or moisture content.

Net certified scale weights, or weights based on certified volumes in the case of rail shipments, will be used as a basis of measurement subject to correction when asphalt material is lost from the car or the distributor, wasted, all otherwise not incorporated in the work. When asphalt material is shipped by truck or transport, net certified weights, subject to correction for loss or foaming, may be used for computing quantities.

When asphalt cement for asphalt concrete pavement is stored in tanks devoted exclusively to the project, quantities will be based on invoices. When asphalt cement for asphalt concrete pavement is not stored in tanks devoted exclusively to the project, quantities will be based on the tank measurements, converted to volumes.

1.02.03 Weighing Procedures and Devices

Furnish, erect and maintain scales or used permanently installed and certified commercial scales for weighing material that are proportioned or measured and paid for by weight.

If bulk material is shipped by truck or rail and is not passed through a mixing plant, the supplier's invoice with net weights or volumes converted to weights may be accepted. Periodic check-weighing may be required.

Batch weights may be acceptable for determination of pay quantities when an approved automatic weighing, cycling and monitoring system is included as part of the batching equipment.

Before use at a new site, have the scales checked, adjusted and certified by an approved testing firm, a laboratory of the State responsible for weight and measures, or a qualified manufacturer's representative. Maintain the scale accuracy to within 0.5% of the correct weight throughout the range of use. Don't use spring balances.

Install and maintain platform scales with the platform level with rigid bulk heads at each end. Make the platform of sufficient length to permit simultaneous weighing of all axle loads of the hauling vehicle. Coupled vehicles may be weighed separately or together.

When a weighing device is determined to indicate less than true weight, no additional payment will be made for material previously weighed and recorded. When a weighing device is determined to indicate more than true weight, all material received after the last previously correct weighing accuracy test will be reduced by the percentage of error in excess of 0.5%.

Furnish competent scale operators to weight and record the gross, tare and net weights of all material measured by weight. Read and record weights to the nearest 50 kilograms. Increments while weighing smaller than 50 kilograms are permitted for automatic weighing system.

Weight the empty vehicles hauling material on platform scales with full fuel tanks at least twice per shift.

Documents that support weighed pay quantities shall contain the following information, as applicable, to the type of scales and recording system used:

- (a) Project identification
- (b) Contract pay item number
- (c) Material source/plant identification
- (d) Date
- (e) Load number
- (f) Truck identification
- (g) Time of weighing
- (h) Applicable empty and loaded weight
- (i) Scale operator's signature

Use an approved pre-printed format for the weight records. Furnish the original record(s) and a written certification as to the accuracy of the weight at the end of each shift.

1.02.04 Receiving Procedures

When the method of measurement requires weighing or volume measurement in the hauling vehicle, furnish a person to direct the spreading and distribution of material and to record the location and placement of the material on the project. During the placement, maintain a record of each delivery and document it in an acceptable manner. The document shall include the following information as applicable:

- (a) Project identification
- (b) Contract pay item number
- (c) Location where placed
- (d) Date
- (e) Load number
- (f) Truck identification
- (g) Time of arrival
- (h) Weight of volume
- (i) Spread person's signature

Use an approved pre-printed format for the weight records. Furnish the original record(s) and a written certification as to the accuracy of the weight at the end of each shift.

1.02.03 Scope of Payment

Compensation provided for in the contract is full payment for performing all contract work in a complete and acceptable manner. All risk, loss, damage, or expense arising out of the nature of prosecution of the work is included in the compensation provided by the contract.

If the contract requires work and there is no measurement of the work by the payment Section or no pay item specifically established for the work, there will be no direct payment for the work. The cost of the work is considered included under the other contract pay items.

If a Section references work is in another Section, the referenced work will not be paid for the directly unless the measurement subsection of the referring Section states that the work will be measured.

Work measured and paid under one pay item will not be paid for under any other pay item.

The quantities shown in the bid schedule are approximate unless designated as a contract quantity. Pay quantities will be limited to the quantities staked, ordered, or otherwise authorized before performing the work. Payment will be made for the actual quantities of the work performed and accepted or material furnished according to the contract. No pay will be made for work performed in excess of that staked, ordered, or otherwise authorized.

1.03. Mobilization

1.03.01 Description

This work consists of moving personnel, equipment, material and accessories to the project and performing all work necessary before beginning work at the project site.

Readiness for commencing works will be considered as fulfilled when the Contractor has provided at least 30% of necessary building materials (bitumen, sand, aggregate, mineral powder) to the site.

All building materials shall have laboratory test certificates on suitability.

1.03.02 Measurement

There will be no measurement for mobilization.

1.03.03 Payment

Any funds required (if required by the Contractor) for mobilization will be considered as being included in the Contract's advance payment.

1.04 Laboratory Testing

1.04.01 Description

This section contains the description and Specifications for the Site Laboratory and other quality control testing services to be provided by the Contractor together with definition of the responsibilities of the Contractor for such laboratory and testing. Whenever the term 'Laboratory' is used it shall include the space, utilities and sampling and testing equipment as hereinafter detailed, unless otherwise specified in the Contract documents or the Bills of Quantity.

The Contractor shall provide, to his own design as approved by the Project Manager, a site laboratory for carrying out sampling and testing as required by the technical specifications.

The location shall be as close as possible to the work being done in order to provide continuous control over material being used. The laboratory shall not be removed from the project until so ordered by the Project Manager.

The size and layout of the laboratory shall be suitable to carry out all sampling and testing of materials and workmanship. It shall contain special storage rooms for samples of materials etc., as approved by the Project Manager.

The Contractor shall provide the equipment and consumables necessary for carrying out the sampling, testing and recording required by the Technical Specification and additional numbers of tests instructed by the Project Manager.

The Contractor shall provide a sufficient number of qualified personnel to perform sampling and testing duties when so directed by the Project Manager. The Contractor shall bear all the costs pertaining to

obtaining specimens of materials, asphalt mixes and samples cut from the paving courses after compaction, including the provision of necessary equipment and plant for obtaining these specimens and samples and transporting them to the laboratory and for conducting all tests, all as directed by the Project Manager.

The Contractor shall provide a suitable vehicle as approved by the Project Manager with competent driver and including fuel, maintenance, insurance and licensing during the contract period for the exclusive use of the site laboratory. The vehicle should be capable of transporting the driver plus 4 people and samples of materials to be delivered to the site laboratory.

The Contractor shall also provide mobile facilities for sampling and testing which can be carried out in the field at the location of works.

The laboratory shall be maintained in a clean and tidy condition to the satisfaction of the Project Manager.

The laboratory shall be completed and ready for use within 4 weeks of the Start Date. If the Contractor commences any selection or testing of materials for submission to the Project Manager for approval of any permanent works before the 4 weeks period, temporary testing facilities, if approved by the Project Manager, may be used.

The Contractor shall allow the Project Manager to carry out his own tests for the Contract, using the Contractor laboratory, his equipment, consumables etc., or to have tests carried out by the Contractor's staff

The facilities provided by the Contractor for the Site laboratory shall remain as the property of the Contractor and the Contractor shall remove facilities after completion of the project and receiving final acceptance. He shall restore the site to match the adjacent surfaces and materials as approved by the Project Manager.

Approval of the Laboratory. Prior to the start of the work, the Project Manager shall inspect the proposed laboratory to ensure the Contractor's compliance with these Specifications. In the event the Contractor fails to comply with these Specifications at any time during the Contract period, the Project Manager may order any or all of the following:

1. Stoppage of all work until the specifications have been complied with;
2. Stoppage of any portion or phase of the work and the Specifications have been complied with;
3. A penalty assessment of for each day that specifications are not complied with, which shall commence 7 days after notification of such noncompliance

Equipment and required tests for the laboratory. The laboratory shall contain at least the equipment to carry out the following tests:

DETERMINATION OF PARTICLE SIZE DISTRIBUTION, GRANULOMETRIC ANALYSIS (SIEVING METHOD)
DETERMINATION OF PARTICLE DENSITY
DETERMINATION OF PARTICLE SHAPE OF COARSE AGGREGATE - FLAKINESS INDEX
DETERMINATION OF BITUMEN CONTENT AND GRADATION OF THE ASPHALT CONCRETE MIX
COMPACTION OF BITUMINOUS MIXTURES USING MARSHALL APPARATUS
MAXIMUM DENSITY OF PAVING MIXTURES (% VOIDS)
SBULK SPECIFIC GRAVITY OF BITUMINOUS PAVING MIXTURES USING SATURATED DRY SPECIMEN
PERCENT OF AIR VOIDS IN COMPACTED DENSE AND OPEN BITUMINOUS PAVEMENTS
DETERMINATION OF NEEDLE PENETRATION
MOISTURE-DENSITY RELATIONSHIP
DENSITY OF SOIL IN-PLACE BY THE RUBBER BALLOON METHOD
DETERMINATION OF THE RESISTANCE TO ABRASION
MARSHALL STABILITY

Laboratory equipment will not be required, if the contractor has his testing performed by an independent laboratory approved by the Project Manager

Measurement

There will be no measurement of this item.

Payment

Costs associated with this task will be considered as being included in the related pay items for the construction works.

Record Drawings

1.05.01 Description

The Contractor shall prepare and furnish the Project Manager with accurate record for reconstruction roads and streets drawings to full size and scales as otherwise stipulated showing complete Works as executed with existing and finished levels (top, invert and formation levels, plans, cross and longitudinal sections, locations of all functions, manholes, inlets, extent of concrete beds and structures and all things necessary to form a complete record of the finished Works). Also to be shown are the locations of existing utilities. The Contractor shall provide plans with longitudinal profile and cross sections for sections where asphalt concrete and surface treatment works have been carried out.

The Contractor shall prepare all record drawings to provide accurate and complete record drawings acceptable to the Project Manager. During the course of the work, the Project Manager shall have the right to call for record drawings at any time so that he may check them for accuracy and completeness. The Contractor shall provide a minimum of two prints of each record drawing for this purpose. The Contractor shall finish the record drawings as specified within five days of the date of the request to submit in writing by the Project Manager.

Drawings shall be dated and signed by the Contractor's representative and, if approved, by the Project Manager. The Contractor shall furnish three hard copies of the drawings and three CD's of electronic versions such as AutoCad files, in both English and Georgian languages.

1.05.02 Final submittal

In addition to any record drawings required during the course of work by the Project Manager, as it is described in the section above, the Contractor shall supply to the Project Manager, record drawings, of quantity scale, and schedule as follows:

- (1) One complete (1) set record drawings, full size reproducible
- (2) One complete (1) set record drawings, full size reproducible (for the Project Manager).

Measurement

There will be no measurements of this item.

1.05.04 Payment

There will be no payment for the work of this section. Costs associated with this task will be considered as being included in the related pay items for the construction work. The final certificate of payment will not be issued until all required record drawings have been approved and supplied to the Project Manager.

1.06 Traffic Management

1.06.01 Description

The Contractor shall, based on due consultation with and requirements of the Police and relevant Local

Authorities, submit a traffic management plan for the Project Manager's consent within 28 days prior to the commencement of any works affecting public or private rights of way. This shall show the proposed scheme of traffic safety and management measures including all construction details, temporary lighting and signing, and programme of works. Thereafter the Contractor shall provide such further details as necessitated by the Works or required by the Project Manager.

The work consists of controlling and protecting public traffic adjacent to and within the project according to the active traffic rules and regulations in Georgia.

1.06.02 Accommodating Traffic During Work

The Contractor shall provide safe movement of vehicles and pedestrians through work zones in accordance to BCH 37-84. The Contractor shall submit traffic control implementation drawings and alternate traffic control proposals including the following:

- 1) A detailed diagram, which shows the location of all traffic control devices, including advance construction signs and speed limit signs, method, length and time duration for lane closures; and location of flaggers and time duration of flagging operation.
- 2) A tabulation of all traffic control devices shown in the detail diagram.
- 3) An access maintenance plan for all properties requiring access during construction. This plan shall also indicate the areas where equipment will be stored, vehicles parked, construction signs and materials stored, if within the construction site limits. The Contractor shall also indicate ingress and egress to the construction site unless otherwise approved.
- 4) A pedestrian traffic control plan.

The work should be performed in a manner that assures the safety and convenience of the public and protects the residents and property adjacent to the works. Accommodate public traffic on roads within the project until the work is accepted. The contractor will cooperate with local traffic police and obtain all permission required to implement traffic control plan. All lane closures shall be subject to the approval of Project Manager. Request for each lane closures shall be made at least twenty-four hours in advance of the time the lane closure is to be implemented. Lane closures will not be allowed to remain for more than needed for work execution.

Maintaining Roadways During Work.

Perform roadway maintenance as follows:

- a) Maintain intersections with trails, roads, streets, enterprises, parking lots, residences, guarantees, farms, and other objects.
- b) Remove accumulations of soil and other material from travelled way.

The Contractor shall maintain the roadway in a safe and acceptable condition. If corrective action is requested and the corrective action is not taken immediately, the condition may be corrected and the Contractor will be charged for the cost of the corrective action.

Maintain Roadways during suspension of works

Maintain Roadway for public traffic during all work suspensions.

1.06.05 Limitations on construction operations.

When the traffic way is open for public traffic, restrict the construction operations as follows:

- (a) Operate equipment in the direction of traffic;
 - (b) Complete construction of adjacent traffic lanes to the same elevation each day, except that differences in excess of 75 mm with a 3:1 fillet may be left overnight with "Uneven pavement" warning
-

signs

- (c) Complete the construction of shoulders to traffic lanes to the same elevation within the period of time specified by the project manager. Sign shoulder drop of in excess of 75 mm with a warning sign “Road Works” and plate “Low Shoulder”.
- (d) Provide minimum lane width of 3.5 meters. Use barricades, drums, or other approved device to delineate traffic lanes through areas where the edge of intended path has been obliterated by construction operation
- (e) Locate staging areas at least 4 meters from the traveled way or approved traffic barriers. Obtain approval of the location and access to staging areas. Store unused traffic control devices at staging areas.
- (f) Park equipment at least 4 meters from the traveled way or behind approved traffic barriers.
- (g) Provide parking areas for employees’ personal vehicles in approved areas.
- (h) When switching traffic to a completed lane, provide adequate personnel and equipment to set or relocate traffic control devices.
- (i) Limit construction caused delays to public traffic.
- (j) Install permanent traffic barriers within 30 calendar days of completing the surface course.

Working Hours

The Contractor shall perform construction operations during the hours of daylight (after sunrise to before sunset) or as directed by the Project Manger.

Traffic and Safety Supervisor

The Contractor shall provide a competent Traffic and Safety Supervisor for the project. The Traffic and Safety Supervisor shall:

- a) Have traffic safety training or experience in maintaining traffic control devices and protecting traffic through highway construction projects.
- b) Understand the contract requirements
- c) Understand the uniform requirements for Methods of Roadway Movement of Organization of Roadway Movement, during Roadway Construction, published Moscow 1989.
- d) Inspect the condition and position of traffic control devices in use.
- e) Review the project for traffic control devices needed to maintain safe and efficient traffic movement.
- f) Correct all traffic control deficiencies
- g) Coordinate maintenance of traffic operations with the Project Manager
- h) Review work areas, equipment operation and storage, and material handling and storage related to traffic safety
- i) Conduct weekly traffic safety meetings for contractor’s employees. Advice the Project Manager of improved safety measures. Invite the Project Manger to attend these meetings.

Acceptance

The work will be accepted providing that it has been built in conformance to the plans and specifications pertaining to the segment involved and is accepted by the Project Manger.

1.06.09 Measurement and Payment

Any cost arising from the application of traffic management and maintenance measures shall be included in the Contractor's unit cost, and is not payable as separate item.

Control of Material

1.07.1 Source of Supply and Quality Requirements

The Contractor selects sources and provides acceptable material. Notify the Project Manager of all proposed sources before delivery to the project, to expedite material inspection and testing. The Contractor shall not incorporate material requiring submittal testing into the work until approved.

Material must be approved at the source of supply before delivery to the project. This approval does not constitute the acceptance of material. If an approved source does not continue to supply acceptable material during the life of the project, further use of that source may be denied.

Local Material Source.

Source of rock, sand, gravel, earth, of other natural material location will be used by the permission of the Employer. Indicated sources are listed as information to aid the Contractor in locating a source. The decision to use an unidentified source is solely that of the Contractor.

(a) Employer-listed sources. The Employer may list possible material sources. The Employer makes no representation as to the quality or quantity of material, or rights to the availability of the material from these sources. These sources are considered to be Contractor-located sources under (b) below.

(b) Contractor-located sources. The Contractor is responsible for these sources, including established commercial sources. Use sources that fulfill the contract quantity and quality requirements. Determine the quantity and type of equipment and work necessary to select and produce acceptable material. Secure all clearances for use of the source and provide copies of the document.

Provide laboratory tests report and data indicating the acceptable material is available from the source. Do not use material from a source that is unacceptable to the Employer. Dispose of unacceptable material and locate another source at no cost to the Employer.

Storing and Handling Material

Store and handle material to preserve its quality and fitness for the work. Stored material approved before storage may again be inspected before use in the work. Locate stored material to facilitate prompt inspection.

Use only approved portions of the right-of-way for storing material and placing plants and equipment.

Provide all additional space needed. The Contractor shall not use private property for storage without written permission of the owner or lessee. Restore all Employer provided storage sites to their original condition.

The Contractor is responsible for the security of all stored material.

Use of Material Found in the Work.

The right to use material found in the work does not include the use of material for other work except for the disposal of waste material. Waste material must be disposed on site if approved by the Project Manager. The Contractor shall be responsible for locating and securing off site waste if required, at no cost to the Employer. If the Contractor produces or processes material from Employer lands in excess of the quantities required for the contract, the Employer may:

(a) Take possession of the excess material and direct its use, paying the Contractor only for the cost

of production, or

(b) Require removal, replacement with suitable fill material and recondition of the over excavated area to a satisfactory condition at no cost to the Employer.

1.07.5 Measurement and Payment

No direct measurement and payment shall be done for the work associated with this section.

1.08 Construction Material

1.08.1 Cement

Portland and Masonry Cement

Portland Cement and Masonry Cement shall be according to GOST 10178

Do not use different brands or types of cement, or the same brand or type of cement from different mills without approval of the Project Manager.

Provide suitable means of storing and protecting the cement from dampness. Do not use cement that:

- (a) Has become partially set
- (b) Contains lumps of caked cement
- (c) Is salvaged from discarded or previously opened bags.

1.08.2 Bitumen

Bitumen shall comply with GOST 22249-90 and corresponds to the grade shown on the drawings or listed in the specifications.

Requirements to the quality of heavy bitumen (GOST 22245-90), Table 1

Indices	B 40/60	B 60/90	B90/130	B 130/200	Test Methods
Penetration under 25°C 0.1 mm, not less than 0°C	40-60 13	61-90 20	91-130 28	131-200 35	GOST 11501
Softening temperature	51	47	43	40	GOST 11505
Spreading in cm. not less + 25 °C	45 -	55 3.5	65 4.0	70 6.0	GOST 11505
Brittle temperature not more °C	-12	-15	-17	-18	GOST 11507 Att., 3.2.
Flash point °C	230	230	230	230	GOST 4333
Softening temperature after warm-up,	5	5	5	6	GOST 18180 GOST 11506 Att.,

not more oC					3.3.
Penetration index	From -1.0 to +1.0				Attachm. 2
Water content %, not more	0.30	0.30	0.30	0.30	GOST 11510

Application Temperatures.

Bitumen should be applied under the temperature ranges shown below in accordance with GOST 22245-90.

Bitumen	Application temperature in °C
B 40/60	130 - 150
B 60/90	130 – 150
B 90/130	130 - 150

Bitumen Supply and Quality Control

Bituminous material will be supplied by the Contractor.

The Contractor has to provide for Project Manager's approval quality certificate for each type of bitumen he intends to use as well as a sample for control testing.

1.08.3 Aggregates

Aggregate for Portland Cement Concrete

Aggregate for Portland Cement Concrete shall conform to VSN 24-88 (17.5.21-5.5-23).

Aggregate for Subbase and Base (SNiP 2.05.02-85)

Aggregates shall consist of hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel meeting the requirements of GOST 8267-93.

Furnish a material that is free from organic matter and lumps or balls of clay. Do not use material that break up when alternately frozen and thawed or wetted and dried.

Obtain the aggregate gradation by crushing, screening, and blending processes as necessary. Fine aggregate, material passing the 5 (6) mm sieve, shall consist of natural or crushed sand and fine mineral particles.

Hot Asphalt Concrete and Surface Dressing Aggregates

Aggregate for hot asphalt concrete pavement and surface dressing shall consist of hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel. Crushed gravel must contain completely crushed particles accounting for at least 30 % by weight of particle sizes in excess of 6 mm and completely uncrushed particles accounting for no more than 30 % by weight. The aggregate may not contain any detrimental amount of impurities, such as clay, peat, organic matter etc.

Aggregates for hot asphalt concrete and surface dressing shall meet also the requirements of GOST 8267-93 and GOST 10260-82

The Los Angeles Test Value shall be less than 16 and the Flakiness Index less than 15 for coarse

aggregate. (Strength can be measured by using GOST method, if ball mill apparatus is not available). Aggregate for hot asphalt concrete must be sieved to at least three fractions. Size, grade, and combine the aggregate fractions for the mixture in such proportions that the resulting composite blend conforms to the requirements of section 'Hot Asphalt Concrete Pavement'.

1.08.4 Sand (natural or crushed)

Requirements for fine aggregate in bituminous mixtures are shown in GOST 8736-85. Sand for bed course shall conform to SNiP 3.06.03.85.

1.08.5 Mineral Filler

Mineral filler for hot bituminous mixes shall conform to GOST 16557-78.

1.08.6 Water

Only potable water may be used. Water used for concrete shall meet the requirements of GOST 23732-79.

1.08.7 Alternative Materials

The Contractor may propose the use alternative materials to the ones specified in the design. In these cases, the Contractor shall inform the Project Manager about his technical proposal at least 4 weeks before the material is to be used.

1.08.7 Measurement and Payment

No direct measurement and payment shall be done for the work associated with this section. Cost for material, including supply, handling, transport storage, etc. will be considered as being included in the related pay items for the construction works.

1.09 Possession of Site

1.09.1 Description and Requirements

The operations of the Contractor shall be confined to the area of and immediately adjoining the works included in this Contract. Clearance shall be kept to the satisfaction of the Project Manager to permit the statutory authorities or other Contractors to enter the site to carry out other works and to maintain the free flow of traffic so far as is practical with safety on the existing carriageway.

The Contractor shall obtain the approval of the Project Manager for the setting of temporary roads, diversions, paths etc., necessary for the execution of the Contract.

The Contractor must allow for safe crossing by construction traffic of existing roads and tracks.

Where it is necessary to work outside the road reserve and to enter either private or occupied land during the course of road construction or maintenance for the purpose of making temporary road diversions, widening road construction or maintenance materials or for any other reason, the land owner or occupier shall first be consulted by the Contractor and his written permission obtained.

In the event of the owner or occupier withholding their permission, the full circumstances of the case shall be referred to the Project Manager and no further action shall be taken until his instructions are received. In that case the Contractor will not be liable for compensation for idle time.

When the Contractor intends to move his establishment to a new location during the construction period, advance notice of at least 14 days must be given to the Project Manager. The Contractor must allow in his rates for such intended moves.

1.09.2 Measurement and Payment

No direct measurement and payment shall be done for the work associated with this section.

1.10. Health, Safety and Accidents

1.10.1 Description and Requirements

The Contractor shall ensure, so far as is reasonably practicable and to the satisfaction of the Project Manager, the health, safety and welfare at work of his employees including those of his sub-contractors and of all other persons on the Site. His responsibilities shall include:

- the provision and maintenance of Constructional Plant and systems of work that are lighted, safe and without risks to health;
- the execution of suitable arrangements for ensuring safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;
- the provision of protective clothing and equipment, first aid stations with such personnel and equipment as are necessary and such information, instruction, training and supervision as are necessary to ensure the health and safety at work of all persons employed on the Works all in accordance with Laws and all local Bye-Laws;
- designation as Safety Officer of one of his senior staff who shall have specific knowledge of safety regulations, and experience of safety precautions on similar works and who shall advise on all matters affecting the safety of workmen and on measures to be taken to promote such safety;
- the provision and maintenance of access to all places on the Site in a condition that is safe and without risk of injury;
- the provision of adequate water-borne sanitation, refuse collection and disposal, complying with the Laws and all local Bye-Laws and to the satisfaction of the Project Manager, for all houses, offices, workshops, and laboratories erected on the camp site or sites;
- the provision of suitable latrines and other sanitary arrangements at sites where work is in progress to the satisfaction of the Medical Officer in the area and of the Project Manager;
- the execution of appropriate measures in consultation with the appropriate Public Health Authority to control within the Site, including the camp sites, mosquitoes, flies and pests including the application of suitable chemicals to breeding areas;
- reporting details of any accident to the Project Manager as soon as possible after its occurrence.

Measurement and Payment

There will be no measurement and payment for this item. Costs associated with this task will be considered as being included in the related pay items for the construction work.

Environmental Protection

This section describes the environmental mitigation requirements to be followed by the Contractor and measures to be carried out by the Contractor related to environmental protection.

Georgian law and regulations shall be followed in environmental protection as well as the following standards:

GOST 17.2.3.02-78

GOST 17.0.0.04.90

The Contractor shall execute all works and take any measures for the environmental protection and impact mitigation, either for the construction period or for the operation period, in full compliance with the relevant local legislation and norms in force. He shall obtain all the necessary updated information about the Organization for Environmental Protection in Georgia and obtain all the necessary authorizations and carry out complementary studies whenever necessary. He shall obtain environmental approvals for all the temporary works.

During the works, and including the maintenance period and the site mobilization activities, the Contractor and his Sub-contractors in compliance with the norms and regulations in force shall implement the following mitigation measures:

Reduction of the Equipment and Plant noise when working in urban areas and in proximity to occupied buildings.

Optimal location for crushers, bitumen plants, batching plants and other similar plants, in order to minimize their adverse impact on the natural, human and social environments.

Enforcement of an adequate traffic management plan, to minimize the disturbance caused by the site traffic and to safeguard the safety of the public and the Contractor's labor.

Protection of rivers, lakes, lands in crop and any areas surrounding the Site, against any pollution, which may be originated either from the permanent road works or from the other activities, related to the Contractor's organization.

Control of the method of storage of materials, with a strict observance of the standards, specifications, regarding the most sensitive items, such as fuel, bitumen, lubricants, cement, explosive, etc.

Protection and accurate reinstatement at the end of the works of borrow pits, quarries, services and diversion roads, and any other temporary or preparatory work.

Reduction of the pollutant's, emissions, when they reach the admissible levels, in accordance with Georgia current legislation and norms.

Any other action, which might be necessary, in accordance with the Project Manager instructions and as required by the current Georgian legislation.

The Contractor shall, at the request of the Project Manager, carry out whatever environmental measurements are required to demonstrate that the requirements of this Clause are being respected. The tests shall be carried out at the location and in the time required by the Project Manager and the Contractor shall carry out such tests at his own expenses with instruments supplied by him.

1.11.1 Noise Control

The Contractor shall follow all the existing laws and regulations concerning the noise control in construction works, asphalt plant and borrow pit activities. The Contractor shall submit a plan to the relevant authorities indicating the type of installation and their respective locations e.g. asphalt plant, mixing plant etc, which is subject for to approval before commencement of the works.

1.11.2 Dust Control

The Contractor shall submit a plan indicating the proposed routes for material transport and make statements on the proposed method of dust control where transport through settlements cannot be avoided.

1.11.3 Management of Solid Waste from Construction and Construction Camps

General

- i) Wherever possible recycling / re-use of materials shall be considered.
- ii) As a rule, solid wastes generated during the construction phase shall be systematically collected, stored and disposed of in suitable locations as agreed with the Project Manager.

Construction Debris (waste from bridge demolition, the replacement of culverts, crash barriers or handrails from bridges etc.) shall generally be removed from the site in an orderly manner and disposed off site in accordance with existing regulations .

Clean soil material, i.e. later indicated as Spoil Material that is not reusable shall be removed from the site and transported to soil dumping areas approved by the Project Manager.

Domestic waste from temporary construction camps shall be systematically collected and hauled to the designated areas approved by the Project Manager. Should construction camps be erected within a reasonable distance to larger settlements, camp's solid waste may be integrated into existing collection and disposal facilities of nearby communities subject to their approval.

1.11.4 Protection of Water Resources

- (i) During construction, the Contractor shall carry the full administrative and legal responsibility for any pollution of surface waters due to any reason associated with the Works, according to the existing

legislation.

The Contractor shall ensure that no oil products, fuel, lubricants, detergents, paint or other harmful substances are introduced into streams, rivers, lakes and irrigation or drainage facilities.

The storage of wastes or production waste as well as filling and parking of machinery or cars is not permitted within a distance of 100 metres of any stream, river or lake including drainage or irrigation facilities. The discharge of oil and fuel onto open soils is prohibited. Fuelling, oiling or lubricating of any machinery shall be restricted to stationary and or mobile filling stations and shall exclusively be carried out by using suitable taps or nozzles. The Contractor shall make all necessary arrangements to ensure that pollution of soils and groundwater will be avoided as far as possible. Mobile filling stations shall carry drip trays that shall be placed below the filling point before any operation begins.

iv) The Contractor shall submit a plan to the relevant authorities indicating the type of installation and their respective locations e.g. fuel and material storage, stationary filling sites, asphalt plant, mixing plant, car wash facilities etc. For each installation the Contractor shall indicate the approximate closest distances to irrigation and drainage channels as well as public or private wells. For each installation beforehand the Contractor shall indicate in written form to the Project Manager in addition to the above the approximate closest distance, which shall be not less than 250 m, to any specified green or protected areas.

v) The direct discharge of sewage from worker's camps into any stream is prohibited. Sewage from these installations shall be collected in septic tanks or soaking pits.

Measurement

There will be no measurement for environmental protection measures.

Payment

There will be no payment for this item. Costs associated with this task will be considered as being included in the related pay items for the construction work.

1.12 Basic Survey and Setting Out

1.12.1 Description

This section covers the setting out of the horizontal alignment, taking and setting levels (survey beacons) and the general site clearance, stripping of topsoil and removal of bushes and trees, structures and other obstructions.

1.12.2 Basic Survey

The Project Manager will provide sufficient basic survey information to enable the Contractor to set out the Works and the Contractor shall be responsible for setting out all necessary reference points and for the maintenance thereof.

Should the Contractor discover any error in line level, or dimension in the basic survey information provided by the Project Manager, he should at once notify the Project Manager. If the information is confirmed to be in error the Project Manager will issue amended drawings or instructions regarding the correction of the error.

Prior to commencing construction, the Contractor shall establish reference points to define the road construction limits at 100 m intervals on both sides or at other intervals instructed by the Project Manager.

The Contractor shall establish temporary bench marks along the road at intervals not exceeding 200 m and shall provide the Project Manager with a schedule of their levels and locations.

1.12.3 Detailed Setting out

The Contractor shall set out the line and level of the Works at intervals of not more than 25 m or such

lesser intervals as are required to construct the Works. Reference pegs clearly and indelibly marked with all relevant information shall be provided clear of the road and at right angles to it from which the centre line and level can be re-established at any time. These shall be maintained by the Contractor for as long as they are needed by the Project Manager to check the work.

1.12.4 Levels

After completion of setting-out and site clearance, the Contractor shall take ground cross-sections at intervals of 25 m, or such intervals as the Project Manager may require, and these shall be plotted and submitted to the Project Manager for agreement. If the Contractor fails to take the requisite levels, levels determined by the Project Manager shall be taken as correct.

The Contractor shall programme for a period of 21 days between submitting the ground cross-sections and being issued with final road levels. Final road levels will be determined by the Project Manager after studying the original ground cross-section levels following site clearance and may be different from the road levels shown on the drawings.

1.12.5 Survey Beacons

The Contractor shall not remove, damage, alter or destroy in any way any plot beacons, survey beacons of the National Survey of Georgia or those reference beacons positioned by the Design Consultants for this project.

Should the Contractor consider that any beacon will be interfered with by the works he shall notify the Project Manager who, if he considers necessary, will make arrangements for the removal and replacement of the beacon.

If the Contractor removes or disturbs a beacon without permission of the Project Manager, he shall be liable for the full cost of its replacement and, as appropriate, a fine under the Survey Ordinance in force.

Measurement and Payment

The units of measurement for basic survey and detailed setting out shall be kilometer.

The accepted quantity, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section. Payment will be made under:

Pay Item	Pay Unit
Basic survey and setting out	kilometer

SECTION 2, PREPARATORY WORKS

2.01 Site Clearance

2.01.1 Description

This section covers general site clearance, and removal of bushes and trees, structures and other obstructions

2.01.2 Construction Requirements

No clearance or alteration to any main service or apparatus shall be done unless specifically ordered by the Project Manager.

Site clearance is defined as the clearing, grubbing, removal and disposal of all vegetation, grass, debris, bushes, scrub, dense bush, trees, hedges, undergrowth, stumps, roots, shrubs, plants and backfilling of holes left by the removal of stumps and roots.

The width and length over which site clearance is to be carried out shall be shown on the Drawings or instructed by the Project Manager.

Site clearance over the area of quarries, borrow pits, stockpiles, spoil tips, road junctions, ditches and drains and other areas shall be carried out where shown on the Drawings or instructed by the Project Manager.

The Project Manager may give instructions that specific trees, stumps or objects shall not be removed during the site clearance operation.

Dispose of clearing and grubbing debris off the project site to a dump area approved by the Project Manager.

2.01.3 Acceptance

The work will be accepted for payment providing it has been done in conformance to the plans and specifications pertaining to the segments involved and is approved by the Project Manager.

2.01.4 Measurement

Site clearance will be measured by area.

2.01.5 Payment

The accepted quantity, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section. Payment will be made under:

Pay Item	Pay Unit
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Site Clearance	hectare
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2.02 Clearing and Re-grading of Existing Ditches

2.02.1 Description

This work consists of all clearing, grubbing and re-grading of existing ditches for the project.

2.02.2 Construction Requirements

Clear, grub and re-grade as required for ditches. Remove debris by methods that prevent damage to

vegetation not be removed. Dispose of clearing and grubbing debris off the project site to a dump area approved by the Project Manager.

Slope, grade, and shape existing ditches. Remove all roots, stumps, rock, or similar matter. Maintain all ditches in an open condition and free from leaves, sticks, and other debris.

2.02.3 Acceptance

The work will be accepted for payment providing it has been done in conformance to the plans and specifications pertaining to the segments involved and is approved by the Project Manager.

2.02.4 Measurement

Clearing, grubbing and re-grading existing ditches will be measured by cubic meter.

2.02.5 Payment

The accepted quantity, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
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Clearing of existing side drains and ditches	cubic meter
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2.03 Removal of Structures, Obstructions and Trees

2.03.1 Description

This work consists of salvaging, removing, and disposing of trees; signs and posts; sign pole mounts, and any other obstructions.

2.03.2 Material

Material shall conform to the following Subsection 'Backfill material'

2.03.3 Construction Requirement

Salvaging material. Salvage, with reasonable care, all material designated to be salvaged. Salvage in readily transportable sections or pieces. Replace or repair all members, pins, nuts, plates, and related hardware damaged, lost or destroyed during the salvage operations. Wire all loose parts to adjacent members or pack them in sturdy boxes with the contents clearly marked.

Stockpile salvaged material to a designated area on the project.

Removing Material. Saw cut curbs and pavements when partial removal is required. Except in excavation areas, backfill and compact cavities left by removal of structures with backfill material in horizontal layers not exceeding 20 cm in depth. Bring backfill up evenly on all sides of the cavity and/or structure as appropriate. Extend each layer to the limits of the excavation or to natural ground. Compact backfill with small approved mechanical or vibratory compactors.

Cutting of trees. Remove trees designated by the Project manager. Trunks of the trees and major roots shall be removed under travelled way and shoulders to 1 m depth from surface of the road. On other areas trees shall be cut to the same level as the surface of the area. Backfill and compact cavities left by removal with backfill material to the level of the finished ground.

Disposing of Material. Dispose of material not designated for salvage as follows:

(a) Removal from the Project. Make necessary arrangements with property owners and haul debris to suitable disposal locations. Furnish a signed copy of the disposal agreement to the Project Manager.

(b) Burn. Obtain necessary burning permits. Furnish a copy of the burning permits to the Project Manager before burning begins. Use high intensity burning processes that produce minimal emissions. Provide a competent watch person during the burning operation. When burning is complete, extinguish the fire. Dispose of unburned material according to (a) above.

2.03.4 Acceptance.

Removal of trees, signs, posts, sign pole mounts, and all other obstructions will be accepted, provided it will be carried out in conformity with Design, Specifications and approved by the Project Manager.

2.03.4 Measurement

Removal of signs, trees, posts and sign pole mounts will be measured by their number and shall include clean-up of burn piles, backfilling of holes as required, replacement of curbs and paying removed for access and replacement of missing parts. Removal of fences will be measured by length or by volume.

2.03.5 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the Bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Demolition of bus stops	each
Remove signs	each
Remove sign pole mounts	each
Remove trees	each
Remove fence	linear meter / cubic meter
Demolition of concrete walls	cubic meter
Demolition of reinforced culverts	cubic meter

2.04 Utilities

2.04.1 Description

The work under this Section includes but is not limited to the relocation, replacement and rerouting of all utilities located on the Project. The contractor is responsible for working closely with any utility company having their infrastructure located within the public right-of-way.

2.04.2 Material

Materials used in the repairing, replacing, rerouting of any utility company's equipment shall be compatible with the existing utility and approved by the utility company's representative.

2.04.3 Construction Requirements

Before any construction is begun the Contractor shall notify the utility companies of the proposed work area and request that they mark the location of any types of equipment in the area.

The Contractor shall establish the position of existing services such as pipelines, sewers, surface water drains, cables for electricity and telephones, overhead lines and water mains, before starting any excavation or other work likely to damage them.

The Contractor shall be responsible for arranging in liaison with the appropriate Authority, the moving of

or alterations to services such as pipelines, power and telephone lines, water mains, sewers and surface water drains which are affected by the Works. The arrangements for such moving or alteration shall be subject to the agreement of the Project Manager and the appropriate Authority.

The Contractor is responsible for any and all damage caused to any utility during construction and shall repair them with his equipment or, if the utility company desires, they shall be allowed a free use of his equipment and personnel as required in order to complete repair works.

Should the utility company chose to repair the damaged utility themselves costs incurred shall be the responsibility of the Contractor.

If any utility equipment is encountered in the proposed work area the Contractor shall submit to the Project Manager for approval his proposal to relocate the utility outside the construction limits in writing. This proposal shall include, but not be limited to the proposed duration of the works, plans and details of a new utility route, materials to be used, together with any required certification that the material meets the utility company's specification and details of protection methods to be used for any utility materials to be left in place. After the utility has been rerouted the interested utility company shall be notified to inspect the work prior to commencing the backfill operation. The Contractor shall take all necessary steps required and as directed by the Project Manager to ensure that all utilities are protected from damage by frost.

2.04.4 Measurement

Measurement for relocation and protection-in-place of electrical utilities will be measured by the length. Communication cables will be measured by length.

2.04.5 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Demolition of existing wooden electricity post	each
Relocation of RC electricity post	each
Relocation and protection-in-place of gas pipe	linear meter
Relocation and protection-in-place of electrical cable	linear meter
Relocation and protection-in-place of communication cable	linear meter
Construction of duct crossings	linear meter

SECTION 3, EARTHWORKS

3.01 Cut and fill

3.01.1 Description

This type of works include all works on road sub-grading, excavation, embankments (soil replacement, layer by layer placing and soil compaction, road-bed layout and slope grading) in accordance to designed profiles.

3.01.2 Definitions

(a) Excavation. Excavation consists of the following:

(1) Roadway excavation. All material excavated from within the right-of-way or easement areas, except subexcavation specified below in (2). Roadway excavation included all material encountered regardless of its nature or characteristics.

(2) Unsuitable material excavations. Unsuitable material excavated from below subgrade elevation or from below the natural ground in embankment sections. Excavation does not include conserving the top soil.

(3) Borrow excavation. Material used for embankment construction that is obtained from outside the right of way limits of the project road. Borrow excavation includes unclassified borrow, select borrow, and select topping.

(b) Embankment construction shall be done following the requirements of SNiP 2.05.02-85.

(c) Embankment material.

There is no limitation in using of soils and slag that change their strength and stability only slightly under the influence of weather and climate. Where rock-fill is being used, a leveling course of not less than 0.5 m in thickness shall be provided on the fill between embankment and road pavement. The material for this layer should be of uniform grain size not exceeding 0.2 m in size. When the soil embankment is designed, if the moisture content of the material exceeds the permissible limit, arrangements to provide the required stability of subgrade shall be foreseen in accordance with Clause 6.31 of SNiP 2.05.02-85.

Permissible soil moisture content during the compaction

Soil type	Permissible moisture content W _{opt} in percentage of optimal moisture content under the required degree of compaction mb			
	1.0	1.0-0.98	0.9	0.90
Clayey sand; light, coarse-grained loamy sand	1.3	1.35	1	1.6
Light and clayey loamy sand	1.20	1.25	.	1.6
Heavy clayey loamy sand and light clayey loam	1.10	1.15	6	1.50
Heavy loam and heavy clayey loam, clay	1.0	1.05	1	1.30
			.	
			3	
			5	
			1	
			.	
			3	

			0	
			1	
			2	
			0	

The upper layer of subgrade (operational layer) shall consist of non-swelling and non-subsidence soil (SNiP 2.05.02.-82 Attachment tables 4, 5)

Soil variety (under 0.5 Wo moisture content)	Relative deformation of swelling, thickness % of moistening layer)	Soil variety	Coeffici ent of subsiden ce	Relative deformation of subsidence, thickness % of wetting layer
non- swelling	less than 2	Non- subsiden ce	aver.moi st. 0.92	Less than 2

(d) Conserved topsoil. Excavated material conserved from the excavation and embankment foundation areas that is suitable for growth of grass or other cover plants. A material reasonable free from hard soil, rock, clay, toxic substances, litter, or other deleterious material shall be used according to SNiP 3.06.03-85 and SNiP 2.06.02-85.

3.01.3 Material

Material shall conform to SNiP 2.05.02-85 and SN 449-72

3.01.4 Construction Requirements

Preparation for Roadway Excavation and Embankment Construction.

Clear the area of vegetation and obstructions according to section 'Site Clearance' and 'Clearing and Re-grading of Existing Ditches'.

Conservation of Topsoil. Conserve topsoil from roadway excavation and embankment foundation areas. Stockpile conserved topsoil in wind rows immediately beyond the rounding limits of cut and embankment slopes or in other approved locations. Separate topsoil from other excavated material.

Roadway Excavation. Excavate according to SNiP 3.06.03-85. The preparation of subgrade for earthworks shall be done in accordance with 4.6-4.12 of SNiP 3.06.03-85, and excavation and embankment works in accordance with 4.13-4.25 and 4.51-4.56 of SNiP 3.06.03-85. The compaction degree of subgrade, defined by compaction ratio, shall meet the requirements of SNiP 2.05.02-82 table 22.

Material Replacement. Excavate unsuitable material to the limits designated by the Project Manager. Prevent unsuitable material from becoming mixed with the backfill. Dispose of unsuitable material as approved by the Project Manager. Backfill the subexcavation with topping, or other suitable material. Compact the material according to Subsection 'Compaction' below.

Borrow Excavation. Do not use borrow excavation until all suitable roadway excavation is used. Use select borrow and select topping as shown on the plans. All excess borrow excavation will be deducted from the appropriate borrow excavation quantity.

Obtain borrow source approval according to Subsection 'Local Material Sources'. Develop and restore Government located and provided borrow sources as approved by the Project Manager. Do not excavate beyond the established limits. When applicable, shape the borrow source to permit accurate measurements when excavation is complete. The borrow pit shall be landscaped after the excavation.

3.01.5 Preparing Foundation for Embankment Construction.

Prepare the foundation for the embankment construction as follows:

- (a) Embankment less than 1.2 m high over natural ground. Completely break up the cleared ground surface to a minimum depth of 150 mm by ploughing or scarifying. Compact the ground surface according to Subsection 'Compaction' below.
- (b) Embankment less than 0.6 m high over an existing asphalt, concrete, or gravel road surface. Scarify gravel roads to a minimum depth of 150 mm. Scarify or pulverize asphalt and concrete surfaces to 150 mm below the pavement. Reduce all pieces to a maximum size of 150 mm and a uniform material, prior to placing embankment.
- (c) Embankment across ground not capable of supporting equipment. Dump successive loads of embankment material in a uniformly distributed layer to construct the lower position of the embankment. Limit the layer thickness to the minimum depth necessary to support the equipment.
- (d) Embankment on an existing slope steeper than 3:1. Cut horizontal benches in the existing slope to a sufficient width to accommodate placing and compacting operations and necessary equipment. Bench the slope as the embankment is placed and compacted in layers. Begin each bench at the intersection of the original ground and the vertical cut of the pervious bench.

3.01.6 Embankment Construction.

Construct embankment conforming to the requirement of SNiP 3.06.03-85.

3.01.7 Compaction.

Compact as follows:

- (a) Rock embankment. Adjust the moisture content of the material to a moisture content suitable for compaction. Compact each layer of material to the full width with:

Two passes of 20 - 25 t compression-type roller, or

Two passes of a vibratory roller having a minimum dynamic force of 18 t impact per vibration and a minimum frequency of 1,000 vibrations per minute, or

Eight passes of 9 t compression-type roller or

Eight passes of a vibratory roller having a minimum dynamic force of 13.6 t impact per vibration and a minimum frequency of 1,000 vibrations per minute.

Proportion the compactive effort for layers deeper than 300 mm as follows:

For each additional 150 mm or fraction thereof, increase the number of roller passes in (1) and (2) above by two.

For two additional 150 mm or fraction thereof, increase the number of roller passes in (3) and (4) above, by four.

Operate compression-type rollers at speeds less than 6 km/h and vibratory rollers at less than 2.5 km/h.

- (b) Earth embankment. Adjust the moisture content of the material to within 2 per cent of the optimum moisture content. Determine the optimum moisture content according to AASHTO T 180-93 use Method C or Method D as appropriate (GOST 22733-77 is also acceptable).

Compact material placed in all embankment layers and the material scarified to a uniform density of not less than 95 per cent of the maximum density. Determine the maximum density according to AASHTO T 180-93. When more than 50 per cent of the material passes the No. 4 (4.75 mm) sieve, use Methods C. Use Method D for earth with 50 per cent or more retained on the No. 4 (4.75 mm) sieve. The maximum density may be determined in conformity with GOST 22733-77, if approved by the Project Manager.

Determine the in-situ density and moisture content using AASHTO T 205-86 or other approved test procedures. When required, use AASHTO T 224-86 to correct for coarse particles. The density and moisture content may be determined in conformity with GOST 5180-84 and using Kovalev device if approved by the Project Manager.

3.01.8 Ditches

Slope, grade, and shape ditches. Remove all projecting roots, stumps, rock, or similar matter. Maintain all ditches in an open condition and free from leaves, sticks and other debris.

Form furrow ditches by plowing or using other acceptable methods to produce a continuous furrow. Place all excavated material on the downhill side so that the ditch is approximately 500 mm below the crest of the loose material. Clean the ditch using a hand shovel, ditcher, or other suitable method. Shape to provide drainage without overflow.

3.01.9 Sloping, Shaping, and Finishing.

Slope, shape, and finish according to SNiP 3.06.03-85.

3.01.10 Measurements

Measurements will be made as follows:

(A) Roadway excavation. When a roadway excavation pay item is shown in the bid schedule and there is no pay item for embankment construction, measurement will be by volume as follows:

(1) Roadway excavation will include the following volumes:

- (a) Roadway prism excavation.
- (b) Rock material excavated and removed from below subgrade in cut sections.
- (c) Unsuitable material below subgrade and unsuitable material beneath embankment areas when a pay item for subexcavation is not shown in the bid schedule.
- (d) Ditches, except ditches measured under a separate bid item.
- (e) Conserved topsoil
- (f) Borrow material used in the work when a pay item for borrow is not shown in the bid schedule.
- (g) Loose scattered rocks removed and places as required within the roadway.
- (h) Conserved material taken from stockpiles and used in the work.
- (i) Slide and slipout material not attributable to the Contractor's method of operation.

(2) Roadway excavation will not include the following:

- (a) Overburden and other spoil material from borrow sources.
- (b) Overbreakage from the backslope in rock excavation.
- (c) Water or other liquid material.
- (d) Material used for purposes other than required.
- (e) Roadbed material scarified in place and not removed.
- (f) Material excavated when rounding cut slopes.
- (g) Preparing foundations for embankment construction.
- (h) Material excavated when benching for embankments.
- (i) Side or slip out material attributable to the Contractor's method of operation.
- (j) Conserved material stockpiled at the option of the Contractor.
- (k) Material excavation outside the established slope limits.

(B) Material Replacement. When a subexcavation (replacement of roadbed soil) pay item is shown in the bid schedule, measurement will be by volume in-situ.

(C) Borrow excavation. When a borrow excavation pay (unclassified borrow, select borrow, and select topping) is shown in the bid schedule, measurement will be by volume in-situ or by weight. If borrow excavation is measured by volume, take initial cross-section of the ground surface after stripping overburden. Upon completion of excavation, re-measure cross-sections or take comparable measurements.

(D) Embankment construction. When an embankment construction pay item is shown in the bid schedule, measurement will be by volume in final position. No measurements will be made for roadway excavation

except as described in (3) below. No deductions will be made from the embankment construction quantity for the volume of minor structures.

(1) Embankment construction will include the following volumes:

- (a) Roadway embankments.
- (b) Materials used to backfill subexcavated areas, holes, pits, and other depressions.
- (c) Material used to restore obliterated roadbeds to original contours.
- (d) Material used for dikes, ramps, mounds, and berms.

(2) Embankment construction will not include the following:

- (a) Preparing foundation for embankment construction.
- (b) Adjustments for subsidence or settlement of the embankment or the foundation on which the embankment is placed.

(3) When embankment construction and roadway excavation pay items are shown in the bid schedule, roadway excavation will be measured by volume and include only the following:

- (a) Unsuitable material below subgrade and unsuitable material beneath embankment areas when a pay item for subexcavation is not shown in the bid schedule.
- (b) Slide and slip out material not attributable to the Contractor's method of operations.
- (c) Drainage ditches, channel changes and diversion ditches.
- (d) Furrow ditches. Furrow ditches will be measured by length.
- (e) Rounding cut slopes. Rounding cut slopes will be measured by length horizontally along the centerline of the roadway for each side of the roadway.

3.01.11 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
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Excavation in road cut	cubic meter
Rock excavation	cubic meter
Provide and place top soil	cubic meter
Provide and place fill for embankment	cubic meter
Excavation of unsuitable material	cubic meter
Embankment construction from road cut	cubic meter
Disposal of unsuitable and surplus material	cubic meter

3.02 Ditches

3.02.1 Description

This work consists of constructing new ditches and provision and installation of rip rap protection where required..

3.02.2 Construction Requirements

Preparation for Ditch Construction.

Clear the area of vegetation and obstructions.

Ditches.

Excavate ditches according to the Drawings. Slope, grade and shape ditches. Remove all roots, stumps,

rock, or similar matter. Maintain all ditches in an open condition and free from leaves, sticks, and other debris. No extra material is allowed to be left on ditch edges.

Rip-Rap

The work shall consist of a protective covering of stone, constructed on an earth bed. Rip-rap shall be constructed at the locations and in conformity with the dimensions shown on the plans or designated by the Project Manager.

Rip-rap materials, for culverts and other drainage work, shall consist of hard and durable field stones, boulders, or quarry rock that is resistant to weathering and water action and free of organic and spoil material. Do not use boulders, shale, or rock with shale seams. Conform to the following:

- (a) Apparent specific gravity, AASHTO T 85 2.50 min.
- (b) Absorption, AASHTO T 85 4.2% max.
- (c) Coarse durability index, AASHTO T 210 52 min.

The diameter of the largest stone size should be 1.5 times the d50 size.

Excavation for Rip-rap

Aprons and slopes to be rip-rapped shall be excavated to provide adequate foundation upon which the rip-rap shall rest, as shown on the plans or specified by the Project Manager. The whole area to be rip-rapped shall be trimmed to a uniform and even surface. Ensure area is sufficiently stable and compacted to receive the stone.

A geotextile membrane shall be placed on top of the earth bed prior to placing the rip-rap, as shown on the Drawings.

Rip-rap shall be placed in such a manner that all relatively large stones shall be essentially in contact with each other, and all voids filled with the finer materials to provide a well graded compact mass. The stone shall be dumped on the slope in a manner that will ensure the riprap attains its specified thickness. When dumping or placing, care shall be used to avoid disturbing the underlying material. Sufficient hand work shall be performed to produce a uniform surface.

Tolerance for riprap shall be plus 150 mm, with no under-tolerance permitted.

After installation is complete, the area surrounding the rip-rap shall be cleared of all debris.

3.02.3 Acceptance.

Ditched will be accepted if constructed according to the designs and specification and is accepted by the Project Manager.

3.02.4 Measurement

Construction of new ditches will be measured by volume.

3.02.5 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Construction of ditches and side drains	cubic meter
Place and provide rip rap protection	cubic meter

3.03 Milling of Bituminous Bound Pavement

3.03.1 Description

This work consists of milling of existing asphalt pavements, breaking down material and adding gradation as necessary to comply with the requirements of granular subbase and base material.

3.03.2 Construction Requirements

Where cold-milling of bituminous bound flexible pavement is required, the area of carriageway to be milled shall be removed by a suitable milling machine. The process shall be carried out so as not to produce excessive quantities of dust, which shall be minimized by damping with water sprays.

The cut edges shall be left neat, vertical and in straight lines. The Contractor shall brush and sweep the milled surface by mechanical means to produce a clean and regular running surface with a groove depth not greater than 10 mm, and with a uniform texture.

Existing ironwork shall not be disturbed by the milling action. Where necessary, surfacing in the vicinity of ironwork and in small or irregular areas shall be cut out by pneumatic tools or other suitable methods and removed.

Where milling is carried out on a carriageway open to traffic, temporary ramping to ensure the safe passage of vehicles shall be provided.

If the milled surface profile varies by more than 10 mm, when measured transversely or longitudinally by a 3 meter straight edge, adjustments or replacements shall be made to the cutting teeth on the milling drum before work continues. Any discontinuity between adjacent milling passes exceeding 10 mm, when measured transversely by a 3 meter straight edge, shall be rectified by further milling or regulating before placing bituminous materials.

Where milling is required over extensive areas, the Contractor shall programme the work to allow removal of full lane widths unless this is impracticable. The Contractor shall notify his proposed programme of milling to the Project Manager prior to commencement of the work.

Immediately after milling, surplus materials shall be removed by a machine of suitable and efficient design and the milled surface swept to remove all dust and loose debris.

The material removed from the carriageway shall be removed from site, unless otherwise directed by the Project Manager. No stockpiling shall be allowed on Site unless the material is to be used in the Works.

Carriageways which are closed to traffic to permit milling shall be resurfaced after milling prior to reopening the carriageway to traffic unless otherwise agreed by the Project Manager.

48 hours prior to cold-milling the Contractor shall carry out a sweep of the area(s) to locate any buried metalwork within the layer to be cold-milled. The sweep shall be carried out with electronic detection equipment suitable for the purpose. The surface shall be clearly marked above all objects to show their detected extent. The objects shall be referenced and their location and depth reported to the Project Manager within 6 hours of discovery. Surfacing in the vicinity of such objects shall be excavated using pneumatic tools or other suitable methods.

The existing bituminous pavement made from cold asphalt shall be milled and sieved to grading for re-use as subbase material or base material. The existing bituminous pavement material does not conform to any given grading, but consists locally of larger gravel and finer material.

3.03.3 Measurement and Pavement

The measurement of milling of existing asphalt shall be calculated from the area and depth milled in accordance with in the Contract. No deductions shall be made for openings of 1 square meter or less.

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
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Milling of bituminous bound pavement	cubic meter
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SECTION 4, PAVEMENT

SECTION 4, PAVEMENT

4.01 Sealing of Cracks and Joints and Patching (N/A)

4.02 Leveling Courses (N/A)

4.03 Granular Subbase and Base Course

4.03.1 Description

This Section covers the provision, laying and compacting of natural gravel material for sub-base and base courses.

Road base: Part of road structure, which provides distribution of traffic load, as well as reduces the pressure, on sub-base layers of pavement structure or directly on subgrade.

Sub-base layers (frost-resisting -, filter -courses): Layers between subgrade and upper pavement layers providing frost-resistance and drainage of pavement as well as preventing the mixing of pavement structure from subgrade.

4.03.2 Materials

Sub-base layers: Sand and gravel (sand and crushed stone) mix for sub-base layers shall meet the requirements of GOST 25607-83 and of the table 45 of SNiP 2.05.02-85;

Mix Number	Total remainder, % in mass, on sieves of holes size, mm								
	70	40	20	10	5	2.5	0.63	0.16	0.05
1	0	10-20	20-40	25-65	40-75	60-85	70-90	90-95	97-100
2	0	0-5	0-10	10-40	30-70	45-80	60-85	75-92	87-100

Crushed stone (gravel) of mix for additional base layers for roads of I - III categories shall have the strength grade of not lower than 200 (crushability shall be at least 24 for gravel and aggregate made out of gravel).

For filter layers of pavement the sand in accordance with GOST 8736-93 is permissible without additional testing, if the fraction of less than 0.14 mm in grain size is less than 25% of the total mass and clay fraction of no more than 5% of the total mass. The clay fraction for natural sand shall not be more than 0.5% of the total mass and for crushed stone not more than 1%, respectively. The permeability under maximum density shall not be less than 1 m/day (SNiP 2.05.02-85, p.7.49).

Base course: Materials to used for crushed stone and gravel pavement, and for base-course shall meet the requirements of GOST 25607-83 (mix No.3 and 5 for pavement and No.1, 2, 4, 6 and 7 for base-course) (p.7.47 SNiP 2.05.-2-85). Grade on strength and frost-resistance of crushed stone/gravel in the mix shall meet the requirements of table 44 of SNiP 2.05.02-85.

Property indices of stone materials	For pavement	For base
Strength grade of stone crush in saturated state;		
minimum value		
- volcanic and metamorphic rocks	800	600
- sedimentary rock	600	200
Gravel and crushed stone out of gravel	crushability 12	crushability 24
Grade by wear out abrasion, not lower than	abrade III	abrade IV
Grade by frost-resistance for regions with average;		
Monthly air temperature of the coldest month, ° C		
- from 0 up to minus 5	15	-
- from minus 5 up to minus 15	25	-
- from minus 15 up to minus 30	50	15
Quantity of crushed grains; % on mass, not less than:	70	25

4.03 Granular Subbase and Base Course

4.03.1 Description

This Section covers the provision, laying and compacting of natural gravel material for sub-base and base courses.

Road base: Part of road structure, which provides distribution of traffic load, as well as reduces the pressure, on sub-base layers of pavement structure or directly on subgrade.

Sub-base layers (frost-resisting -, filter -courses): Layers between subgrade and upper pavement layers providing frost-resistance and drainage of pavement as well as preventing the mixing of pavement structure from subgrade.

4.03.2 Materials

Sub-base layers: Sand and gravel (sand and crushed stone) mix for sub-base layers shall meet the requirements of GOST 25607-83 and of the table 45 of SNiP 2.05.02-85;

Mix Number	Total remainder, % in mass, on sieves of holes size, mm								
	70	40	20	10	5	2.5	0.63	0.16	0.05
1	0	10-20	20-40	25-65	40-75	60-85	70-90	90-95	97-100
2	0	0-5	0-10	10-40	30-70	45-80	60-85	75-92	87-100

Crushed stone (gravel) of mix for additional base layers for roads of I - III categories shall have the strength grade of not lower than 200 (crushability shall be at least 24 for gravel and aggregate made out of gravel).

For filter layers of pavement the sand in accordance with GOST 8736-93 is permissible without additional testing, if the fraction of less than 0.14 mm in grain size is less than 25% of the total mass and clay fraction of no more than 5% of the total mass. The clay fraction for natural sand shall not be more than 0.5% of the total mass and for crushed stone not more than 1%, respectively. The permeability under maximum density shall not be less than 1 m/day (SNiP 2.05.02-85, p.7.49).

Base course: Materials to used for crushed stone and gravel pavement, and for base-course shall meet the requirements of GOST 25607-83 (mix No.3 and 5 for pavement and No.1, 2, 4, 6 and 7 for base-course) (p.7.47 SNiP 2.05.-2-85). Grade on strength and frost-resistance of crushed stone/gravel in the mix shall meet the requirements of table 44 of SNiP 2.05.02-85.

Property indices of stone materials	For pavement	For base
Strength grade of stone crush in saturated state; minimum value		
- volcanic and metamorphic rocks	800	600
- sedimentary rock	600	200
Gravel and crushed stone out of gravel	crushability 12	crushability 24
Grade by wear out abrasion, not lower than	abrade III	abrade IV
Grade by frost-resistance for regions with average; Monthly air temperature of the coldest month, ° C		
- from 0 up to minus 5	15	-
- from minus 5 up to minus 15	25	-
- from minus 15 up to minus 30	50	15
Quantity of crushed grains; % on mass, not less than:	70	25

4.03.3 Construction Requirements

Placing and Compacting

(a) Spreading of Materials

The materials shall be evenly spread over the whole of the designated area for the layer concerned and in such

quantity that the compacted thickness of the layer complies with the specified requirements.

Any new layer of less than 75 mm compacted thickness shall be bonded to the previous layer by scarifying the previous layer to a depth so that the total compacted thickness of the new layer plus the scarified portion of the previous layer will not be less than 100 mm.

(b) Breaking Down and Preparation of the Material

The material placed on the road shall be thoroughly broken down throughout the layer by means of equipment suited to this purpose to a size not exceeding two-thirds of the compacted layer thickness.

Any oversize material, which cannot be broken down to the required size, shall be bladed off the road, loaded, transported and disposed of or utilized as directed by the Project Manager.

Where the coarse and fine fractions of the material are not uniformly distributed or have been allowed to become segregated, the material shall be thoroughly mixed on the road by blading in successive cuts over the full depth of the layer, after the required amount of water has been added. Such mixing shall continue until a uniform mixture of the various size fractions of the material has been obtained.

(c) Watering and Mixing

Any water required before material is compacted shall be added to the material in successive applications by means of water sprinklers fitted with sprinkler bars or by means of pressure distributors all capable of applying the water evenly and uniformly over the area concerned.

The water shall be thoroughly mixed with the material to be compacted by means of soil mixers or other suitable equipment. Mixing shall continue until the required amount of water has been added and until a uniform mixture is obtained. Thereafter compaction may proceed.

The amount of water to be added shall be sufficient to bring the material to the optimum moisture content for the compaction equipment used.

(d) Compaction

Compaction shall be carried out in a series of continuous operations covering the full width of the layer concerned and the length of any section of a layer being compacted shall, wherever possible, be not less than 150 m nor more than can be properly compacted with the available equipment. The Project Manager reserves the right to order the Contractor to reduce the length of any layer compacted in any single operation if the proper compaction of such a layer is not being achieved.

The types of compaction equipment to be used and the amount of rolling to be done shall be such as to ensure that specified densities are obtained without damaging lower layers or structures. During compaction the layer shall be maintained to the required cross-section shape.

If at any time after compaction the layer is damaged by drying out or is damaged by rain, it shall be scarified, aerated and/or watered and re-compacted as specified above, all at the Contractor's expense.

(e) Disposal of Oversize Material

The Project Manager will direct that oversize material be disposed of or utilized elsewhere in one of the following ways:

- (i) The material is bladed off the road and utilized in the uniform widening of fills outside the road prism.
- (ii) The material is bladed off the road, loaded, transported and taken to spoil.
- (iii) The material is bladed off the road, loaded, transported to the point of use and utilized in other item of construction.

The Contractor shall exercise all reasonable care not to bring onto the road material which cannot be broken down to the required size by processing on the road.

Moisture Content and Compaction

The moisture content of the sand and gravel mix during the construction shall close to the optimal and the deviation shall not be more than $\pm 5\%$. If the moisture content, differs more the mix shall be moistened as required 20-30 minutes before the compaction is carried out (SNiP 3.06.03-85 p.7.9). The placed mix shall be compacted in accordance to requirements of p.7.1 and p.7.5 of SNiP 3.06.03-85. Construction of base-course and pavement structure by penetration method shall be carried out in accordance with p.9.1 and p 9.32-9.39 of SNiP 3.06.03-85.

Protection and Maintenance

The compacted layers shall be adequately drained and shaped to prevent water from standing on or scouring the finished work. Windrows shall be removed to facilitate drainage of water from surface.

No material for a succeeding layer shall be placed if the underlying layer is softened by excessive moisture.

The Contractor shall protect and maintain the completed layer at his own expense. Maintenance shall include the immediate repair of any damage or defects that may occur and shall be repeated as often as it is necessary to keep the layer continuously intact. Repairs shall be done in a manner that will ensure restoration to an even and uniform surface.

4.03.4 Quality Control

Quality Control shall follow the requirements and methods indicated below:

- (a) aggregate, gravel pavement and sub-base construction; p.1.13, p.7.35-7.36 of SNiP 3.06.03.85.
- (b) base course and pavement by penetration method; p.9.50 of SNiP 3.06.03.85

4.03.5 Acceptance.

Construction of granular subbase and base courses will be accepted according to Section 'Measurement and Payment', provided that the work conforms to the plans and Specifications and is approved by the Project Manager.

4.03.6 Measurement

Reconstruction and widening of existing pavement is measured by area. Sub-base and base course placing is measured by volume.

4.03.7 Payment

The accepted quantities measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section and must be approved by the Project Manager.

Payment will be made under:

Pay Item	Pay Unit
Base course	cubic meters
Sub-base course	cubic meters

4.04 Bitumen Prime and Tack Coat

4.04.1 Description

This work consists of applying a cut back bitumen prime and tack coat or emulsified bitumen.

A prime coat means an application of low viscosity bituminous binder to an absorbent non-bituminous surface.

A tack coat shall mean a light application of bituminous binder to a bituminous or concrete surface.

4.04.2 Material

Material shall conform to Section 'Bituminous Material'. Bitumen shall comply with GOST 22245-90:

For prime coat, the binder shall be a medium-curing cut-back unless otherwise instructed by the Project Manager.

For tack coat, the binder shall be a rapid-curing cut-back, a medium-curing cut-back, a quick-breaking emulsion or a slow setting emulsion diluted with water.

4.04.3 Construction Requirements

Equipment

Equipment to be used shall be approved by the Project Manager. Bitumen shall be sprayed from a pressure distributor and no hand-spraying shall be permitted except in small areas, or to make good a defective area caused by a blocked nozzle.

The nozzles shall be arranged to give a uniform spray and shall be tested prior to spraying by discharging on to suitable material (such as building paper, metal sheets, etc.) or into purpose made troughs. Testing shall not take place on the road, and any bitumen spilt on the ground shall be cleaned off.

Surface Preparation

Prepare the surface for a prime coat as follows:

Clear the existing surface of all loose material, dirt, or other delirious substances by approved methods. Any defect of the surface shall be made good as instructed by the Project Manager, and bituminous material shall be laid or sprayed or sprayed until the Project Manager has approved the surface. Where required by the Project Manager, immediately prior to the application of prime coat, the surface of the base layer shall be lightly sprayed with water, but in no case saturated.

In order to bring the surface to be primed to the condition required, water shall be applied in small increments by a distributor. Any water on the surface after spraying shall be brushed off or allowed to drain away before the prime coat is applied.

Prepare the surface for a tack coat as follows:

(a) Patching. Remove and dispose of unsuitable asphalt material in the area to be coated. Smoothen all rough edges within the pothole. Clear the existing surface of all loose material, dirt, or other delirious substances by approved methods.

Pre-leveling. After pre-leveling dips, depressions, sags, excessive or non existing crown or other surface irregularities shall be corrected. Clear the existing surface of all loose material, dirt, or, other delirious substances by approved methods.

(c) Asphalt surfaced roads. Clean the existing surface of all loose material, dirt, or other delirious substances by approved methods.

Weather Limitations. Apply binder prime and tack coat on a dry, unfrozen surface.

Bitumen Application.

Calibrate the bitumen distributor spray bar height, nozzle angle, and pump pressure and check longitudinal and transverse spread rates weekly.

Protect the surfaces of nearby objects to prevent spattering or marring. Spread building paper on the surface for a sufficient distance from the beginning and end of application so that the flow through the distributor nozzles may be started and stopped on the paper. All equipments to be used in the work must be in good condition and functioning property.

Prime coat application is to be at the rate of 0.6 – 1.0 kg/sq.m, or as required in the plans or instructed by the Project Manager.

Tack coat application is to be at the rate of 0.2 – 0.3 kg/sq.m, or as required in the plans or instructed by the Project Manager.

The Project Manager will approve the exact application rate, temperature, and area to be treated before the application and may make adjustments for variations in the field conditions. Apply the bitumen uniformly with an asphalt distributor. Move the distributor forward at the proper application speed at the time the spray bar is opened. Use care not to apply excess bitumen at the junction of spreads.

Apply the coat at a rate to be established by the Project Manager. When a tack coat cannot be applied with an asphalt distributor spray bar, apply the tack coat uniformly and completely by fogging with a hand spray attachment or by another approved method.

If excess binder material is applied, squeegee the excess from the surface. Allow the primed or tacked surfaces to completely cure before placing the covering course. Place the covering course within 8 hours of placing the prime/tack coat.

4.04.4 Acceptance

Prime and tack coat treatment will be accepted according to Section 'Measurement and Payment', provided that the work conforms to the Specifications and is approved by the Project Manager.

4.04.5 Measurement

Bitumen prime and tack coat will be measured by weight at the application rate specified in the designs.

4.04.6 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section and must be approved by the Project Manager.

Payments will be made under the following items:

Pay Item	Pay Unit
Prime coat	ton
Tack coat	ton

4.05 Hot Asphalt Concrete Pavement

4.05.1 Description

Asphalt concrete pavement works consist of supply and construction of binder and wearing courses, spreading and compaction

4.05.2 Material

Materials for asphalt concrete mix shall comply with the requirements of existing standards. The quality of bitumen by its physical properties shall comply with GOST 22245-90.

Indices	B 40/60	B 60/90	B90/130	B 130/200	Test Methods
Penetration under 25oC 0.1 mm, not less than 0oC	40-60	61-90	91-130	131-200	GOST 11501
	13	20	28	35	

Softening temperature	51	47	43	40	GOST 11505
Spreading in cm. not less + 25 oCoC	45	55	65	70	GOST 11505
	-	3.5	4.0	6.0	
Brittle temperature not more oC	-12	-15	-17	-18	GOST 11507 Att., 3.2.
Flash point oC	230	230	230	230	GOST 4333
Softening temperature after warm-up, not more oC	5	5	5	6	GOST 18180 GOST 11506 Att., 3.3.
Penetration index	From -1.0 to +1.0				Attachm. 2
Water content %, not more	0.30	0.30	0.30	0.30	GOST 11510

Bitumen testing shall be carried out in accordance with GOST 11501-78, 11505-75, 11506-73, 11507-78, 11510-65, 18180-72. Bitumen grade depends on asphalt concrete mix type, climatic conditions and road category.

Coarse aggregate (crushed stone) shall comply to requirements of GOST 9128-84, p.3.2

Fine aggregate (sand) shall comply to requirements of GOST 9128-84, p. 3.3

Filler (mineral powder) shall comply to requirements of GOST 16557-78

4.05.3 Asphalt Concrete Mix

Asphalt concrete mix shall be designed taking into account asphalt concrete type, grade and usage indicated in designs. Physical and mechanical characteristics should correspond to GOST 9128-84.

(a) Physical and mechanical indices shall be as follows:

Indices	Asphalt concrete mix grades	
	I	II
1. Required strength in compression, MPa (kg/cm2), at temperature:		
a) 20°C, not less than	2.5 (25)	2.2(22)
b) 50°C, not less than, for a/c type A/B	0.9(9)/ 1.3 (13)	0.8(8)/ 1.2(12)
c) 0°C, not more than	13(130)	13(130)
2. Water stability ratio, not less than	0.85	0.8
3. Water stability ratio under long term saturation, Not less than	0.75	0.7
4.Swelling, % in mass, not more than	0.5	1.5

(b) Residual porosity of asphalt concrete shall be 1 ... 3 % of volume.

(c) The grading of the asphalt concrete mix shall comply with the following requirements in accordance to GOST 9128-84:

Mix Type	Grading limits; Grading (passing %)										
	Sieve size (mm)										
	0.071	0.14	0.31	0.63	1.25	2.5	5	10	15	20	40
Fine	2-8	3-15	4-22	7-28	10-38	18-50	27-65	45-76	57-100	70-100	-
Coarse	2-8	3-15	4-22	7-28	10-38	18-50	27-65	45-76	57-100	70-100	95-100

(d) Recommended bitumen content in mix is 5 - 7 %

(e) Tolerance in dosage of asphalt concrete mix component compared to the total mass of each component is as

follows:

- Coarse and fine aggregates (crushed stone and sand): $\pm 3\%$
- Filler and binder (mineral powder and bitumen): $\pm 1.5\%$

(f) Mix temperature during the discharge from mixer should correspond to the values shown in the table below:

Binding agent	Preparation temperature in °C
B 35/50	165 \pm 15
B 50/70	160 \pm 15
B 70/100	155 \pm 15
B 100/150	150 \pm 15
Bitumen 60/90, Bitumen 90/130	140 - 160
Bitumen 130/200	120 - 140

Preparation of Asphalt Concrete Mix. The preparation of asphalt concrete mix should be carried out according SNiP 3.06.03-85 p. 10.3-10.5, p 10.8-10.13.

Paving. Asphalt concrete mix placing should be performed according to SNiP 3.06.03-85 p. 10.16-10.32

Quality Control. Quality control should be carried out according SNiP 3.06.03-85 p. 10.39-10.41

4.05.4 Equipment

Mixing Plant

The mixing plants should be approved by the Project Manager. The asphalt plants shall be of batch mix type with automatic controls and with a capacity of at least 50 tons/hour. At least four cold bins for different aggregate fractions are required. All bins shall be covered to prevent the ingress of moisture. The weighs of the plant shall be calibrated before the start of the production or whenever directed by the Project Manager. Asphalt concrete mix should be weighed on vehicle scales up to 2% in accuracy.

The bitumen tank shall be capable of maintaining its contents at the specified temperature within a tolerance of plus or minus 5°C and shall be equipped with a thermostat to prevent the temperature rising above 180°C and a fixed thermometer easily read from outside the tank. Any bitumen which has been heated above 180°C or has suffered carbonization from prolonged heating shall be removed from the plant.

Pavers

Pavers shall be approved by the Project Manager and shall be of modern manufacture and equipped with ramming timber and vibrating screed. It shall be capable of laying asphalt concrete with no segregation, dragging, burning or other surface defects and within specified level and surface regularity tolerances. Delivery augers shall not terminate more than 20 cm from the edge plates.

Compaction Plant

The Contractor shall provide sufficient rollers of adequate size and weight to achieve the specified compaction. Prior to commencing the laying of bituminous mixes in the permanent Works, the Contractor shall carry out Site Trials to demonstrate the adequacy of his plant and to determine the optimum method of use and sequence of operation of the rollers.

4.05.5 Road Base Preparation

The surface shall be prepared according to Section 'Bituminous Prime and Tack Coat'. An even bitumen prime or tack coat shall be applied along entire surface, contact surface of curbs, gutters, manholes and other structures, according to SNiP 3.06.03-85. Nearby areas shall be protected from spatter or splashing during the application.

4.05.6 Weather Limitations

Works, on asphalt concrete pavement and sub-grades construction shall be carried out in dry weather and during daylight hours. Place hot mixes at the air temperature of not less than +5°C.

4.05.7 Asphalt Preparation

Heat evenly the bitumen to provide a continuous supply of the heated bitumen from storage to the mixer. Do not heat bitumen above 170 °C.

4.05.8 Aggregate Preparation

Prior to mixing supply, heat, dry, and deliver crushed stone (gravel) and sand to the mixer at a temperature sufficient to produce a mixture within approved temperature range. Reduce the moisture content of the aggregate up to 1 per cent or less. Adjust flames used for drying and heating to prevent damage to and contamination of the aggregate.

4.05.9 Mixing

Measure the aggregate and bitumen into the mixer is in accordance to the job-mix formula approved by the Project Manager. Mix until all the particles are completely and uniformly coated with bitumen. The temperature of mix shall all the time during mixing and loading be maintained within the specified range.

4.05.10 Hauling

Use vehicles with tight, clean, and smooth surface for hauling asphalt concrete mixtures and provide each vehicle with necessary documentation related weigh calibration. The duration of asphalt concrete hauling is determined by the minimum temperature condition for spreading in accordance with Subsection 'Compaction' below. The surface of beds should be covered by thin coat of approved material to prevent the mixture from adhering to the beds. Do not use petroleum derivatives or other coating materials which contaminate or alter the characteristics of the mixture. Drain the bed before mix loading. Equip each truck with a canvas cover or other suitable material of sufficient size to protect the mixture from the weather influence. Where necessary to maintain the mix temperature, use insulated truck beds and securely fastened covers. Provide access ports or holes for checking the temperature of the asphalt mixture in the truck.

4.05.11 Placing and Finishing

Mixture placing and finishing must be arranged without any unnecessary pauses and the temperature of the mixture shall not drop below the permissible temperature. The laying temperature measured from several points of the load has meet the requirements of mixing temperature. If the temperature is incorrect the load must be rejected, if not approved by the Project Manager to be used in secondary places. Before beginning of laying the adjustments of the machinery, which have effect on how well the mix moves in the paver and the quality of surface, must be put in order. The auger and compacting beam must not be so worn out, to cause segregation or unevenness. Place the asphalt concrete mixture as continuously as possible. Work and traffic arrangements must be done in a way that the traffic does not damage the edges of laid pavement. The damaged edges must be cut and repaired by repaving the damaged area. Asphalt concrete mix shall be placed by paver providing full width of the strip.

4.05.12 Compacting

Compact the mixture so that the asphalt concrete residual porosity is within the range of 2.5% - 5%. The density of asphalt concrete of hot mix of "A" type shall not be less than 0,99, and of porous asphalt concrete type not less than 0,98. The number of rolling equipment must be sufficient compared with the capacity of the production. Compact the surface so that no harmful roller tracks or cracks will appear. Do not pass rollers over the unprotected end of a freshly laid mixture or leave the roller on freshly laid soft surface. The proper evenness and pavement cross-fall shall be kept continuously during rolling. Do not allow traffic on newly laid pavement before it has cooled down enough to avoid rutting.

Start compaction immediately after placing, keeping the temperature range of the mix at the beginning not less than 120° C. Mix of asphalt concrete of A and B types and for porous asphalt concrete shall be compacted first with a pneumatic-tyred roller at least 16 tons in weight (6-10 passages) or with a steel-wheel roller at least 10-13 tons in weight (8-10 passages) or by vibrating rollers 6-8 tons in weight (5-7 passages). Intermediate rolling should be carried out with a pneumatic-tyred roller and final rolling with a steel-wheel 11-18 tons in weight (6-8 passages). Rolling shall begin at the side and proceed longitudinally parallel to the centre-line, each trip overlapping one-half of the roller width. On super-elevated curves, rolling shall begin at the low side.

At the beginning the speed of roller should not exceed 5 km/hour for steel-wheel roller, 3 km/hour for vibrating roller and 10 km/hour for pneumatic-tyred roller. The roller wheels should be continuously moistened to avoid the adhesion with surface of the mix laid.

4.05.13 Joints, Trimming Edges, and Clean Up

At connections to the existing pavement and previously placed lifts, make the transverse joints vertical to the depth of the new pavement. Form transverse and longitudinal joints by cutting of the previous layer to expose the full depth of the course. No ruts or unevenness should be formed to the joint area. Joint area must be carefully cleaned and if cooled it must be heated or coated with tack coat before doing adjacent pavement. Apply a bitumen tack coat to the edge of the joint for both transverse and longitudinal joints. Avoid the rolling along non-protected ends of newly laid mix. Cut material from edges and dispose all discarded asphalt material to a site, approved by the Project Manager.

4.05.14 Pavement Smoothness

Measure the smoothness of the finished surface course after final rolling. For smoothness measurement both in cross direction and in parallel to the centre line a metal straightedge 5 m in length shall be used. A defective area is considered an area with surface deviations in excess of 7 mm between the straightedge and the surface (number in parenthesis is for finished surface with unbound base). Correct defective area and measure again after the correction for acceptance. New pavement should be uniform without segregations, cracks, bleeding of binder etc.

4.05.15 Acceptance Procedures for Asphalt

Asphalt materials will be accepted in accordance Section 'Measurement and Payment', provided that the work conforms to the Specifications and is approved by the Project Manager.

Certification. Deliver a certification signed by the supplier to cover the quality and the quantity of material and the condition of container for each shipment. Provide test result as required by the Project Manager.

Acceptance sampling procedures. Mix and asphalt concrete samples for acceptance will be selected, obtained and tested, as follows:

- 1) Gradation of asphalt concrete and bitumen content: At starting of asphalt production and in case of job-mix formula is changed or if in any doubt of the right composition of the mixture, the required number of samples is taken from asphalt plant for testing. One sample for every 500 tons to be taken randomly or one sample at least daily from placed but not compacted pavement.
- 2) Thickness and density of samples selected from the finished asphalt concrete layer: A set of 5 core samples from carriageway is taken at the beginning of works, thereafter one set after 10 000 m² has been laid and thereafter one set per each 20 000 m² of pavement. Core samples shall be taken randomly and thickness and density shall be determined. If required, the additional set of cores might be taken. Marshall samples shall be taken, when the density requirement is not fulfilled, the mix cracks during rolling or the grading is suspected.
- 3) One sample of bitumen shall be taken from each shipment to the plant and from each binder type as directed by the Project Manager.
- 4) Aggregate samples shall be tested in the beginning of the production and, if aggregate is changed or as directed by the Project Manager.
- 5) Mineral filler is tested for each 5000 tons of mix production in a single plant or whenever the shipment is suspected as directed by the Project Manager.

4.05.16 Acceptance

Mineral filler will be accepted under Subsection 002.03.

Hot asphalt concrete pavement construction will be accepted under Subsection 002.04.

Asphalt content, aggregate gradation and density will be accepted under Subsection 002.02.

Density (void content). Core samples will be taken and tested by the Contractor to verify the required density of the compacted pavement. The unit price of asphalt concrete is reduced as follows, if the requirement for density is not full filled:

Hot asphalt concrete, type A:

For full payment acceptance criteria for density is 0.99 (99 %). For each 0.001 (0,1 %) part, that the density is less than the required value the price of the asphalt concrete is reduced by 1%. The maximum deduction is 10 %. If the

average density is less than 0.98, the corresponding production is rejected.

Porous asphalt concrete:

For full payment acceptance criteria for density is 0.98 (98 %). For each 0.001 (0,1 %) part, that the density is less than the required value the price of the asphalt concrete is reduced by 1 %. The maximum deduction is 10 %. If the average density is less than 0.97, the corresponding production is rejected.

Extra sample set may taken, if so directed by the Project Manager

(b) Pavement smoothness. The acceptance criteria are given in Section 'Hot Asphalt Concrete Pavement'.

(c) Thickness. Required amount is indicated in the drawings or Bill of Quantities and it is the minimum average amount requirement of laid and compacted pavement. Amount is calculated from core samples (same sample set as for density) and evaluated for amount per unit area. If the amount is less than allowed tolerance, the amount representing each sample, 2300 m² may be rejected or if directed by the Project Manager approved by lower price using following formula:

thickness of sample per ordered thickness multiplied 2300 times unit price.

Average thickness (weight per unit area) is also calculated daily on the basis of mix weighted on asphalt plant and total production (m²) in the same day. The average thickness (amount laid per unit area) shall not be less than ordered. If the amount is less the value of that day's production is reduced by amount corresponding the difference to the ordered amount.

(d) Bitumen content and gradation. If the bitumen content for the whole asphalt concrete work calculated from the total used bitumen amount and produced asphalt concrete is less or more than ordered amount the value of the work is deducted using following formula:

Binder content deviation %-units	Value deduction % of AC- works value
< 0.05	0
0.10	- 4
0.15	- 9
0.20	-13

Intervals are interpolated and if needed table is continued linearly.

4.05.17 Measurement

Hot asphalt concrete pavement will be measured by weight or area and will include the construction of asphalt concrete pavement as well as trimming of joints edges and clean up and all ancillary works.

4.05.18 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section and must be approved by the Project Manager.

Payments will be made according to the following items:

Pay Item	Pay Unit
Hot asphalt concrete binder course	square meter
Hot asphalt concrete surface course	square meter

4.06 Surface Treatment (N/A)

4.07 Shoulder Reconditioning

4.07.1 Description

This work consists of removing, filling up shoulders and paving with aggregate.

4.07.2 Material

Material for filling shall meet the following requirements:

Aggregate SNiP 2.05.02-85

Sand/gravel SNiP 2.05.02-85

and should be in accordance with GOST 23735-79.

4.07.3 Construction Requirements

Removing and filling up shoulders. Filling up shoulders is done on the sections where roadway is to be widened, in areas, where emergency lanes are located, in areas where embankment height is increased, or when existing shoulders are to be paved with asphalt concrete.

Filling up shoulders is done after placing sand bed course and pavement construction or widening is completed.

Filling up shoulders is done after removing existing shoulders. Material may be reclaimed and used in embankment fill, if it conforms to the requirements. If not, is to be removed and disposed of by the Contractor. Spoil area will be the responsibility of the Contractor.

Compaction shall be done layer by layer according to SNiP 2.05.02-85 relevant to construction subgrade layers. Compaction will be done at optimum mixture content.

Borrow sources for shoulder filling shall be approved by Project Manager.

4.07.4 Aggregate or gravel/sand mix paved shoulders

Shoulder strengthening with a 15 cm thick layer of crushed stone or gravel/sand mix shall be done using material with maximum particle size less than 70 mm.

Material will be spread in one layer using self-propelled grader and compacted with rollers according to SNiP 3.06.03-85 for aggregate bases. To reduce friction between grains water shall be spread during compaction.

4.07.5 Acceptance

The work will be accepted according to Subsection 001.04 providing that it has been done according to plans and specifications and SNiP 3.06.03-85 and is accepted by the Project Manager.

4.07.6 Measurement

Removing materials and filling shoulders will be measured by area or volume. Paving with aggregate or asphalt concrete will be measured by area or volume.

4.07.7 Payment

The accepted quantities, measured as indicated above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Removing shoulders with asphalt	square meters
Removing shoulders without asphalt	cubic meters
Shoulder fill and construction	cubic meters

4.08 Asphalt Concrete for Sidewalks and Islands

4.08.1 Description

This work consists of constructing hot asphalt concrete for sidewalks and islands.

4.08.2 Construction Requirements

Composition of Mixture (Job-Mix Formula). Provide an asphalt concrete mixture composed of crushed stone or gravel and bitumen mixed in a plant approved by the Project Manager. Mix type AC 12 or 16 in accordance with Section 'Surface Treatment' shall be used if not otherwise required by the design or the Project Manager.

Submit the strength, quality, and gradation specifications for the asphalt concrete mixture to the Project Manager. Include copies of laboratory test reports which demonstrate that the properties of the aggregates, bitumen cement, additives, and mixture meet the specifications. Also submit the maximum laboratory density of the mixture.

Surface Preparation. Prepare the surface according to Section 'Bitumen Prime and Tack Coat'. Apply a bitumen tack coat to contact surfaces of curbing, gutters, manholes, and other structures. Protect nearby areas from spatter or splashing during the application.

Weather Limitations. Construct asphalt concrete pavements and base courses in dry weather, on unfrozen surface. Place hot and cold mixes at the ambient air temperature of not less than +50C.

Hauling. Use vehicles with tight, clean, and smooth metal beds for hauling asphalt concrete mixtures.

Thinly coat the beds with an approved material to prevent the mixture from adhering to the beds. Do not use petroleum derivatives or other coating material which contaminate or alter the characteristics of the mixture. Drain the bed before loading.

Equip each truck with a canvas cover or other suitable material of sufficient size to protect the mixture from the weather. When necessary to maintain temperature, use insulated truck beds and securely fastened covers. Provide access ports or holes for checking the temperature of the asphalt mixture in the truck.

Placing. Place the mixture with mechanical paver. In areas where mechanical spreading and finishing is impractical, spread and finish each course by hand raking, screeding, or by other approved methods. Construct a surface that is uniform in texture and cross-section.

Compacting. Compact the mixture to a minimum of 96 per cent of laboratory mix design density using a roller weighing not less than 135 kg or with a small power roller. Compact areas that are not accessible by rollers by vibrating plates or other methods.

Pavement Smoothness. Use a 3m metal straightedge to measure at right angles and parallel to the centerline at designated sites.

Defective areas are surface deviations in excess of 5 mm between any two contacts of the straightedge with the surface. Correct defective areas using approved methods.

4.08.3 Acceptance

The work will be accepted according to Subsection 001.04 providing that it has been done in conformance to the plans and specifications and is accepted by the Project Manager.

4.08.4 Measurement

Asphalt concrete will be measured by weight or area.

4.08.5 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in the Section and must be approved by the Project Manager.

Payments will be made under:

Crushed aggregates shall be prepared to provide a sufficient reserve near the construction site to minimize hauling

activities. The storage place should be clean, well drained and prevent both segregation and mixing with improper material and soil.

Construction Requirements

Mix Design (Job-Mix Formula). The Contractor shall submit to the Project Manager for approval a mix design 7 days prior to commencing cold recycling operations.

The reclaimed stabilized layer shall correspond to the following characteristics:

Cement content	< 4 % *)
Bitumen emulsion content	2.5 – 4.5 %
Compaction degree	98 % (Modified Proctor Method)
Tensile strength at 5 °C after 7 days	0.8 – 1.3 MPa
Tensile strength at 5 °C after 28 days	1.2 – 2.0 MPa
Void Content after compaction	8 – 15 %

*)The use of cement in excess of 2% by mass should be avoided as it has a negative effect on the flexibility and fatigue properties of the stabilized layer.

The control of the moisture content in the recycled material is one of the most important aspects of stabilizing with bitumen emulsion. Therefore existing moisture content in the recycling section has to be verified.

Test Strip. At the start of the project, the Contractor shall process the first 100 linear meter of the full width of the section of road to be rehabilitated as a test strip. This test strip will serve to demonstrate that the equipment and processes used by the Contractor are in accordance with the specification herein. The test strip shall also establish the all necessary parameter including target gradation of the reclaimed material and optimum rolling pattern.

Recycling operation will only resume after acceptance of the test strip by the Project Manager.

When there is a significant change in mix proportions, weather conditions or other controlling factors, the Project Manager may require construction of a new test strip to check target parameters.

Surface Preparation. Clean or clear away all debris and vegetation within 1 m of pavement edge. Reclaimed material must be free of organic materials, soil, or other foreign substances.

Soft spots /weak subgrade. Areas of weak subgrade or soft spots which have been identified either by preliminary investigations or during the recycling process shall be treated as follows:

Removing and recovering the material of the pavement layers overlying the unstable material and stockpile for reuse
Excavating the soft/unsuitable material to required depth and disposal
Backfilling the excavation with suitable material in layers not exceeding 200mm

In-place Recycling. The in-place recycling shall consist of two separate operations: reclamation and stabilization. Reclamation and stabilization in one operation is not permitted, unless otherwise approved by the Project Manager in writing.

The recycling equipment shall be operated to ensure that the in-situ material is broken down to a gradation acceptable to the Project Manager. Virgin aggregates conforming to the requirements of these specifications shall be incorporated into the design if the existing aggregate does not conform to the required gradation.

Where distortion of the existing road pavement is in excess of the specified thickness for reclamation, the depth shall be adjusted to ensure that the entire bituminous pavement is reclaimed.

Grading of non-stabilized reclaimed material shall be conducted in such a manner as to ensure that the surface levels and shape of the completed reclaimed material layer is in conformance to the lines and grades established by the Project Manager.

When necessary, the addition of granular material, meeting the requirements of these specifications, shall take place after the reclamation process and prior to or in conjunction with the stabilization operation. Full, homogenous mixing of the reclaimed material, virgin granular material and the binder shall be performed.

Adjust cement and emulsion content as pavement conditions change. Add water as necessary to facilitate uniform mixing. The stabilization agent shall not be spread on the road ahead of the stabilization equipment.

Surface Levels and Shaping Requirements. The final grading operation shall be conducted in such a manner as to ensure that the placing of the stabilized layer meets the lines and grades of the design.

Care shall be exercised while spreading the stabilized layer to prevent undue segregation.

To prevent the final surface from tearing and scarring the level and cross-sectional shape requirements shall be addressed prior the material receiving the full compaction.

Compaction Requirements. Rolling shall commence as soon as possible after placing and shall follow the sequence determined in the test strip.

The maximum time elapsed between mixing the recycled material with a stabilizing agent and compacting the placed material shall be the shortest for the individual used stabilizing agents:

Cement : three hours

Bitumen emulsion: before the emulsion breaks

The stabilized reclaimed material shall be compacted to a minimum of 98 % of the modified AASHTO density. Where bitumen emulsions are used the term moisture content is replaced by “total fluid content” in defining the moisture density relations. Maximum density is achieved at the Optimum Total Fluid Content (OTFC) which is the combined mass of moisture and bitumen emulsion (before breaking) in the mix.

Stabilized material which for any reason cannot be compacted to the specified density shall be removed and replaced with hot mix meeting the requirements of the corresponding clause for ‘Hot Asphalt Concrete Pavement’.

Watering and Finishing. After compaction, the road surface shall be treated with light applications of water or diluted bitumen emulsion and rolled with pneumatic-tired rollers to create a close-knit texture.

The final layer shall be free from surface laminations, segregated areas, corrugations, or any defects that the Project Manager deems may adversely affect the performance of the layer. Defective sections shall be repaired at Contractor’s expense to the satisfaction of the Project Manager.

Curing. The stabilized surface should be protected against drying out and covered by asphalt layer latest on the third day after construction. Until that time it is preferable that no traffic is permitted on the recycled surface.

Weather Limitations. Recycling operations shall not be performed when the ambient air temperature is below 10°C, when the weather is foggy or rainy, or when the conditions are such that in the Project Manager’s judgment, proper mixing, spreading and compaction of the material cannot be accomplished.

4.09.3 Acceptance

The work will be accepted providing that it has been done in conformance to the plans and specifications and is accepted by the Project Manager.

4.09.4 Measurement

Asphalt concrete will be measured by area of the nominal thickness or volume.

4.09.5 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. It covers milling, supply of additional crushed aggregates, cement, emulsion and mixing and compaction. Payment will be full compensation for the work prescribed in the Section and must be approved by the Project Manager.

Payments will be made under:

Pay Item	Pay Unit
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Recycling of existing bituminous pavement	cubic meter
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SECTION 5, DRAINAGE

5.01 Culverts

5.01.1 Description

This work consists of constructing culverts, extending existing culverts and/or replacing culverts.

5.01.2 Material

General. Culverts and materials used for works of the present section shall meet requirements of SNiP 2.05.03-84, SNiP 2.05.02-85, Album of type constructions GOST 35-27.0-85, GOST 5781-82 and 13015.2-81.

Joint fill. Apply joint fill of the type and mix design approved by the Project Manager.

Pipes. Culvert pipes shall conform to SNiP 2/05.03-85 and GOST 6482-88. The length of culvert pipes shall be as stipulated in the Album of typical drawings unless otherwise specified. Metal pipes shall conform with VSN 176-78

Concrete pipe will be accepted for use in the project if "product certification" is furnished to the Project Manager by the manufacturer stating that it has been commercially produced according to a standard specification.

5.01.3 Construction Requirements

General. Use the same material on all continuous pipe sections and extensions. Use special sections, such as elbows and branch connections, that are the same material and coating as the attached pipe. Culvert material, sizes, and approximate locations are shown on the plans.

Use special sections, such as elbows and branch connections, that are the same material and coating as the attached pipe. Culvert material, sizes, and approximate locations are shown on the plans.

Extension of the existing culverts. Extension of the existing culverts shall be started from removing the existing culvert heads. Start at the lower end and lay the bell or groove end upgrade. Fully joint all sections. Structures and materials should be moved to special areas and disposed or buried. Extension of the existing culverts shall be done according to the designs. Placing materials and structures shall be done only after the Project Manager's approval.

Replacement of existing culverts. Before replacing existing culverts scarify the existing pavement and remove pavement and subgrade and pile in approved areas.

The Contractor shall prepare provisional schemes of traffic control during the construction periods and get approval from the relevant authorities and the Project Manager.

Demounted culverts and culvert heads shall be disposed by the Contractor. The work consists of excavation, placing crushed stone bed foundation, installation of culverts, making culvert joints, waterproof new culvert, inlet installation and waterproofed, backfilling and soil compaction, concrete inlet and outlet at culvert heads.

The soil for back filling shall meet requirements of Section 'Excavation and Embankments'. Laying and compaction of the pavement shall conform to Section 'Reconstruction and Widening of Existing Pavement'.

Metal pipes shall be protected from corrosion according to the requirements of SNIP/GOST 21513-83

Construction of new culvert. Construction of a new culvert shall be done in accordance with these Specifications, except for existing culvert removing.

5.01.4 Acceptance

The work of existing culverts extension, replacement and new culvert construction will be accepted according to Section 'Measurement and Payment' providing it has been done according to the plans, specifications and accepted by the Project Manager.

5.01.5 Measurements

Extension, replacement of existing culverts and construction of new culverts are measured as follows:

Item Measured by

Demolition of existing reinforced concrete culverts	volume
Reinforced concrete culverts	volume
Reinforcement	weight

5.01.6 Payment

Accepted and measured quantities as described above shall be paid at the contract price per unit of measurement. The payments mentioned below include costs of relevant quantities of trenching, back filling pits, subgrade, demounting and paving, building crushed stone pads for culvert foundation, placing of foundation, waterproofing, join filling and all other incidental items required for construction. The Payment will be full compensation for the work prescribed in this Section.

The Payment will be made under.

Pay item	Pay Unit
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Demolition of existing reinforced concrete culverts	cubic meter
Extension of culverts	cubic meter
Construction of culverts	cubic meter
Construction of inlet and outlet structures	Cubic meter
Reinforcement for culverts	ton
Stone paving	square meter

5.02 Reconditioning of Existing Drainage Structures

5.02.1 Description

This work consists of cleaning existing culverts in place, reconditioning existing inlets, and repairing and cleaning existing spillways and chutes.

5.02.2 Materials

1. Concrete Composition. Concrete shall conform to Section 'Minor Concrete Structures'. Before batching concrete submit the proposed concrete proportions for approval to the Project Manager. As a minimum, submit the following:

- (a) Type and source(s) of all material proposed for use.
- (b) Material certification for all material proposed for use.
- (c) Saturated surface dry weight of the fine and course aggregate per cubic meter of concrete.
- (d) Gradation of fine and coarse aggregate.
- (e) Weight of mixing water per cubic meter of concrete.
- (f) Weight of cement per cubic meter of concrete.
- (g) Entrained air content of concrete mix in percent by volume
- (h) Maximum slump of concrete mix in cm.

2. Joint mortar used for concrete minor structure shall consist of the following:

- (a) One part hydraulic cement (see GOST 25192-87, GOST 26633-89 and table 3.1 of SNiP 2.05.02-85) shall not contain lumps, be partially set, or come from previously opened bag subject to hydration.

- (b) Two parts fine sand free of clay or other deleterious materials.
 - (c) Water as required to obtain a freely working mix capable of being forced into small interstices.
3. Inlet metal grates shall be used as available from local suppliers.

5.02.3 Construction Requirements

Cleaning Culverts in Place. Remove and dispose of all foreign material within the barrel and appurtenances of the culvert by any method that does not damage the culvert.

Reconditioning Drainage Structures. Remove all debris from inlets designated to be reconditioned. Repair all leaks and structural damage.

5.02.4 Acceptance

The work will be accepted for payment providing that it has been built in conformance to the plans and specifications pertaining to the Sections involved and is accepted by the Project Manager.

5.02.5 Measurement

Cleaning culvert in place will be measured by length. If the culvert is removed and relayed there will be no additional measurement or payment except as specific in Section 'Culverts'. Reconditioning drainage structures will be measured by number. Repairing and cleaning spillways will be measured by number and by length.

5.02.6 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Reconditioning inlets	each
Repair and cleaning of culverts	linear meter
Repair and cleaning of gully	each
Repair and cleaning of chutes	linear meter

5.03 Spillways, Gullies and Lined Ditches

5.03.1 Description

This work consists of constructing lined spillways, gullies, and similar ditches.

Lined ditches will be constructed according to the Project and Typical Album.

Spillways, gullies, and ditches will be precast of Portland cement concrete, available from local suppliers and will require a product certification from the manufacturer stating that it has been commercially produced in conformity with standard specifications provided by the Project Manager.

5.03.2 Material

Material shall conform to Typical Album No. 503-09-7.84.

5.03.3 Construction Requirements

General. Form the bed parallel to the finished surface of the waterway.

Concrete Spillway and Gullies. Perform the work according to Section 'Minor Concrete Structures', utilizing commercially available precast units.

Lined Ditches. Ditch lining with crushed stone and prefabricated concrete slabs shall be done according to the typical drawings, specifications and designs.

5.03.4 Acceptance.

The work will be accepted for payment providing that it has been built in conformance to the plans and specifications to the Sections involved and is accepted by the Project Manager.

5.03.5 Measurement

Lined ditches and concrete spillways on the slope will be measured by length on the shoulder, and ditch lining by volume. The cost of excavation, bedding support of excavation and backfill shall be included in the costs by length.

5.03.6 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Concrete shoulder spillway	each
Concrete slope spillway along slope	linear meter
Concrete apron at the road-bed foot	square meter
Concrete apron at ditch	square meter
Gully	each
Concrete apron	square meter
Ditch lining with concrete	cubic meter

5.04 Manholes, Inlets, Outlets and Catch basins

5.04.1 Description

This work consists of constructing or adjusting inlets, outlets and aprons.

5.04.2 Materials.

1. Concrete Composition. Concrete shall conform to the requirements of Section 'Minor Concrete Structures'.
2. Joint mortar shall conform to the Section 'Reconditioning Existing Drainage Structures'.
3. Inlet grates shall be used as available from local suppliers.

5.04.3 Construction Requirements

Concrete Construction. Construct concrete inlets according to the corresponding Section of these Specifications. Concrete structures must be cast-in-place.

Grout all joints and opening to make them watertight.

Finish the channel flow line in inlets accurately to match the pipe flow line. Set metal frames in a full joint mortar bed.

Grade Adjustment of Existing Structures. Adjust metal frames and grates to finish grade before placing the surface course.

Remove and clean the frames, covers, and grates. Trim the walls down to the solid material. Reconstruct the walls with the same material as existing and reset the cleaned frames at the required elevation.

When inlets are adjusted to grade and abut existing concrete structure, separate the castings from the adjacent concrete with a performed expansion joint no less than 15 mm in thickness.

Clean each structure of all accumulated silt, debris, or foreign matter.

5.04.4 Acceptance

The work will be accepted for payment providing that it has been built in conformance to the plans and specifications pertaining to the item involved and is accepted by the Project Manager.

5.04.5 Measurement and Payment

Inlets, inlet adjustments, inlet metal grates, concrete inlet aprons, metal frames and grates, manholes covers and frames will be measured by number.

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Inlet	each
Inlet metal grates	each
Manhole covers	each

SECTION 6, ROAD FURNITURE

6.01 Guardrails

6.01.1 Description

This work consists of constructing guard-rails and modifying, removing, resetting, and raising existing guard-rails.

6.01.2 Materials

Material shall conform to the following:

Concrete	Section 'Minor Concrete Structures'
Galvanised steel rail	GOST 26804-86, Serial #3.503.1-89
Guard-rail hardware	GOST 26804-86, Serial #3.503.1-89
Guard-rail posts	GOST 26804-86, Serial #3.503.1-89

Paint for guard-rail posts. Painting of guard-rail posts shall be performed under specification approved by the road police.

Guard-rail installation shall conform to GOST 23457-86 and SNiP 2.05.02-85.

6.01.3 Construction Requirements

Posts. When pavement is within 1 m of the guard-rail, set posts before placing the pavement.

Do not shorten guard-rail posts unless the cut end is set in concrete. Drive posts into pilot holes that are punched or drilled. The dimensions of the pilot hole shall not exceed the dimensions of the post by more than 15 mm. Install posts back-fill, and compact.

Rail Elements. Install the rail elements after the pavement adjacent to the guardrail is complete. Do not modify specified hole diameters or slot dimensions.

Steel rail. Shop bend all curved guard-rails with a radius of 45 cm or less.

Erect rail elements in a smooth continuous line with the top lapped in the direction of traffic flow. Use bolts that extend at least 6 mm but not more than 25 mm beyond the nuts. Tighten all bolts.

Terminal Sections. Construct cast-in-place or precast concrete end anchors according to GOST 26804-86. Do not connect the guard-rail to cast-in-place anchors until the concrete has cured 7 days. Install the end anchor cables tightly without slack.

Removing and Resetting Guard-rail. Remove and store the existing guard-rail, posts, and appurtenances. Remove and dispose of posts that are set in concrete. Replace all guard-rail, posts, and hardware damaged during use, removal, storage, or resetting.

Raising Guard-rail. Remove the existing guard-rail and appurtenances. Replace and reset posts as needed. Replace all guard-rail, posts, and hardware damaged during the removal and raising.

6.01.4 Acceptance

The work will be accepted for payment providing that it has been built in conformance to the plans and specifications pertaining to the sections involved and is approved by the Project Manager.

6.01.5 Measurement

Guard-rail will be measured by length along the face of the rail not including terminal sections. Terminal sections will be measured by number.

Removing and resetting guard-rail and raising guard-rail will be measured by length along the face of the rail including reset terminal sections. Replacement posts (except replacement posts for posts damaged by construction

operations) used in the removing, resetting, or raising guard-rail, will be measured by number.

6.01.6 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Provide and install guard-rail	linear meter
Repair and reset guard-rail	linear meter
Replace guard-rail posts	each
Paint guard-rail posts	each
Remove guard-rail	linear meter

6.02 Permanent Traffic Control

6.02.1 Description

This work consists of constructing permanent traffic control signs, supports, delineators, and object markers.

6.02.2 Material

Material shall conform to the following:

All sign panels shall be manufactured according to Corrections #3 to GOST 10807-78.

All hardware and signposts shall be manufactured according to GOST 25458-82, GOST 25459-82 and Typical Album Serial # 3.503.9-80.

Delineators are to be manufactured according to Typical Album Serial # 3.503.1-89.

Concrete shall be as specified in Section 'Minor Concrete Structures'.

6.02.3 Construction requirements

General. Furnish traffic control devices according to GOST 23457-79, Technical Methods of Organising Traffic Movement, and Corrections #3 to GOST 10807-78. Submit the sign list, roadside and delineator soaking for approval to the Project Manager before ordering. The design of traffic sign and their installation shall be approved by the road police.

Supports. Sign locations and delineator locations shown on the plans may be changed in agreement with the Project Manager to fit the field conditions. determine the lengths of posts at time of staking.

Drive posts with a suitable driving head or set posts in drilled or punched holes. Replace all posts damaged by driving. Erect sign supports plumb, backfill, and compact.

Construct concrete footings according to Section 'Minor Concrete Structures'.

Panels. Road sign panels are installed on posts in accordance with Album # 3.503.9-80. Mounting of individual signs consisting of prefabricated panels may be made at the place of installation. Do not field drill holes in any part of the panel. Use anti-theft fasteners where possible. Paint all bolt heads, screw heads, and washers that are exposed on the sign face. Match the colour of the paint to the colour of the background or the message area at the point where the fitting is exposed.

If a sign message is not applicable, completely cover the face of the sign with an opaque material.

Maintain the covering in good condition until the message becomes applicable. Do not use adhesive tape on the face of a sign.

Repair or replace damaged parts including reflective sheeting.

6.02.4 Acceptance

The work will be accepted for payment providing that it has been built in conformance to the plans and Specifications pertaining to the segment involved and is approved by the Project Manager.

6.02.5 Measurement

Sign installations will be measured by the area of the front face of the sign panel. Nominal dimensions will be used. A sign installation includes the support.

Signs will be measured by the area of the front face of the sign panel. Each sign in a multiple configuration will be measured.

Posts will be measured by length. Roadside delineators will be measured by number. Sign supports will be measured by number.

6.02.6 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Warning and regulatory signs	each
Prohibitory signs	each
Mandatory signs	each
Chevron marker signs	each
Information signs	each
Direction and name signs	each
Additional panels at signs	each
Galvanised steel sign posts	meter
Road side marker posts	each
Km-posts	each

6.03 Permanent Pavement Markings

6.03.1 Description

These works consist of applying permanent pavement markings on the completed pavement.

6.03.2 Material

Material shall conform to GOST 13508-74 and Correction No. 4 of GOST 13508-74. The materials are conventional traffic paint and thermoplastic markings.

6.03.3 Construction requirements

General. Where existing and final pavement marking locations are identical, stake the limits of all existing pavement

markings (no-passing zones, edge stripes, etc.) before any pavement work. Upon completion of the final surface course, establish line limits for the new pavement for approval before marking. Establish markings according to GOST 13508-74.

Remove loose particles, dirt, tar, grease, and other deleterious material from the surface to be marked. Apply markings to a clean, dry surface according to GOST R 50597-93.

At least 7 days before starting pavement marking applications, furnish a written copy to the Project Manager of the marking manufacturer's recommendations for use. A field demonstration may be required to verify the adequacy of recommendations.

Ship marking material in appropriate containers plainly marked with the following information as appropriate for the material being furnished:

- (a) Manufacturer's name and address
- (b) Name of product
- (c) Lot/batch number
- (d) Colour
- (e) Net weight and volume of contents
- (f) Date of manufacture
- (g) Date of expiration
- (h) Statement of contents, if mixing of components is required
- (i) Mixing proportions and instructions
- (j) Safety information

Apply pavement marking in the direction of traffic according to GOST 13508-74. Apply all markings to provide a clean-cut, uniform and workmanlike appearance by day or night.

Protect marked areas from traffic until the markings are dried to no-tracking condition. Remove all tracking marks, spilled marking material, markings in unauthorised areas, and defective markings.

Conventional Traffic Paint

Apply paint when the pavement and air temperatures are above + 5°C. Spray paint at 0.4 mm minimum wet film thickness at a rate of 2.6 m²/l

Apply paint HI-501 when the temperature of road pavement and air is over + 15°C. Spray paint at 0.35 mm minimum wet film thickness at a rate 350 g/m².

Thermoplastic markings

(1) Apply thermoplastic when the pavement and air temperature are above + 10°C. Spray or extrude the thermoplastic at + 220 ± 5°C. For centre lines and lane lines, spray or extrude 2.5 mm minimum dry film thickness or at a rate of 2.5 kg/m². For edge lines spray or extrude 1.5 mm minimum dry film thickness or at a rate of 1.5 kg/m².

(2) Apply thermoplastic IE 5142 with extruder at about + 170°C at 3 mm thickness at a rate 5 to 6 kg/ m².

The minimum bond strength of the thermoplastic shall be in accordance with manufacturer's specifications.

6.03.4 Acceptance

The work will be accepted for payment providing that it has been built in conformance to the plans and specifications pertaining to the segment involved and is approved by the Project Manager.

6.03.5 Measurement

Pavement markings will be measured by length. Directional arrows will be measured by number.

6.03.6 Payment

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under:

Pay Item	Pay Unit
Pavement markings, paint	linear meter
Pavement markings, thermoplastic	linear meter
Directional arrow markings	each
Obstruction marking	square meter
Marking of kerbstones	linear meter
Chevron marking at roundabouts	square meter

6.04 Temporary Traffic Control

6.04.1 Description

This work consists of furnishing, maintaining, relocating, and removing temporary traffic control devices and services as ordered for the control and protection of public traffic through the project work zone.

Barricades and warning light types are designated as shown in the 'Uniform Requirements for Methods of Organisation of Roadway Movement, Utilised During Roadway Construction', published in Moscow, 1989.

6.04.2 Material

Material shall conform to the above document and the following Standards:

Construction sign panels:	Correction #3 to GOST 10807-78
Retro-reflective sheeting:	Correction #3 to GOST 10807-78

Temporary traffic control devices:

Uniform Requirements for Methods of Organisation of Roadway Movement, Utilised During Roadway Construction, published in Moscow, 1989.

6.04.3 Construction Requirements

General. Install and maintain temporary traffic control devices adjacent to and within the project according to the approved traffic control implementation drawings, and the document (VSN 37-84). Install and maintain traffic control devices as follows:

- (a) Furnish and place traffic control devices before the start of construction operations.
 - (b) Install only those traffic control devices needed for each stage or phase.
 - (c) Relocate temporary traffic control devices as necessary.
 - (d) Remove devices that no longer apply to the existing conditions.
 - (e) Whenever the Contractor removes, obliterates, or overlays any pavement markings, he shall replace them on a daily basis in accordance with the contract or as directed by the Project Manager.
 - (f) Immediately clean, or replace any device that is lost, destroyed, or damaged or when its retro-reflectivity is reduced by 50% of its required retro-reflectivity.
 - (g) Keep temporary traffic control devices clean.
 - (h) Repair scratches and rips in the retro-reflective sheeting.
 - (i) Remove all temporary traffic control devices upon contract completion or when approved.
-

Barricades. Perform the work described in the above document. Use wood, metal, or plastic barricades.

Cones. Perform the work described in the above document and as described in the plans.

Construction Signs. Recto-reflective sheeting shall be used on all signs for temporary traffic control. Use wood, metal, or other approved posts. Remove or completely cover all unnecessary signs with metal, plywood, or other acceptable material.

Flagmen..Train flaggers in their duties. Use flagmen or striped black and white batons.

Vertical signs. Perform the work described in the above document. Use wood, metal, or plastic vertical signs.

Warning Lights. Perform the work described in the above document.

Temporary pavement. Temporary roadways shall consist of detour pavement as specified herein as indicated on the Drawings and as approved by the Project Manager. Earthwork shall be constructed in accordance with the requirements of Section 'Excavation and Embankments' and as approved by the Project Manager to provide acceptable grade transition where adjoining existing pavements. Temporary drainage shall be provided.

Prior to placement of detour pavement at temporary roadways, the Contractor shall clear and grub the roadway area. The top 30 cm of sub-grade shall be compacted to 95 per cent of maximum density as determined by compaction control tests. The sub-grade material within the upper 30 cm of the roadbed shall have a minimum CBR of 10 when in accordance with AASHTO T-193 or SNiP 2.05.03.84.

On the above prepared sub-grade the Contractor shall place and compact the detour pavement for temporary roadway pavement.

When directed by the Project Manager or when existing conditions require same, the Contractor shall provide necessary and acceptable means of protection for utilities or services (existing or new) under detour pavement and/or temporary roadway to protect side utilities or services from any and all damages.

When no longer required, the Contractor shall remove all detour pavement and construction at temporary roadways and restore the Site.

The Contractor is responsible for maintaining existing pavement within the limits of construction used for detouring traffic.

All materials resulting from removal of detour pavement at temporary roadways shall be disposed of.

Temporary construction barriers, traffic cones and traffic delineators. The Contractor shall furnish maintain and remove on completion of the Works or when directed by the Project Manager all temporary construction barricades, traffic cones, traffic delineators and appurtenances as indicated on the drawings or required where roads are closed, partially closed, or where required to direct, inform or assist traffic in the area of construction. The Contractor shall relocate all temporary construction barricades and traffic cones as required by the construction stages or steps and his sequence of construction operations.

Temporary construction barricades, traffic cones and traffic delineators shall be placed as indicated on the drawings and as directed by the Project Manager to direct traffic smoothly and safely.

Temporary construction barricades shall have yellow lamps in the steady and/or flashing mode at the side bordering the line of traffic for the sake of giving warning. The light shall be placed in such a way that it lights the barricades without the use of vehicle light.

Maintenance of all temporary construction barricades furnished under this Contract shall include, but not limited to all reflective sheeting, lighting, flashing warning lights, replacement or other work required to maintain barricade in a condition and position as approved by the Project Manager.

At the completion of construction or when directed by the Project Manager, the Contractor shall remove and dispose of all barricades, cones and delineators, as approved by the Project Manager.

Temporary Marking of Signs. Sign legend that conflicts with the construction signing shall be completely covered by the Contractor so that none of the covered sign or legend is visible to traffic. If the whole sign is to be covered, it shall be covered with a non-transparent material that covers the entire face at the sign.

6.04.4 Acceptance

The work will be accepted for payment providing that it has been built in conformance to the plans and specifications pertaining to the Sections involved and is accepted by the Project Manager.

6.04.5 Measurement and Payment

There will be no measurements and payment for temporary traffic control. Costs associated with temporary traffic control measures will be considered as being included in the related pay items for the construction works.

6.05 Bus Shelter

6.05.1 Description

The works cover complete installation of bus shelter including ancillary works.

6.05.2 Material

The Contractor shall before placing any order for manufactured bus shelter submit to the Project Manager the names of the firms from whom he proposes to obtain such materials and manufactured articles giving for each firm a description of the materials and manufactured articles to be supplied, their origin, the manufacturer's specification, quality, weight, strength and any other relevant details. The Contractor shall deposit with the Project Manager samples of such materials and manufactured articles when requested and, where appropriate, manufacturer's certificates of recent tests carried out on similar materials and manufactured articles.

The Contractor shall provide the Project Manager with copies of all orders for the supply of materials and manufactured articles required in connection with the Works as the Project Manager may require.

6.05.3 Construction Requirements

Bus stop shelters shall be constructed as shown on the drawings.

The Contractor shall propose to the Project Manager for approval a bus shelter type and manufacture.

Plastering and painting works should be performed at minimum 10°C.

6.05.4 Acceptance

The works will be accepted providing it has been done according to corresponding drawings, specifications and accepted by the Project Manager

6.05.5 Measurement and Payment

Works should be priced per units and total cost summed up for the scopes provided below.

The accepted quantities, measured as provided above, will be paid at the contract price per unit of measurement for the pay items listed below that are shown in the Bill of quantities. Payment will be full compensation for the work prescribed in this Section.

Payment will be made under

Pay item	Pay Unit
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Provision and installation of bus shelter	each
Painting of bus shelter	square meter
Roofing of bus shelter	square meter
Provision and installation of chairs	each

SECTION 7. RETAINING STRUCTURES

7.01 Gabions

7.01.1 Description

The works consists of provision of provision and installation of gabion retaining walls, including preparation of surface, assembling, filling, compaction and bracing and wiring lids.

7.01.2 Materials

Gabions shall be type 'Maccaferri' boxes and/or 'Reno' mattresses, or similar, both with diaphragms at 1 metrecentres, or similar approved. The maximum mesh size shall be 100 mm x 120 mm for boxes and 60 mm x 80 mm for mattresses. The wire used for the construction of gabions shall be either of appropriate hard plastic material or plastic coated and unless otherwise instructed by the Project Manager and comply with the requirements shown below

Wire for Gabion Construction

Description	Diameter (mm)	Galvanising (g/m ²)
Mesh Box	3.4	275
Mattress	2.7	260
Binder Box	2.2	240
Mattress	2.2	240
Selvedge Box	3.9	290
Mattress	3.4	275

7.01.3 Construction Requirements

The alignment of the gabion shall be correct within a tolerance of 100 mm of the instructed alignment and the level of any course of gabion shall be correct to within a tolerance of 50 mm of the instructed level. In addition adjacent gabions shall not vary by more than 25 mm in line and/or level from each other.

The pre-packed elements of gabions shall be of dimension and arranged as shown on the standard drawings.

The surface upon which gabions are to be laid shall be compacted to a minimum dry density of 90 % MDD (AASHTO T180) and trimmed to the instructed level or shape.

Joints in gabions shall be stitched together with 600 mm minimum lengths of binder wire, with at least one stitch per 50 mm, and each end of the wire shall be fixed with at least two turns upon itself.

Adjacent gabions shall be stitched together with binder wire along all touching edges.

Gabion boxes shall be laid with broken bond and throughout to avoid continuous joints both horizontally and vertically.

All wire shall be to BS 1052 having a tensile strength of not less than 40 kg/mm² and plastic coated or appropriate plastic material produced by a reputable manufacturer, subject to the approval of the Project Manager. Galvanising shall comply with the requirements of BS 443.

Gabions shall be constructed to the shapes and dimensions as shown on the Drawings or given in the Special Specification or as directed by the Project Manager. Gabions, as constructed shall be within a tolerance of ± 5 % on the height or width instructed and ± 3 % on the length instructed.

Gabions shall be hand-packed with broken rock of 150 mm minimum dimensions and 300 mm maximum dimension. The sides shall be packed first in the form of a wall, using the largest pieces, with the majority placed as headers with broken joints to present a neat outside face. The interior of the gabion shall be hand packed with smaller pieces and the top layers shall be finished off with larger pieces. The whole interior and top layers shall be packed tight and hammered into place.

Where shown on the drawings or where instructed by the Project Manager the Contractor shall place filter fabric

(‘Terram’ or similar approved) behind gabion faces or below mattresses in contact with existing or backfilled ground. The Contractor shall ensure that the filter fabric is not damaged during the construction or backfilling around the gabion works and any damaged or torn fabric shall be replaced.

At the back face and ends of completed gabion work or where shown on the Drawings or instructed by the Project Manager the existing soil shall be backfilled, thoroughly compacted against the sides of the gabions and finished flush with the top surface of the gabion.

7.01.4 Measurement and Payment

The measurement of gabion walling and mattresses shall be the number of gabion boxes and volume contained within the outline of the gabions or mattresses as stated in the Contract

Payment will be made under:

Pay Item	Pay Unit
Provision and installation of gabion boxes	each
Crushed stone for gabion boxes	cubic meter

SECTION 8, BRIDGE WORKS

8.01 Removal of Concrete Elements

8.01.1 Description

The works comprises the removal of existing concrete bridge elements, including saw cut limits of removal, cutting through reinforcement, protection of permanent elements to remain, and transport and disposal of material.

8.01.2 Construction Requirement

Remove the shown parts of the old bridge according to the drawings carefully. If the bridge crosses water, no material should be allowed to fall into the water.

Removal method of asphalt concrete shall be approved by the Project Manager.

The Project Manager shall approve the concrete chiseling equipment. When dismantling concrete, marked straight cutting lines shall be used, which do not damage the reinforcement. Damaged concrete shall be chiseled behind the steel bars to a depth of at least 20 mm or equal to bar diameter.

All cutting concrete surfaces and reinforcing bars shall be abrasive-blasted or high-pressure water-blasted to remove all debris, loose concrete and rust. Concrete surfaces shall be blasted to produce a clean rough surface.

If the whole construction, including foundation down to 1 meter beneath ground level or according to drawings, will be removed, check the required lifting capacity of the crane beforehand.

8.01.3 Measurement

Removal of concrete elements will be measured in cubic meter. No deduction shall be made for

- (a) holes, pockets and the like not exceeding 0.15 cubic meter in each volume
- (b) reinforcement
- (c) cast in components not exceeding 0.15 cubic meter in each volume

8.01.4 Payment

Payment will be at the unit price per cubic meter of the concrete in the elements to be removed.

Payment will be made under:

Pay Item	Pay Unit
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Removal of concrete elements	cubic meter
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8.02 Structural Excavation and Backfill

8.02.1 Description

The works consist of structural excavation and backfill, including loosening or breaking up material before or in the process of excavation, and provision and compaction of backfill.

8.02.2 Material and Construction Requirements

Excavation shall be done to the extent that makes it possible for the Contractor to work with the supports according to the drawings. The slopes of the excavation should not be steeper than 1:1.5 for excavation deepness less than 2 m and not steeper than 1:1.7 for deeper excavations or according to drawings.

The bottom of all foundation excavations shall be inspected by the Project Manager and rectified, compacted or covered with lean concrete as instructed before formed to the lines and levels shown on the Drawings. Pockets of soft

soil or loose rock shall be removed and the resulting voids and any natural voids shall be filled with lean mix concrete.

Material used for backfill and for erosion protection shall be in according to SNiP 2.05.02-85

Where fill to structures is required to the same level on more than one side of a structural element or buried structure it shall be maintained at heights not differing by more than 250 mm after compaction on opposing sides of the structural element as filling proceeds.

The Contractor shall restrict compaction plant used on fill to structures, within 2 m of a structure, to the following items:

- (i) vibratory roller having a mass per meter width of roll not exceeding 1,300 kg with a total mass not exceeding 1,000 kg;
- (ii) vibrating plate compactor having a mass not exceeding 1,000 kg;
- (iii) vibro-tamper having a mass not exceeding 75 kg.

The soil compaction degree of working layer behind the abutments, defined by compaction ratio, should meet the requirements of SNiP 2.05.02-82 table 22. (Ratio 0.95)

8.02.3 Measurement

The measurement for excavation shall be the volume of the void to accommodate the structure, bedding and surround to the outline stated in the drawings. The measurement of backfill and compaction shall be the volume of compacted backfill.

8.02.4 Acceptance and Payment

The works will be accepted for payment providing that it is carried out in accordance with the drawings and specifications and is approved by the Project Manager. Provision of material and deposition of surplus material and all ancillary works including transport are included in the unit price.

Payment will be made under:

Pay Item	Pay Unit
Structural excavation	cubic meter
Backfill	cubic meter

8.03 Scaffolding and Formworks

8.03.1 Description

This work includes constructing and removing of all scaffolding and formwork as well as work platforms and safety railings. Design is included in the work, respectively. The Contractor shall submit the design documents for Project Manager's approval at least one week before planned starting date for construction of the temporary supports, formwork and scaffolding.

8.03.2 Material

On the Site, the material in the form shall be wooden material, either formwork timber or plywood. Aluminum ties should be used for bracing of the formwork, if possible. The Project Manager shall approve all materials and equipment.

8.03.3 Construction Requirements

Formworks should be done in according to SNiP 3.01.01-85, III-15-76, III-43-75 and the description below.

Temporary supports shall be designed, constructed and removed according to SNiP 3.06.04-91. Maximum acceptable form deformation is L/300, for beams L/500.

The formwork shall be well moistened before casting the concrete so that it will not leak or take up water from the fresh concrete. The surface shall be well oiled to prevent the formwork to get stuck to the concrete.

Tolerances

The tolerances of the formwork should be ± 5 mm of the measures shown at the drawings

Removal of the formworks

The Contractor will not be allowed to remove the formwork until 70% of the concrete compression strength has been achieved. Formwork removal shall be carried out without any damage to structures.

The Project Manager shall approve the time of removal of the formwork.

8.03.4 Measurement and Payment

There will be no measurement and payment for this item. The cost of the formwork shall be included in the price of the cast concrete.

8.04 Reinforcement

8.04.1 Description

The works consist of provision, placing and transport of reinforcement for concrete elements.

8.04.2 Material and Construction Requirements

Material shall comply with the requirements of SNiP 2.05.03-84, GOST 5781-82 and GOST 380-88. The Project Manager shall approve all materials and equipment. Works shall be carried out in accordance with the requirements of SNiP 3.06.04-91 and SNiP 2.05.03-84. The Contractor shall prepare and deliver reinforcement plans for Project Manager's approval at least one week before starting date of the reinforcement works.

Concrete cover

At surfaces subjected to rapid flow of water or placed directly against the ground, steel reinforcement shall have a minimum cover of 75 mm of concrete. At other surfaces exposed to water or weathering conditions, or situated below ground level, the cover for steel reinforcement shall be not less than 45 mm for bars over 16 mm in diameter and not less than 40 mm for bars 16 mm or less in diameter, unless otherwise shown on the Drawings. The tolerance is ± 5 mm.

The cover shall be achieved by placing distance blocks between the reinforcement and the formwork with c/c 1.0 meter. These blocks shall be manufactured of the same sort of cement as the structural concrete.

8.04.3 Measurement

The steel reinforcement in the formworks is measured in tons.

8.04.4 Payment

In precast elements the cost of reinforcement is included in the price of the cast concrete. The reinforcement in cast in situ elements and foundations is paid separately according to the unit rate per unit.

8.05 Concrete Works

8.05.1 Description

The works includes provision of concrete, concrete casting with forms, transport, manufacturing and installation of pre-cast elements.

8.05.2 Materials and Construction Requirements

Materials shall comply with the SNiP 2.05.03-84, SNiP 3.06.04-91, Russian Standard Drawings and VSN 24-88.

In the following are additions to some of the standards. The additions precede what is written above:

Concrete shall be composed of Portland cement, fine aggregate, coarse aggregate, water and admixtures as specified, all well mixed and brought to the proper consistency.

Storage of aggregates: After washing, fine aggregate shall be stored in stockpiles with a free draining base for at least 72 hours and shall be subsequently handled to ensure that sand delivered to the batching plant has a uniform and stable moisture content.

Storage of Cement: Cement that has not been used within three (3) months from the date of initial sampling shall not be used in the Works unless it has been retested and is shown to conform to the specified requirements.

The following requirements shall apply to the storage and handling of cement at the Site or at any intermediate transfer or storage point:

All methods for transporting, handling and storing bulk and bagged cement shall be designed beforehand.

All storage bins and silos shall be drawn down (so as to be substantially empty) at least once every three (3) months.

All bagged cement shall be stored at all times, up to its use in the Works, in completely weatherproof structures, which shall include a raised floor and be adequately ventilated to prevent the accumulation of moisture. Cement of different types shall be stored separately.

Do not use cement that: a) has become partially set b) contains lumps or caked cement c) is salvaged from discarded or previously opened bags.

Addition of water to overcome stiffening of the concrete before placing will not be permitted.

Aggregate shall not be batched for concrete or mortar when free water is dripping from the aggregate.

Cement shall be sampled at the source and tested by the manufacturer and certified as conforming to the requirements of this Specification before being dispatched from the factory of the cement manufacturer. All costs associated with the sampling and testing shall be included in the rates for furnishing and handling cement.

The concrete mixture

The maximum ballast size shall be 32 mm. No aggregates that can cause alkali reactions can be used. The grading scale of the aggregates can be as follows:

38 % 0 mm – 4 mm sand (i.e washed quarts)

60 % 5 mm - 32 mm (i.e basalt or granite).

All the components and aggregates used in the concrete mix must be laboratory tested according to GOST standards. Moreover, the contractor must specify:

Place of origin of components and aggregates

Petrography analysis and chemical composition of all components, including water

Quality and compressive strength of the aggregates

Water absorption capabilities of all fractions used (<1 % weight percent)

All reinforced concrete tests, certifications, verifications and documents required by GOST for bridge construction must be complied with.

Requirements for the composite parts of concrete

The composite parts of the structural concrete mass, including filler, sand, rock, additives or plastifiers must have known documented origin and documented properties. The composite parts may not contain any items that can endanger or diminish the structural concrete's or reinforcement's properties and function.

The chloride content of the composite materials must be so low that the total free chloride content (Cl-) of the structural concrete not exceeds 0,1% of the binder weight. An independent laboratory must test this criterion.

Cement

The cement must be Standard Portland 400 and comply with the GOST standards and quality requirements.

The chemical composition of the Portland cement 400 must convey to GOST standard. However, the cement type used must be low alkali and high sulphate resistance, LA/SR. The upper C3A limit must be 5%. The requirements of the Tables 1 and 2 must be fulfilled, too.

Table1: Maximum values for certain chemical components in the cement.

Chemical composition	Weight percentage
Cl	0,1
Gravimetric SO ₃ ,	4,0
Inorganic correction materials	5,0
MgO	5,0

Table 2: Complying values for certain properties of the cement.

Cement qualities		
Cementation	3 hours	8 hours
Heat development	Maximum	Maximum
	210 J/g	250 J/g days
	days 1-3	1-7
Compressive strength	Minimum	Minimum
	16 MPa	29 MPa day
	day 7	28
Bend / Shear	Minimum	Minimum
	3 MPa	5 MPa
	day 7	day 28

Mineral additives

If mineral additives are used in the concrete, the Contractor must present a special report containing the physical properties of the mineral additives and their chemical composition together with their variation. This report must include:

Specific Area

Combined Aggregate Grading

Production Certificate

Fly ash is not permitted as mineral additive. Other mineral additives will only be allowed in factory-produced concrete. In-situ use of mineral additives is only permitted after the written permission of the Project Manager. Before the use in the structural concrete, the mineral additives have to be tested and analysed and the results presented to the Project Manager. The test results may not exceed the values shown in Table 3.

Table 3: The maximum content values for some products accepted in mineral additives. (Values expressed in weight percentage of dry material).

	Silica	Slag
Cl	0,2	0,1
SO ₃ ,	4,0	4,0
CaO	2,0	
MgO	5,0	
Equivalent alkali content (Calculated as Na ₂ O + 0,66K ₂ O)	0,6	0,6
Glow, loss	5,0	

Concrete casting

The Contractor shall make a work plan for the concrete casting. When necessary, the work plan shall be revised

before each casting. Work Plan shall include at least the following items:

- General description of structures
- Special requirements for concrete, e.g. frost resistance
- Requirements for work conditions, e.g. readiness for hot weather conditions
- Available equipment
- Management of works and personnel
- Preparations for concrete casting
- Arrangements to avoid cracks formation
- Mixing
- Casting
- Vibration
- Construction joints
- Temperature measurements during concrete hardening
- Strength measurements
- Repair and finishing

The Contractor shall, where necessary, employ effective means such as pre-cooling the aggregates, refrigerating the mixing water, adding chipped or flaked ice into the mixing water, placing at night or a combination of these, to ensure that the concrete does not exceed the temperature of 350 C or is less than 50 C during curing.

Under no circumstances will concrete be accepted if the temperature of the concrete, as deposited into the formwork, is not within these limits.

The Contractor shall provide for the cooling of mixing water and for the efficient insulation of any storage tanks and pipelines for mixing water.

Aggregate bins, batching and mixing equipment shall be painted white and protected from sunshine as far as practicable.

Appropriate measures shall be taken with respect to transporting and placing the concrete to control the temperature of concrete. Pipelines for conveying concrete shall be shaded and insulated or painted white; the elapsed time from mixing to placing shall be minimised. Concrete shall be placed promptly when delivered and finishing operations shall not be delayed. Concrete surfaces shall be protected from wind and sun, if directed by the Project Manager, during placing, finishing or curing operations.

Immediately before placing concrete, all surfaces upon or against which the concrete is to be placed shall be free from standing water, mud, debris, oil, objectionable coatings and loose, semi-detached fragments. Where directed by the Project Manager, the surfaces shall be cleaned with water jet.

The surfaces of construction joints shall be clean when covered with fresh concrete or mortar. Cleaning shall consist of the removal of all laitance, loose or defective concrete, coatings, sand, curing compound if used, and other foreign material to the satisfaction of the Project Manager.

Construction joints shall be wet usually for 12-14 hours before casting, so that moisture will not be drawn from the freshly placed concrete. Wooden forms shall be wet few days before casting and tightened just before casting.

The Contractor shall place all concrete in structures as shown on the Drawings, or as directed by the Project Manager, in accordance with this Specification, or as approved by the Project Manager. Concrete shall be deposited continuously and at a rate, which will give the prescribed rise of the fresh concrete in the formwork, while a block of concrete is being completed.

At every place where concreting is in progress, one of the Contractor's supervisors, well experienced in concrete works, shall be present and responsible for the work. All concreting shall be carried out by skilled workmen under the supervision of a foreman with sound technical knowledge and experience. During concreting, a sufficient number of workmen shall be present to handle the concrete and an adequate number of steel fixers and carpenters shall keep the steel reinforcement and form work under surveillance.

If and when concreting is carried out in the dark, ample lighting shall be provided at the mixing station and at every place where concrete is being deposited.

The concrete shall be handled and placed in such a manner that it will have an approximately horizontal, plastic surface throughout the casting. The rise of concrete in the formwork shall not be less than 100 mm per hour. The maximum permitted rise of concrete in formwork shall not exceed 750 mm per hour, unless otherwise approved by the Project Manager.

When casting the concrete, it must be vibrated so that homogenous construction is obtained. Concrete shall be vibrated in layers 250...300 mm in thickness. At the same time previously placed layer shall be vibrated. Vertical structures shall be vibrated with vibrators with $D=25\ldots48$ mm. Vibrator should be kept as vertical as possible. Vibrating time is at least 10 minutes per cubic meter. The Project Manager shall approve vibrators.

Concrete shall be protected against damage from sunshine and rainfall. Concrete may not be placed in water, unless specifically indicated on the Drawings or approved by the Project Manager. The Contractor shall deal with all water encountered during concreting operations in such a manner that the water is prevented from flowing over or exerting pressure against the concrete, until such time after depositing as approved by the Project Manager.

While the concrete is at an early age, the surface of the joint shall be prepared for the subsequent deposition of fresh concrete by the application of high velocity water jet with a pressure of at least 3 atmospheres at the nozzle. The jet shall be applied so that laitance and foreign matters are removed and the clean aggregate exposed, but not so that the edges of the larger particles of the aggregate are undercut.

The Contractor shall inform the Project Manager when concrete will be placed.

Sprinkling of the surfaces with dry cement or any other material during finishing operations for drying off the concrete, to facilitate towelling or for any other purpose will not be permitted.

Curing, protection and finishing the surfaces

At least fourteen (14) days before placing concrete in any structure to be water cured, the Contractor shall submit to the Project Manager details of the equipment and methods he proposes to use for water curing. Water used for curing shall meet the requirements of this Specification for water used in concrete, but with the additional requirement that the water shall not contain any chemicals or other substances that will cause staining of concrete surfaces.

Concrete cured with water shall be kept continuously wet for at least fourteen (14) days immediately following placement of the concrete, or until covered with fresh concrete.

In case of sunshine or windy weather concrete shall be covered with plastic sheeting. Immediately after curing period surfaces will be checked for cracks. Maximum acceptable width of crack is 0.2 mm. In parapets and sidewalk areas cracks 0.1 mm or more in width shall be injected or grouted.

Prefabricated beams

A certificate that states their conformity with the requirements according to Standard drawings and Russian Standards shall accompany the beams. The required concrete quality shall be at least B30.

The support for the beams shall be well prepared and approved by the Project Manager before placement of the beams as described in the drawings. The joints between the beams shall be cast according to the drawings with concrete of at least quality B30.

Tolerances

Dimensions shall conform to design documentation. Tolerance for bridge span clearances shall be ± 30 mm. Falls on concrete surfaces shall be ± 0.5 %. Bridge span surface acceptable evenness is 20 mm measured by a straight-line 4 m in length. Concrete cover shall not be less than 5 mm under minimum acceptable.

8.05.3 Measurement

Concrete casting will be measured in cubic meters.

8.05.4 Payment

All costs for material, mixing, casting and handling the concrete up to acceptance of the work shall be included in the

cost per cubic meter.

For prefabricated beams all costs for transportation and placing of the beams shall be included in the unit price. The casting of the joints between the beams shall also be included in the price.

All concrete works will be paid according to the Bill of Quantities.

8.06 Repair of Small Concrete Damages without Forms

8.06.1 Description

This work consists of repair of small concrete damages caused by faulty pours and other poorly compacted places and local deterioration or breaks.

8.06.2 Materials

Following or equal cement based patch mortars should be used:

1) Polymer cement mortar (Russia):
 Portland cement M 400-500; GOST 10178-85
 Sand M 0.4-0.8; GOST 8736-85
 44% emulsion divinyl styrene latex SKS-65 GP mark TU 38.103111-83
 Water; GOST 23732-79

The ratio of the above mentioned mass parts in the polymer cement mixture is the following: 100:100:41:17.

- 2) Structurite 300 Thoro N.V. (Belgium)
- 3) Sika Top 122 Sika AG (Switzerland)
- 4) Vandex CRS 05 Vandex GmbH (Germany)

Materials shall be approved by the Project Manager.

8.06.3 Construction Requirements

Patching works shall be made according to the instructions of the manufacturer.

Damaged concrete shall be chiseled. The boundaries of the concrete to be removed shall be saw cut to a depth just missing the reinforcing bars. Concrete within the marked boundaries shall be removed by high pressure water jet blasting equipment or light pneumatic hammer.

Concrete shall be removed to a depth of at least 20 mm behind the reinforcing bars. The bars shall be cleaned with steel brush and compressed air. Recommended temperature during works is +10...+15 °C. Air temperature must be at least +5 °C.

The work will be accepted for payment providing that it has been done in conformance to the drawings and specifications and is accepted by the Project Manager.

8.06.4 Measurement

Small repair of concrete surfaces will be measured in cubic meters of the used polymer mortar.

8.06.5 Payment

Payment for all working platforms and scaffoldings are included in the unit price. Payment will be made at the unit price by cubic meters according to the priced Bill of Quantities.

Payment will be made under:

Pay Item	Pay Unit
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Repair of concrete elements	cubic meter
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8.07 Painting of Steel Structures

8.07.1 Description

This work consists of cleaning, sand blasting and painting of steel structures. Works include construction and removal of scaffoldings and working platforms.

8.07.2 Materials and Construction Requirements

Paintwork materials shall comply with the SNiP 2.03.11-85 requirements. Touch-up painting should be done with the same paint material as was used before.

Surface treatment shall consist of at least three paint layers in total thickness not less than 160 µm.

Works shall be carried out in accordance to requirements of SNiP 3.06.04-91. Works shall be carried out in dry weather at the temperature +10 C°...+30 C°. Relative air humidity shall not exceed 80% and the metal surface shall be clean and dry.

Final cleaning shall be done by sand blasting just before painting. Dry quartz sand of 0,6...1,5 mm in grain size shall be used for sandblasting.

The Contractor shall submit the work plan of surface treatment and painting and description of proposed materials to the Project Manager for approval at least two weeks before planned procurement of paint materials. Design of necessary scaffoldings must be submitted within work plan.

8.07.3 Measurement

Painting is measured in square meters of the painted surfaces.

8.07.4 Payment

Accepted quantities are paid per unit at the contract price. Payment includes the old painting removal by sandblasting, design, construction and removal of temporary scaffoldings and working platforms and necessary vessels.

Payment will be made under:

Pay Item	Pay Unit
Paining of steel elements	square meter

8.08 Down Pipes

8.08.2 Description

This work consists of repair of the existing down pipes and construction of new down pipes.

8.08.3 Materials

Stainless steel should be used for down pipes, if possible. The Project Manager may accept also the following materials:

Cast iron pipe, TCK, GOST 69423-80–150-200
Cast iron funnel, GOST 1412-85 C415
Cast iron webbing, GOST 14122-85 C415

Polymer cement mortar shall be made according to GOST 28013-89 and SNiP 3.06.04-91

8.08.4 Construction Requirements

Down pipes installation works shall be executed according to the requirements of SNiP 3.06.04-91.

The rehabilitation of existing down pipes includes installation of new down pipes, funnels and webbings on the designed levels.

New down pipes will be constructed, where distance between the existing down pipes exceeds 10 m.

The location of new down pipes shall be approved by the Project Manager.

Down pipes shall be glued with stiff epoxy glue.

8.08.5 Measurement

Repair of existing down pipes and installing new down pipes are measured by number.

8.08.6 Payment

The accepted quantities will be paid at the contract price per unit of measurement.

Payment will be made under:

Pay Item	Pay Unit
Installation of new down pipes	linear meter
Repair of existing down pipes	linear meter

8.09 Bridge Railings

8.09.1 Description

This work comprises dismantling of railing sections, their re-installation, straightening or replacement of damaged railing elements including fixing details, sand blasting of existing railings and painting as well as manufacturing, installation and painting new railing sections.

8.09.2 Materials and Construction Requirements

Railing material, fixings and technical requirements shall comply with SNiP 3.503.1-81 and SNiP 3.06.04-91 under GOST 380.88. Paintwork materials shall comply with the SNiP 2.03.11-85 requirements. Cleaning of railings from corrosion and the old paint are done according to the VSN 24-88 requirements. Railing elements surface under lacquer coating shall be cleaned till I grade purification efficiency under GOST 9.402-80. Cleaning shall be done by sand blasting.

Surface treatment materials shall consist of two paint layers on two primer layers in total thickness not less than 160 µm.

The quality of the paintwork layer shall correspond to the VI class under GOST 9.032-74.

The Contractor shall submit the work plan of surface treatment and painting and description of proposed materials to the Project Manager for approval at least two weeks before planned procurement of paint materials.

8.09.3 Measurement

Bridge pedestrian railing will be measured in linear meters.

8.09.4 Payment

Payment will be at the unit price per linear meter for the delivery and placing rails..

Payment will be made under:

Pay Item	Pay Unit
Handrails	linear meter

8.10 Bearings (N/A)

8.11 Expansion Joints

8.11.1 Description

The work consists of removal of existing expansion joints, supply and installation of new expansion joints, including provision of data and drawings, adhesives and the like, and protective system.

8.11.2 Materials

Expansion joints structures shall be manufactured at plant conditions meeting SNiP 3.03.01-87, SNiP III-18-75 and SNiP 3.06.04-91 requirements. The joints constructions shall be manufactured with the control erection of all elements at the plant. Packages are completed with all the necessary elements including catch drains.

Storage and installation of joints, jointing materials, sealants and other associated items shall be in accordance with the manufacturer's recommendations.

The same joint system, seal or sealant shall continue across the full width of the deck including footway, verge, hard strip, hard shoulder and central reserve. Different joint systems shall not be combined at one end of a deck unless otherwise approved by the Project Manager.

8.11.3 Construction Requirements

Expansion joints are discontinuities in concrete designed to allow for thermal or other movements in the concrete. Expansion joints shall be formed in the positions and in accordance with the details shown on the Drawings or elsewhere in the Specifications.

Installation

The existing expansion joints shall be removed without damaging the adjacent concrete parts. Before installation of the joint, the concrete surfaces shall be free from laitance, sound, clean and comply with the manufacturer's requirements.

The expansion joint and the bridge deck waterproofing shall be formed so that a watertight seal is provided. Where prefabricated units are used, the seal between each unit shall be made watertight and in addition a secondary waterproofing system in the form of a continuous membrane shall be installed.

Expansion joints shall be of uniform width and straight alignment and shall be accurately set and finished and aligned with the finished surface.

During the placing and hardening of the bedding and bonding materials, movement between the joint and the substrate shall be prevented.

Installation works and welding erection joints shall be executed according to the SNiP 3.03.01-87, SNiP 3.06.04-91 requirements and "Expansion joints construction recommendations".

Before vehicles traffic the joints, temporary covers capable of withstanding vehicular loading shall be provided over expansion joints during and after their installation as appropriate for protection.

Corrosion Protection

Expansion joints shall be protected from corrosion in accordance to the requirements of SNIP2.03.11-85.

8.11.4 Measurement

Expansion joints are measured in linear meter.

8.11.5 Payment

Payment for expansion joints will be at the unit price per linear meter for the installation of expansion joints on the top of the carriageway and sidewalk.

Payment will be made under:

Pay Item	Pay Unit
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Expansion joint on the carriageway	linear meter
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Expansion joint on sidewalks	linear meter
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8.12 Waterproofing and Protective Layer

8.12.1 Description

This work consists of preparation of concrete surface for applying sheet membrane waterproofing and construction of protective layer on the carriageway.

8.12.2 Materials

The bridge deck shall be waterproofed by two watertight layers to ensure protection against damage caused by moisture, frost action and de-icing salts. The waterproofing shall be protected by a protection course. The waterproofing shall conform to the following requirements:

Thickness of layer	≥ 6 mm
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Water pressure resistance	300 kPa
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Temporary heat resistance	200 °C
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Tensile strength, longitudinal direction at 23 °C 10 kN/m and in cross direction 8 kN/m

Concrete B 30 shall be applied for leveling and protection layer. Protection layer shall be reinforced in accordance to the Typical Design 3.503.1-101.

All materials shall be approved by the Project Manager and conform to the requirements of SNiP 3.06.04-91, SNiP 2.05.03-85, VSN 32-81. The Contractor shall submit to the approval of the Project Manager at least 2 weeks prior to the commencement of the works technical details and specifications, together with the working drawings of the waterproofing and protective layers. Materials shall be stored according to the manufactures recommendations.

8.12.3 Construction Requirements

The works shall be carried out according to the requirements of SNIP 3.06.04-91.

Concrete surface

The surface that is to be waterproofed must be blasted in order to obtain a thoroughly roughened and clean surface. Cracks wider than 0.2 mm shall be sealed by a method approved by the Project Manager. The work shall be carried out so that no particles over 1.5 mm protrude from the concrete surface. Prior to the waterproofing, the entire surface of the concrete shall be cleaned with compressed air. No vehicle traffic is allowed on the cleaned parts. Only personal that are involved in the waterproofing works are permitted on the cleaned parts of the bridge deck. It is important that no execution works that can generate dust or dirt are to be carried out in the vicinity of the waterproofing area.

The surface of the drain outlet must be sanded slightly in such a way that a mat surface is obtained.

Working conditions

All the waterproofing work shall be done on dry and clean surface, at least 21 days after the concreting work. No stains of oil, petrol or other fluids are allowed on the surface of the concrete.

The protective and binder course are to be applied within 12 hours after the waterproofing has been placed on the concrete surface. No vehicles, tools or other personal are allowed to stand on the waterproofing.

Texture of waterproofing

The bridge deck will be waterproofed with two layers of waterproofing mat. The clean concrete surface will be at first primed with bitumen solution, 0.3 kg/m².

The first waterproofing mat can be either welded or glued to the deck with bitumen. In both cases great care should be taken in the amount of heat applied.

The execution must start at the lowest point of the structure. The mat is to be rolled out in such a manner that there is a wave of melted bitumen in front of it.

The waterproofing mat must withstand the minimum bond strength. This will be verified by cutting a rectangle of the waterproofing mat with the dimensions 0.1 x 0.3 m. The waterproofing mat and the underlying layer must have the same temperature. The rectangle will be cut into 3 parts with the length of 0.3 m. Thereafter, the short ends will be pulled evenly. The minimum bond strength of 0.5 MPa must be achieved.

Extent of waterproofing and sealing

The waterproofing mat will be rolled out in such a way that the longitudinal overlapping will be 100 mm and the transversal overlapping of 120 mm. Waterproofing at deck joints shall be fully sealed.

Weather limitations

Primers and waterproofing shall not be laid during rain and snowfall. It is desirable to apply temporary covers when working. No waterproofing, seal or protective course works are allowed if the temperature of the underlying concrete surface, waterproofing material or outside air temperature is below +5 C0. During isolation works the relative humidity of the air shall not exceed 85 %.

8.12.4 Acceptance

The work will be accepted for payment providing that it has been constructed to the drawings and specifications and is accepted by the Project Manager.

8.12.5 Measurement

The waterproofing will be measured by square meter and the leveling concrete layer on the bridge slab by cubic meter.

8.12.6 Payment

The accepted quantities will be paid at the contract price per unit of measurement. There will be no separate payment for reinforcement of protective concrete.

Payment will be made under:

Pay Item	Pay Unit
Leveling layer	cubic meter
Waterproofing	square meter
Protective layer	square meter

Drawings

LOCATION MAP

SECTION №1 KM 28-29

PLAN

SECTION №2 KM 29-30

PLAN

ROAD PAVEMENT STRUCTURE

LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

LONGITUDINAL SECTION

CROSS SECTION

SECTION №3 KM 32-33

PLAN

SECTION №4 KM 40-41

PLAN

SECTION №5 KM 42-43

PLAN

SECTION №6 KM 43-44

PLAN

SECTION №7 KM 44+800 - 53+000

PLAN

SECTION №8 KM 45-46 AND SECTION №9 KM 46-47

PLAN

SECTION №10 KM 47-48

PLAN

ROAD PAVEMENT STRUCTURE

LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

INDIVIDUAL SIGN

STRUCTURE OF POST AND FOUNDATION

GENERAL VIEW OF PIPE

AXIS N1, LONGITUDINAL SECTION

AXIS N2, LONGITUDINAL SECTION

AXIS N1, CROSS SECTION

AXIS N2, CROSS SECTION

SECTION №11 KM 48-49

PLAN

SECTION ~~N~~12 KM 50-51

PLAN

SECTION~~N~~13 KM 52-53

PLAN

SECTION ~~N~~14 KM 54-55

PLAN

SECTION ~~N~~15 KM 54-55

PLAN, LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

ROAD PAVEMENT STRUCTURE

CHUTE TYPE I

CHUTE TYPE II

GENERAL VIEW OF PIPE

AXIS N1, LONGITUDINAL SECTION

AXIS N2, LONGITUDINAL SECTION

AXIS N1, CROSS SECTION

AXIS N2, CROSS SECTION

SECTION ~~N~~16 KM 54-55

PLAN

PLAN

SECTION~~N~~17 KM 56-57

PLAN

GENERAL VIEW OF PIPE

SECTION~~N~~18 KM 57-58

PLAN

SECTION ~~N~~19 KM 59-60

PLAN

SECTION ~~N~~20 KM 62-63

PLAN

SECTION ~~N~~21 KM 63-64

PLAN, LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

SECTION~~N~~22 KM 66-67 AND SECTION~~N~~41 KM 68-67

PLAN, LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

SECTION ~~N~~24 KM 71-72 AND SECTION ~~N~~25 KM 71-72

PLAN

SECTION ~~N~~26 KM 73-74 AND SECTION~~N~~27 KM 74-75

PLAN, LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

SECTION №28 KM 76-77 AND SECTION №29 KM 77-78

PLAN

SECTION №30 KM 78-79

PLAN

SECTION №35 KM 84-83

PLAN

SECTION №36 KM 81-80

PLAN

SECTION №37 KM 80-79

PLAN

SECTION №38 KM 80-79

PLAN

SECTION №39 KM 72-71

PLAN

SECTION №40 KM 71-70

PLAN

SECTION №42 KM 64-63

PLAN

SECTION №43 KM 62-63

PLAN

SECTION №34 KM 87-86

PLAN

KM 58+100 (LEFT DIRECTION) ARRANGEMENT OF GRAVEL ROAD, ACCESS ROAD TO LAND PLOTS

PLAN

ROAD PAVEMENT STRUCTURE

GABION WALL

METAL PIPE D-1020MM

REINFORCED CONCRETE CHUTE

INTEL WELL

LONGITUDINAL SECTION

CROSS SECTION

CONSTRUCTION OF BUS STOPS NEAR DECELERATION LINE AT JUNCTION №1 (BOTH DIRECTIONS)

PLAN

ROAD PAVEMENT STRUCTURE

LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

CONSTRUCTION OF BUS STOPS, GENERAL VIEW

STRUCTURE OF STAIRES AND PEDESTRIAN PATH

GENERAL VIEW OF PIPE

CHUTE

LONGITUDINAL SECTION, RIGHT CARRIAGEWAY

LONGITUDINAL SECTION, LEFT CARRIAGEWAY

CROSS SECTION, RIGHT CARRIAGEWAY

CROSS SECTION, LEFT CARRIAGEWAY

CONSTRUCTION OF BUS STOPS KM 97 - BETWEEN JUNCTIONS N1 AND N2 NEAR UNDERPASS (BOTH DIRECTIONS)

PLAN

ROAD PAVEMENT STRUCTURE

LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

CONSTRUCTION OF BUS STOPS, GENERAL VIEW

STRUCTURE OF STAIRES AND PEDESTRIAN PATH

DESIGN REINFORCED CONCRETE RETAINING WALL

CONSTRUCTION OF REINFORCED CONCRETE RETAINING WALL

LONGITUDINAL SECTION, RIGHT CARRIAGEWAY

LONGITUDINAL SECTION, LEFT CARRIAGEWAY

CROSS SECTION, RIGHT CARRIAGEWAY

CROSS SECTION, LEFT CARRIAGEWAY

CONSTRUCTION OF BUS STOPS KM 98 - NEAR DECELERATION LINE AT JUNCTION N2

PLAN

ROAD PAVEMENT STRUCTURE

LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

CONSTRUCTION OF BUS STOPS, GENERAL VIEW

STRUCTURE OF STAIRES AND PEDESTRIAN PATH

GENERAL VIEW OF PIPE

LONGITUDINAL SECTION

CROSS SECTION

CONSTRUCTION OF BUS STOPS KM 102 - NEAR DECELERATION LINE AT JUNCTION N3 (BOTH DIRECTIONS)

PLAN

ROAD PAVEMENT STRUCTURE

LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING

CONSTRUCTION OF BUS STOPS, GENERAL VIEW

STRUCTURE OF STAIRES AND PEDESTRIAN PATH

LONGITUDINAL SECTION, RIGHT CARRIAGEWAY

LONGITUDINAL SECTION, LEFT CARRIAGEWAY

CROSS SECTION, RIGHT CARRIAGEWAY

CROSS SECTION, LEFT CARRIAGEWAY

CONSTRUCTION OF BUS STOPS KM 104 - NEAR BRIDGES AT THE RIVER PRONE WEST SIDE (BOTH DIRECTIONS)

PLAN

ROAD PAVEMENT STRUCTURE

LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING
CONSTRUCTION OF BUS STOPS, GENERAL VIEW
STRUCTURE OF STAIRES AND PEDESTRIAN PATH
EXTENTION OF EXISTING DESIGN REINFORCED CONCRETE RETAINING WALL
CONSTRUCTION OF REINFORCED CONCRETE RETAINING WALL
EXTENTION OF EXISTING CORRUGATED DRAINAGE PIPE D=400MM
METAL HAND-RAIL STRUCTURE
LONGITUDINAL SECTION, RIGHT CARRIAGEWAY
LONGITUDINAL SECTION, LEFT CARRIAGEWAY
CROSS SECTION, RIGHT CARRIAGEWAY
CROSS SECTION, LEFT CARRIAGEWAY

CONSTRUCTION OF BUS STOPS KM 110- NEAR VILLAGE AGARA (BOTH DIRECTIONS)

PLAN
ROAD PAVEMENT STRUCTURE
LAYOUT OF ROAD SIGNS, FENCING AND ROAD MARKING
CONSTRUCTION OF BUS STOPS, GENERAL VIEW
STRUCTURE OF STAIRES AND PEDESTRIAN PATH
EXTENTION OF EXISTING CORRUGATED DRAINAGE PIPE D=400MM
CHUTE TYPE II
CONCRETE DITCH AND CHUTE CONSTRUCTION
LONGITUDINAL SECTION, RIGHT CARRIAGEWAY
LONGITUDINAL SECTION, LEFT CARRIAGEWAY
CROSS SECTION, RIGHT CARRIAGEWAY
CROSS SECTION, LEFT CARRIAGEWAY

INSTALLATION OF HEIGHT RESTRICTION BARRIERS AN ADDITIONAL ROAD SIGNE BEFORE ENTRANCE RIKOTI AND GORI TUNNEL

PLAN GORI TUNNEL
PLAN RIKOTI TUNNEL
STEEL FULL-FRAME STRUCTURE
STEEL FULL-FRAME STRUCTURE DETEILS
REINFORCING OF THE FOUNDATION OF FULL-FRAME STRUCTURE
NONSTANDARD WELDING JOINTS AND STEEL SPECIFICATION PER ONE POST
OVERHEIGHT VEHICLE DETECTION SYSTEM
BARRIER

GENERAL DRAWING

Scheme of installation of standard road signs and road signs of individual design
SCHEME OF TRAFFIC CONTROL
HORIZONTAL LINE MARKING OF CARRIAGEWAY SHALL
FENCING WITH CONCRETE FENCE AND SIGNAL POST
STRUCTURE OF STAIRES AND PEDESTRIAN PATH
GUIDE POSTS AND LIGHT REFLECTINGS
GUIDE POSTS

BILL OF QUANTITIES

A. Preamble

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Particular Conditions of Contract, Technical Specifications, and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.
3. The rates and prices bid in the priced Bill of Quantities shall, except as otherwise provided under the Contract, include all construction equipment, labor, supervision, materials, erection, maintenance, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.
4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of Items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.
5. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.
6. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities.
7. Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with the Conditions of Contract.

B. Work Items

1. The Bill of Quantities usually contains the following part Bills, which have been grouped according to the nature or timing of the work:

Bill No. 1 –
Bill No. 2 –
Bill No. 3 –
Bill No. 4 - etc., as required;
Daywork Schedule; and
Summary Bill of Quantities.

2. Bidders shall price the Bill of Quantities in local currency only .
-

BILL OF QUANTITIES

(Please see BOQ attached in Excel as a separate file)

Section IX. Particular Conditions of Contract

A. General	
GCC 1.1 (d)	The financing institution is: The World Bank
GCC 1.1 (r)	<p>The Employer is Roads Department of the Ministry of Regional Development and Infrastructure of Georgia</p> <p>12A Kazbegi ave. Tbilisi, Georgia</p> <p>The authorized representative is:</p> <p>Mr. Nugzar Gasviani, Deputy Chairman of the Roads Department of Georgia</p>
GCC 1.1 (v)	The Intended Completion Date for the whole of the Works shall be 6 months from the start date.
GCC 1.1 (y)	The Project Manager is: TBD
GCC 1.1 (aa)	The Site is located at: Natakhtari-Agara existing section km28-km114
GCC 1.1 (dd)	The Start Date shall be: Upon written notification of the Project Manager to the Contractor.

GCC 1.1 (hh)	<p>The Works consist of:</p> <p><u>Tbilisi-Senaki-Leselidze</u></p> <p><u>West-East direction</u></p> <p>km28-29- equip of the existing road junction with road signs</p> <p>km29-30 – arrangement of the accelerate lanes, relevant road signs and fencing at the highway junctions</p> <p>km38-39 – arrangement of the guardrail</p> <p>km40-41 lock of the illegal junction with guardrail</p> <p>km42-43 lock of the illegal junction with guardrail</p> <p>km43-44 lock of the illegal junction with guardrail</p> <p>km45-46 lock of the illegal junction with guardrail</p> <p>km46-47 arrangement of the guardrail</p> <p>km47-48 arrangement of the decelerate-accelerate lanes, relevant road signs, marking and fencing at the junction of the Ferma village</p> <p>km48-49 arrangement of the guardrail</p> <p>km50-51 arrangement of the guardrail, additional road signs</p> <p>km52-53 lock of the illegal junction with guardrail</p> <p>km54-55 fencing unprotected artificial structures and old road sign foundations with guardrails</p> <p>km54-55 graveling road to the cement plant, road to the agricultural plots, arrangement of the reinforce chute, relevant road signs, road marking and fencing</p> <p>km54-55 equip of the sharp bend with relevant road signs</p> <p>km56-57 arrangement of the additional relevant road sign, guardrails at the existing junction, connecting existing reinforce channels</p> <p>km56-57 fencing of the individual road signs with guardrails</p> <p>km59-60 fencing of the individual road signs with guardrails</p> <p>km62-63 lock of the illegal junction with guardrail</p> <p>km63-64 equip of the decelerate lane with relevant road signs</p> <p>km71-72 lock of the illegal junction with guardrail</p> <p>km71-72 fencing of the individual road signs with guardrails</p> <p>km73-74 equip of the sharp bend with relevant road signs</p> <p>km74-75 equip of the decelerate lane with relevant road signs</p> <p>km76-77 lock of the illegal junction with guardrail</p> <p>km77-78 lock of the illegal junction with guardrail</p> <p>km77-78 fencing of the individual road signs with relevant road signs and lock illegal junction</p> <p>km77-78 lock of the illegal junction with guardrail Tbilisi-Senaki-Leselidze</p> <p><u>West-East direction</u></p> <p>km87-86 equip of the existing shelter with an relevant road sign</p> <p>km84-83 arrangement of the additional road sign (Tskhinvali junction)</p> <p>km81-80 fencing of the individual road signs with guardrails</p> <p>km80-79 arrangement of the additional road sign</p> <p>km80-79 fencing of the individual road signs with guardrails</p> <p>km72-71 fencing of the individual road signs with guardrails</p> <p>and lock of the illegal junction</p> <p>km71-70 arrangement of the additional road sign</p> <p>km68-67 equip of the existing accelerate-decelerate lanes with relevant road signs</p> <p>km64-63 arrangement of the additional road sign (Nigoza, Karafala junction)</p> <p>km62-61 lock of the illegal junction with guardrail</p> <p>km60-59 arrangement of the additional road sign and guardrail (Rene junction)</p> <p>km57-56 arrangement of the additional road sign and guardrail (Kaspi junction)</p> <p>km57-56 equip of the sharp bend with relevant road sign</p> <p>km47-46 lock of the illegal junction with guardrail</p> <p>km33-32 arrangement of the additional road sign and guardrail (Tserovani, Korovani)</p> <p>km58+100 road to the agricultural plots</p> <p>Arrangement of the 1.5km gravel road, round steel pipes, reinforced opened chutes, upper gabion retaining wall</p> <p>At the decelerate lanes of the junction #1 located at the km94 shelters shell be arranged on both directions</p>
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	<p>Between the junctions #1 and #2 near the underpass located at the km95 shelters shall be arranged at the on both directions</p> <p>At the decelerate lane of the junction #2 located at the km 95 shelter shall be arranged only on right direction</p> <p>At the decelerate lane of the junction #3 located at the km 96 shelter shall be arranged on both direction</p> <p>At the bridge on the river Frone shelters shall be arranged on both directions</p> <p>At the km 110 in Agara near the herd pass shall be arranged shelters, also water avoiding measurements</p> <p>At the West-East direction km44+800 – km53+000 on the whole section guardrails and relevant road signs shall be arranged on both sides</p> <p>At the entrances of the Gori and Rikoti tunnels shall be arranged oversized cargo detecting sensor laser. LED display with free programming full coloring 7.7X2.4 and automatic lock barriers</p>
GCC 2.2	Sectional Completions are: None
GCC 3.1	<p>The language of the contract is English.</p> <p>The law that applies to the Contract is the law of Georgia</p>
GCC 5.1	The Project Manager may not delegate any of his duties and responsibilities.
GCC 8.1	Schedule of other contractors: None
GCC 13.1	<p>The minimum insurance amounts and deductibles shall be:</p> <p>(a) For the Works, Plant and Materials: 110% of the accepted contract price</p> <p>(b) For loss or damage to Equipment: 250,000 GEL</p> <p>(c) For loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract 100,000 GEL</p> <p>(d) For personal injury or death:</p> <p>(i) of the Contractor's employees: 100,000 GEL</p> <p>(ii) of other people: 100,000 GEL</p>
GCC 14.1	Site Data are: None
GCC 20.1	The Site Possession Date shall be confirmed by the Project Manager with a written notification to the Contractor.
GCC 23.1 & GCC 23.2	<p>Appointing Authority for the Adjudicator:</p> <p>"International Arbitration Court of the Georgian Chamber of Commerce and Industry".</p> <p>Address: 29 Berdzeni Str., Tbilisi, Georgia</p> <p>Tel: (995 32) 272-07-10</p> <p>Fax: (995 32) 272-31-90</p>

GCC 24.3	Hourly rate and types of reimbursable expenses to be paid to the Adjudicator: Hourly fees 120 USD (One hundred and Twenty United States Dollars) and travel and accommodation expenses accordingly with actual cost.
GCC 24.4	<p>For contracts with the contractors from the Employer's country:</p> <p>Institution whose arbitration procedures shall be used: "International Arbitration Court of the Georgian Chamber of Commerce and Industry". Address: 29 Berdzeni Str, Tbilisi, Georgia The place of arbitration shall be: Tbilisi, Georgia'</p> <p>For contracts with the international contractors:</p> <p>"Rules of Conciliation and Arbitration of the International Chamber of Commerce (ICC): All disputes arising in connection with the present Contract shall be finally settled under the Rules of Conciliation and Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with said Rules." The place of arbitration shall be: Paris, France</p>
B. Time Control	
GCC 26.1	The Contractor shall submit for approval a Program for the Works within 14 days from the date of the contract signing.
GCC 26.3	<p>The period between Program updates is 15 days.</p> <p>The amount to be withheld for late submission of an updated Program is 10,000 GEL (Ten Thousand Georgian Lari).</p>
C. Quality Control	
GCC 34.1	The Defects Liability Period is: 1 year
D. Cost Control	
GCC 44.1	NOT APPLICABLE
GCC 45.1	The Contract is not subject to price adjustment.
GCC 46.1	The proportion of payments retained is: 5%
GCC 47.1	The liquidated damages for the whole of the Works are 0.1 percent per day of the final Contract Price . The maximum amount of liquidated damages for the whole of the Works is 10 percent of the final Contract Price.
GCC 48.1	The Bonus for the whole of the Works is : None

<p>GCC 49.1</p>	<p>The Advance Payment shall be:</p> <p>20% of the contract price and shall be paid to the Contractor no later than 28 days after receipt and approval of the Advance Payment Security.</p> <p>The amount of the Advance Payment security shall be of the same value and currency as the Advance Payment amount, and shall be in the form provided in the bidding documents. Advance Payment Security shall be issued <u>ONLY</u> from local commercial Banks operating on the territory of Georgia.</p> <p>Full list of commercial Banks operating on the territory of Georgia is available on National Bank of Georgia's website on following link- https://www.nbg.gov.ge/index.php?m=403&lng=eng. Please note that the mentioned link is for the purpose of facilitating process of identification of a suitable local Bank and under no-circumstances commit the Employer to undertake responsibility regarding credibility of any and/or all commercial Bank's on the list</p> <p>The reimbursement of the Advance Payment shall start when the value of Works executed reaches 20%.</p> <p>Formula to calculate the amount of advance payment to be reimbursed in each payment:</p> $Z = A * (x \% - y \%)$ $80\% - B \%$ <p>Z= The amount to be deducted in the calculated period. A= Expresses amount of deposited Advance Payment.</p> <p>X= Works performed in the calculated period divided by the initial contract amount expressed in percentage. This value shall not exceed 80%.</p> <p>Y= The same but for the previous period. B= 20%</p> <p>The Contractor will finish the total reimbursement of the Advance payment when the value of the Works executed reach 80% of the Works Value. Advance payment when the value of the Works executed reach 80% of the Works Value.</p>
<p>GCC 50.1</p>	<p>The Performance Guarantee shall be provided to the Employer as an unconditional and irrevocable Bank Guarantee from the Bank acceptable to the Employer for the amount of 10% of the Contract Price.</p> <p>Performance Security shall be issued <u>ONLY</u> from local commercial Banks operating on the territory of Georgia and shall be in the forms of guarantees provided in the bidding documents in the currency of the Contract.</p> <p>Full list of commercial Banks operating on the territory of Georgia is available on National Bank of Georgia's website on following link- https://www.nbg.gov.ge/index.php?m=403&lng=eng. Please note that the mentioned link is for the purpose of facilitating process of identification of a suitable local Bank and under no-circumstances commit the Employer to undertake responsibility regarding credibility of any and/or all commercial Bank's on the list.</p>

E. Finishing the Contract	
GCC 56.1	The date by which “as built” drawings are required is the date of Completion Date in accordance with GCC Sub-Clause 56.1.
GCC 56.2	The amount to be withheld for failing to produce “as built” drawings by the date required in GCC 56.1 is 10,000 GEL (Ten thousand Lari)
GCC 57.2	The maximum number of days is: 100 days.
GCC 58.1	The percentage to apply to the value of the work not completed, representing the Employer’s additional cost for completing the Works is 20%

ANNEXES

All Annexes to this BD s are uploaded to the Dropbox data room and are open to all bidders at the following link:

<https://www.dropbox.com/sh/ezxiou8ldcwf1ds/AAAmRHVmkIRjaTUibEq29eiTa?dl=0>
