

**Local Government & Community Development
Department**



**Amended PC-I
for
Provision of Machinery & Equipment
for
Improvement of Solid Waste
Management in Jhang City**

Estimated cost: Rs.374.01 million

January, 2022

Municipal Committee Jhang

**PC-I Form
For
PROVISION OF EQUIPMENT MACHINERY
FOR
IMPROVEMENT OF SOLID WASTE MANAGEMENT IN JHANG CITY**

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PC-I FORM
for
Provision of Machinery & Equipment for improvement of Solid Waste Management in Jhang City

Project Serial Number

Sector :Local Government & Community Development Department
Sub Sector: Social

1. Name of the project	Amended PC-I Provision of Machinery & Equipment for improvement of Solid Waste Management in Jhang City
2. Location	<p>Location</p> <p>Jhang city is a District headquarter city of Jhang District. It is situated on the east bank of the Chenab River, about 210 km (130 mi) from Lahore, about 70 km (43 mi) from Faisalabad, about 160 mi (257 km) from Multan. Jhang has also been connected with Motorway M-4 through Jhang-Gojra Road. It's bearing are N 31° 16' and E 72° 19'.</p> <p>Location map and city description has been given in Annexure-A</p>
3. Authorities responsible for:	
i- Sponsoring	World Bank funding through loan for Punjab Cities Program administered by PMDFC.
ii- Execution	Municipal Committee Jhang under the oversight of PMDFC
iii- Operation and Maintenance	Municipal Committee Jhang
iv- Concerned Provincial Department	Punjab Local Government and Community Development Department
4a. Plan Provision	
i. If the project is included in medium term/five year plan, specify actual allocation	The Technical Assistance (TA) Component of the Punjab Cities Program (PCP) has been funded in ADP 2021-22 at Serial No-1922 with an allocation of Rs 374.01 million. The subproject under this PC-I is one of the projects being planned and executed under Punjab Cities program.
ii- If not included in the current plan, what warrants its inclusion and how it is now proposed to be accommodated	PCP is a World Bank funded Program and as per policy of Government of Punjab, Foreign Funded Programs /projects is not reflected in the ADP. However, as indicated above, the Technical Assistance (TA) Component of PCP has been reflected in ADP 2021-22 at Serial No 1922 with an allocation of Rs 374.01 million and the sub project under this PC-I is one of the subprojects being implemented under PCP.
iii- If the project is proposed to be financed out of block provision indicate.	No; the Program is not funded under the Block Allocation.
4 Provision in the current year PSDP/ADP	Rs. 374.01 million have been allocated under ADP 2021-22 at Sr. No-1922 under the caption of Technical Assistance (TA) Component for Punjab Cities Program.
5. Project objectives and its relationship	Sector Objectives

with sector objectives	<p>The sector objectives included in the Annual Development Program 2021-22 as <i>Strategic Intervention (2021-22)</i> are given below:</p> <ol style="list-style-type: none"> 1. Provision of machinery & equipment of solid waste management in Jhang city 2. Provision of machinery & equipment of solid waste management in Jhang city project amounting Rs.374.01 Million will be launched 3. Vehicle Chassis amounting Rs.168.201 Million will be launched under 4. Provision of Super Structure project amounting Rs. 98.236 Million. 5. Provision of wheel Excavator amounting Rs. 38.679 million 6. Provision Three years HR cost for operation of Solid Waste Machinery of amounting Rs. 63-828 million 7. Cost of purchase of the Vehicle Tracking System Service charges for 3 years amounting to Rs.5.065 million <p>Objectives of Sub-Project</p> <ul style="list-style-type: none"> • Provision of new improved, economical, efficient and cost effective Solid Waste Collection and Transportation machinery & Equipment for improving the efficiency of collection and disposal of solid waste and the sanitary and hygienic conditions in the city. • Raising the service delivery level in the sector of Solid Waste Management for reduction of the vector and water borne diseases to improve general health standards of the citizen. <p>Scope of the Sub-project</p> <p>The scope of the subproject includes:</p> <ol style="list-style-type: none"> 1) Provision of equipment and machinery for primary collection of the solid waste in effective manner. 2) Provision of machinery for secondary collection and safe transportation of the solid waste to dumping sites. 3) Provision of machinery for excavation, re-handling and compaction of the solid waste in dumping sites. 4) Provision of motor bikes for easy mobility of the sanitation supervisory staff. 5) Provision of mobile workshop for at site and speedy repairs of the equipment and machinery for reducing the breakdown periods and increasing the efficiency of these machines. <p>Hence, the objectives of the project are in line with the sector objectives given at Sr.No-5 given above.</p>																		
<p>6. Description, justification, technical parameters and technology transfer aspects (enclose feasibility study for projects costing Rs.350.05 million and above</p>																			
i. Present Condition	Existing situation of solid waste management in the city is given in Annexure-B																		
ii. Description of the subproject-	Description of the project including the planning, design and the proposed scope of work has been given as under: Section-I Design Criteria: Annexure-C Section-II Project Proposal: Annexure-D																		
iii Provide details of civil works, equipment, machinery and other physical facilities required for the project	<p>The details of the machinery and equipment to be procured by MC under the project are given below:</p> <table border="1" data-bbox="379 1895 1305 2204"> <thead> <tr> <th>S.N.</th> <th>Detail of machinery & equipment</th> <th>Nos.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Arm roll truck 5 m³</td> <td>4</td> </tr> <tr> <td>2</td> <td>Arm roll truck 10 m³</td> <td>4</td> </tr> <tr> <td>3</td> <td>Compactor trucks</td> <td>5</td> </tr> <tr> <td>4</td> <td>0.8 m³ containers</td> <td>228</td> </tr> <tr> <td>5</td> <td>Three wheeled conventional handcarts</td> <td>182</td> </tr> </tbody> </table>	S.N.	Detail of machinery & equipment	Nos.	1	Arm roll truck 5 m ³	4	2	Arm roll truck 10 m ³	4	3	Compactor trucks	5	4	0.8 m ³ containers	228	5	Three wheeled conventional handcarts	182
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6	Three wheeled handcarts with adjustable height compatible with 0.8 cubic meter containers	25
7	Mini tippers	12
8	Water boozers with spray system	2
9	Front blade tractors	3
10	Front end loaders	4
11	Dumper trucks 10 m ³	1
12	Wheel Excavator	1
13	Mobile workshop (Suzuki Carry)	1
14	Motor bike 70 CC	8

Iv Indicate governess issues of the sector relevant to the project and strategy to resolve them

- MC has a number of sections that deal with the service delivery, however for design, planning, marketing, and regulating the services MC needs strengthening of certain sections in terms of additional manpower as well as diverse skills. It should have the financial and technical capacity to operate and maintain the existing and additional infrastructure being provided under the project.
- Presently all MCs in Punjab are short of manpower required for the collection and disposal of waste because of the ban imposed on recruitment of staff since long. The population has increased whereas the manpower has been reduced because of death and retirement of number of skilled and non-skilled workers. Hence even the provision of most efficient machinery and equipment for solid waste collection and disposal will not bring about targeted results if the required manpower is not provided to the MCs.
- MC Officers and workers responsible for the solid waste management will have to be trained for operation and maintenance of the machinery and equipment and will have to be monitored for at least Program implementation period to derive the best possible efficiency.

7- Capital Cost of Project

The total costs of the machinery & equipment has been worked out as given in the table below:

(All figures in million PKR)

1	Group-A	
	Vehicles chassis	168.201
2	Group-B	
	Super structure of the vehicles	98.25
3	Group-C	
	Wheel Excavator	38.679
4	Group-D	
	Two years HR cost for operation of Solid Waste Machinery	63.828
5	Group-E	
	Cost of purchase of the Vehicle Tracking System including 5 % PST Service charges for 3 years	5.065
Total cost		374.02

The specifications and standards for manufacturing the machinery & equipment have been given in **Annexure-E**

For cost effectiveness, the chassis of the vehicles will be procured directly from the manufacturers and handed over to the fabricating vendors for construction of the super structure. This will save middle man's profit.

The details of the cost estimates have been given in **Annexure -F**

i- Indicate date of estimation of the project cost	The project estimates have been framed during the month of January 2022.																																			
ii- Basis of determining the estimates be provided.	<p>The cost estimates have been framed on the basis of standards and specifications and bill of quantities derived from the planning and design of the equipment and machinery as per population of the city duly taking into consideration the machinery and equipment already available with MC.</p> <p>The cost estimation has been based on the market rates for which quotations from the manufacturers have been obtained and included in the PC-I. The quotations provided by the manufacturers for truck chassis have validity period of only 45 days. The rates may change after this period and the PC-I may need revision due to change in these rates.</p>																																			
iii- Provide year wise estimation of physical activities	<p>The physical and financial requirements, year wise are included in the following table:</p> <p style="text-align: center;">A. Physical Phasing</p> <table border="1" data-bbox="363 734 1294 1025"> <thead> <tr> <th>S. #</th> <th>Items of work</th> <th>Total</th> <th>Year 2021-22</th> <th>Year 2022-23</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Group-A- Vehicles chassis</td> <td>100 %</td> <td>100 %</td> <td>0</td> </tr> <tr> <td>2</td> <td>Group-B- Vehicles super structure</td> <td>100%</td> <td>0</td> <td>100%</td> </tr> <tr> <td>3</td> <td>Group-C Wheeled excavator</td> <td>100%</td> <td>0</td> <td>100%</td> </tr> <tr> <td>3</td> <td>HRCost for 2 years</td> <td>100%</td> <td colspan="2">From 2022-23 to 2023-24</td> </tr> <tr> <td>4</td> <td>Monitoring & vehicle tracking system</td> <td>100%</td> <td colspan="2">From 2022-23 to 2024-25</td> </tr> </tbody> </table>	S. #	Items of work	Total	Year 2021-22	Year 2022-23	1	Group-A- Vehicles chassis	100 %	100 %	0	2	Group-B- Vehicles super structure	100%	0	100%	3	Group-C Wheeled excavator	100%	0	100%	3	HRCost for 2 years	100%	From 2022-23 to 2023-24		4	Monitoring & vehicle tracking system	100%	From 2022-23 to 2024-25						
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iv- Phasing of capital cost on the basis of each item of work.	<p>The phasing of capital cost of the project is included in the following table:</p> <p style="text-align: center;">B. Financial Phasing (All figures are in million rupees)</p> <table border="1" data-bbox="363 1126 1294 1485"> <thead> <tr> <th>S. #</th> <th>Items of work</th> <th>Total</th> <th>Year 2021-22</th> <th>Year 2022-23</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Vehicles chassis</td> <td></td> <td>168.201</td> <td></td> </tr> <tr> <td>2</td> <td>Vehicles super structure</td> <td></td> <td>98.25</td> <td></td> </tr> <tr> <td>3</td> <td>Wheeled excavator</td> <td></td> <td>38.679</td> <td></td> </tr> <tr> <td>3</td> <td>HRCost for 2 years</td> <td></td> <td colspan="2">From 2022-24</td> </tr> <tr> <td>4</td> <td>Monitoring & vehicle tracking system</td> <td></td> <td colspan="2">From 2022-23 to 2023-24</td> </tr> <tr> <td></td> <td>Total</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	S. #	Items of work	Total	Year 2021-22	Year 2022-23	1	Vehicles chassis		168.201		2	Vehicles super structure		98.25		3	Wheeled excavator		38.679		3	HRCost for 2 years		From 2022-24		4	Monitoring & vehicle tracking system		From 2022-23 to 2023-24			Total			
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8- Annual recurrent cost after completion of the project and source of financing	<p>i. Annual recurring cost of the project</p> <p>Annual operation and maintenance cost of existing manpower, POL & repair and maintenance of machinery & equipment is quite higher because of the inefficient and non-cost effective machinery like tractors which consume much higher POL as compared with the trucks. The POL consumption in case of new machinery will be lower but as 100% efficiency of the solid waste management is targeted hence it may exceed but not so appreciably.</p> <p>Further lower manpower is required in case of compactor trucks than tractors trolleys as it carries almost triple quantity of waste as compared to the tractor trolleys whereas only one vehicle driver is needed as compared with three drivers in case of tractor trolleys. Hence the cost incurred on the vehicle drivers may reduce.</p> <p>Hence it is estimated that the cost presently incurred on O&M of the solid waste machinery and equipment will almost remain the same</p> <p>(ii). Source of Financing</p> <p>MC is already bearing cost of operation and maintenance of this municipal service and will finance the O & M cost of the facility out of its own resources in future as well. However, HR cost for operation of the proposed machinery for 2 years has been provided in this PC-I. Rest of the cost will be borne by MC.</p>																																			

existing

9- Demand & Supply Analysis

i-Existing Capacity of services

I. Existing supply level

- MC is unable to render satisfactory service to the entire area of city due to shortage of efficient equipment and manpower. Some areas are reasonably served whereas others are deprived of the required level of the service and are served once or twice a week. In present scenario, most of the areas are poorly served and heaps of solid waste accumulated in these areas are only removed when the tolerance level of inhabitants of the area exceeds.
- The level of service in different areas of the city is given as under;

Muhallas and colonies wherein full service is presently being rendered	39 Nos
Muhallas and colonies wherein partial service is presently being rendered.	65 Nos
Muhallas and colonies wherein no service is presently being rendered	28 Nos

- The details of the muhallahs and colonies has been included in Existing Situation Analysis given in Annexure-B.

II. Capacity of machinery & equipment

- The existing equipment and machinery is being operated at its full capacity but still it is not possible to attain full service efficiency due to low efficiency of equipment consuming larger time and money in its operation.
- The tractor trolleys are slow moving and consuming large fuel and time but carry only one third of the waste to dumping sites as compared to the compactor trucks.
- Similarly the container carriers haul only one container carrying 3.4 m3 of waste to the dumping site. These carriers are also hauled by tractors having slow speed, high fuel consumption and very low efficiency.
- Both of these secondary collection systems are having very poor efficiency and also require larger manpower. The MC's administration feels that they require much more manpower as compared to the existing sanitation establishment.
- The proposition of continued use of this equipment with enhanced number of manpower will not cure the problem. Rather it will increase the operation and maintenance cost with very little improvement of the service delivery level.

III. Capacity of the dumping sites

- MC is dumping the waste in an in sanitary manner near Jhang By-Pass on Gojra Road at a distance of 6 km from city center. This is also creating all the hazards associated with open dumping sites.
- MC will continue to dump the waste in the present dumping site unless some other site is available in the vicinity.

IV. Efficiency of the service

As described in the situation analysis, the present waste collection and disposal efficiency is not more than 54 % which shows a large gap between supply and demand.

ii-Projected Demand for 10 years

- The municipal service requires radical improvement to enhance the efficiency of the service to increase service delivery to a satisfactory level. For this purpose the presently available equipment and machinery with poor efficiency will have to be replaced by a much more efficient one to reduce the operating costs, increase the efficiency, consume lesser manpower and result in satisfactory service delivery level.
- Sanitary landfill for safe and sanitary dumping of the waste is required to eliminate the present insanitary conditions around the present dumping sites and reduce vector diseases.

Equipment and machinery

The demand of the equipment, machinery for the next 5 years has been worked out and given in Serial No-7 of this PC-I (Capital cost of the Project).

10. Financial Plan - Sources of financing				
a) Equity	(All figures are in million rupees)			
	Source	Local	FEC	Total
	World Bank loan	299.208	299.208	299.208
	Co-financing by MC @ 20%	74.802	-	74.802
	Total	37401	299.208	374.01
b) Debt	Indicate the local and foreign debt			
	Nil			
c) Grants	The loan of Rs 299.208 million from World Bank will trickle down to MC as Grant.			
d) Weighted cost of capital	Nil			
11-Project benefits and analysis				
i. Financial: Income to the project with assumption	It is a social sector project and the capital cost of the project is not intended to be recovered. MC has not levied any sanitation fee or tax so far but ultimately to recover the operation & maintenance cost of the machinery & equipment MC will have to levy this fee.			
ii. Social: Quantify benefits to the target group	<p>The completion of the project will result in the following benefits:</p> <ul style="list-style-type: none"> • Improvement in the environment of the city; • The efficiency of the waste collection and transportation system will increase to 95-100% provided required manpower is sanctioned by the competent authority and recruited by MC. • The service delivery level will be improved. • Present health hazards generated in the form of vectors and vector generated diseases because of the waste heaps in the city, will be eliminated. • General public health standards will be improved. • Public mental tension, frustration will be minimized; • Obnoxious smell because of poor service delivery and open heaps will be eliminated. • Reduction in the water borne and vector diseases will reduce the expenditure on medicine and hence effect savings in the national economy 			
ii. Environmental Impact negative/positive	There will be no negative impact because of procurement and operation of the machinery & equipment. Rather positive impacts because of improvement of the environment in the city will be observed and present health hazards will be eliminated. Hence overall positive impacts due to operation of the project will be experienced.			
2. Project Analysis				
Quantifiable project outputs	<p>The project outputs which can be quantified are given below;</p> <p>A. Vector diseases will be reduced/eliminated because of improvement of the environments due to safe and sanitary waste collection and transportation. This will result in;</p> <ul style="list-style-type: none"> • Improvement of general public health standards. • Reduction in the expenditure on curative medicine • Saving in the man days of the inhabitants. • Improvement in the local, district and national economy. <p>B. With the use of efficient, fast and speedy transportation vehicles under mentioned results will be achieved;</p> <ul style="list-style-type: none"> • Lesser fuel consumption and lesser deployment of labor will give saving in O&M charges. • Fast and efficient transportation will improve the efficiency of the service and improve the service delivery level. • Efficient working of machinery will have lesser repair and maintenance cost. 			


	<p>Parking area for the vehicles</p> <p>The solid waste and other vehicles of MC Jhang are being parked Satellite Chowk, Satellite Town at Gojra Road having three Kanal area. This is unpaved area equipped with steel sheds. All required facilities remain to be provided in this area for existing and additional machinery.</p> <p>A separate PC-I will be drawn for the development of this Parking Area wherein all facilities and sheds will be provided. The development of this area will be done simultaneously with the manufacture of the machinery and equipment and the development will be completed before the machinery is received in the MC.</p> <p>The facilities so provided in this parking areas will include:</p> <ul style="list-style-type: none"> • Provision of vehicle Chassis • Provision of Super Structure • Provision of Wheel Excavator • Provision of two year HR Cost solid waste machinery • Provision of Vehicle Tracking
iii Capacity of other similar projects being implemented in public/private sector -	No other project of this nature is being implemented in public as well as private sector.
iv-Supply and Demand gap	<p>The nature of supply and demand gap has been explained in the preceding paras which concludes that;</p> <ul style="list-style-type: none"> • The existing equipment and machinery has poor efficiency. • It is consuming more time, fuel and requires excessive manpower to operate. • The overall delivery level of the service is not satisfactory. • Numerous public complaints are the talk of the day. • The overall efficiency of collection of waste is 54% instead of 95% to 100%. • Waste dumps site is a big health hazard. • No proper parking area for the sanitation vehicles and equipment exists in MC. • Hence there is a large gap between the supply and demand which is to be bridged by provision of latest more efficient collection and transportation equipment & machinery and construction of vehicle parking area.
v. Designed capacity and output of the project	<p>The machinery & equipment has been designed to fill-up the above mentioned gaps between supply and demand by the provision of much more efficient machinery and equipment. Upon completion of the project;</p> <ul style="list-style-type: none"> • The present efficiency (54%) of solid waste management will be raised to 95 to 100% provided required manpower is sanctioned by the competent authority and MC is allowed to recruit that manpower by lifting the ban on recruitment. • The operation and maintenance cost of the machinery and equipment will remain almost the same although entire city area will be covered. However HR cost for 02 years for the proposed machinery has been provided in the PC-I. • The parts of the city presently receiving poor service or no service at all, will get satisfactory service. • The entire city will have cleaner look with improved environments. • The health hazards presently generated by the waste heaps lying in the city will be eliminated. • The vector diseases generated because of the present insanitary conditions inside the city will be eliminated.

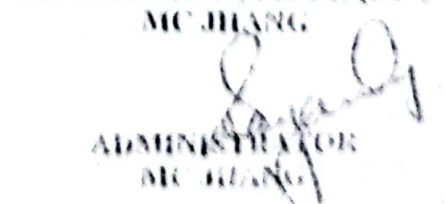
	<p>C. Elimination of double handling of waste will result in;</p> <ul style="list-style-type: none"> • Efficient service delivery. • Lesser labor deployment. • Saving in manpower cost. • Safety of the workers. • Elimination of health hazards associated with body to waste contact. 						
ii. Unit cost analysis	<p>The unit cost analysis is produced below;</p> <table border="1"> <tr> <td>Project capital cost</td> <td>Rs. 374.02 million</td> </tr> <tr> <td>Projected population in year 2026</td> <td>582,070 persons</td> </tr> <tr> <td>Unit capital cost per capita</td> <td>Rs. 642.56</td> </tr> </table>	Project capital cost	Rs. 374.02 million	Projected population in year 2026	582,070 persons	Unit capital cost per capita	Rs. 642.56
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iii. Employment generation (direct and indirect)	<p>Employment Analysis</p> <p>Direct Employment The manufacture of the machinery and equipment will require skilled and non-skilled labor.</p> <p>Indirect Employment Indirect employment for production, marketing and transportation of steel will be generated</p>						
iv. Impacts of delays on project cost and viability	<ul style="list-style-type: none"> • The impact of delay in project implementation will result in increased cost due to escalation in cost of material and labor. • The targeted benefits to the general public will also be delayed for the period the projects remains unexecuted 						
13-Implementation Schedule							
i- Indicate starting and completion date of the project	The project is anticipated to commence by start of February 2022 and to be completed by October 2022 with project implementation period of 8 months						
ii- Item wise/year wise schedule in line chart	The machinery and equipment will be supplied by the manufacturers within 8 months. The supply to be effected in each month cannot be estimated at this stage as it will depend upon the availability of the truck chassis from the truck manufacturers which cannot be predicted.						
14. Management Structure and manpower requirements							
i- Administrative arrangements for the implementation of the project	The project will be executed by Municipal Committee Jhang through Municipal Officer (Infrastructure and Services) being the Engineer in Charge and supervised by the Supervision Consultants which will be hired and deployed by PMDFC.						

<p>ii. The manpower requirements by skills during execution and operation of the project</p>	<p>i. Planning and design The planning and design of the project has been done by PCP Infrastructure Wing which has got its own recruited staff under the management of PCP. The resident supervision of the project will be done by the Supervision Consultants. The staff deployed for both activities is as under</p> <table border="1" data-bbox="470 302 1428 784"> <thead> <tr> <th>S #</th> <th>Designation</th> <th>Nr of slots</th> <th>Qualification</th> <th>Experience</th> </tr> </thead> <tbody> <tr> <td colspan="5">A Planning & design</td> </tr> <tr> <td>1</td> <td>Senior Program Officer (Infr. Dev.)</td> <td>1</td> <td>BSc. Civil Engg.</td> <td>50 years</td> </tr> <tr> <td>2</td> <td>Program officer (ID)</td> <td>1</td> <td>BSc. Civil Engg.</td> <td>15 years</td> </tr> <tr> <td>3</td> <td>CAD operator</td> <td>1</td> <td>Diploma in draftsman</td> <td>10 years</td> </tr> <tr> <td>4</td> <td>Accounts officer</td> <td>1</td> <td>MBA (Finance)</td> <td>10 years</td> </tr> <tr> <td colspan="5">B Project supervision</td> </tr> <tr> <td>1</td> <td>Senior engineer</td> <td>1</td> <td>BSc. Mechanical Engg.</td> <td>20 years</td> </tr> <tr> <td>2</td> <td>Supervisory engineer</td> <td>1</td> <td>BSc. Mechanical Engg.</td> <td>10 years</td> </tr> <tr> <td>3</td> <td>Inspector</td> <td>1</td> <td>Diploma in Associate Engineer</td> <td>10 years</td> </tr> <tr> <td>4</td> <td>Accounts officer</td> <td>1</td> <td>MBA (Finance)</td> <td>10 Years</td> </tr> </tbody> </table> <p>ii-Manufacturing staff Manufacturer's technical staff will comprise of various skilled labor for cutting, drilling, fabrication, welding, cleaning, painting, galvanizing and transportation along with electrical/ mechanical engineers & managers.</p>	S #	Designation	Nr of slots	Qualification	Experience	A Planning & design					1	Senior Program Officer (Infr. Dev.)	1	BSc. Civil Engg.	50 years	2	Program officer (ID)	1	BSc. Civil Engg.	15 years	3	CAD operator	1	Diploma in draftsman	10 years	4	Accounts officer	1	MBA (Finance)	10 years	B Project supervision					1	Senior engineer	1	BSc. Mechanical Engg.	20 years	2	Supervisory engineer	1	BSc. Mechanical Engg.	10 years	3	Inspector	1	Diploma in Associate Engineer	10 years	4	Accounts officer	1	MBA (Finance)	10 Years
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3	CAD operator	1	Diploma in draftsman	10 years																																																				
4	Accounts officer	1	MBA (Finance)	10 years																																																				
B Project supervision																																																								
1	Senior engineer	1	BSc. Mechanical Engg.	20 years																																																				
2	Supervisory engineer	1	BSc. Mechanical Engg.	10 years																																																				
3	Inspector	1	Diploma in Associate Engineer	10 years																																																				
4	Accounts officer	1	MBA (Finance)	10 Years																																																				
<p>iii. The job description, qualification, experience, age and salary of each post</p>	<p>a. Municipal Committee Jhang Municipal Officer (I&S) will be the Project Manager / Engineer in Charge for execution of the project and the project will be executed under his management. He will be assisted by his support staff who are qualified engineers and sub engineers. All of these engineers are regular employees of MC Jhang or provincial government.</p> <p>iii. Operation and Maintenance After completion the machinery & equipment will be operated and maintained by MC Jhang through its regular staff. The additional staff as and when so required, will be recruited by MC. The HR cost for the proposed machinery for 03 years and the Mentoring & Vehicle Tracking cost for 03 years has also been included in the PC-I</p>																																																							
<p>15-Additional projects /decisions required to optimize the investment being undertaken</p>	<p>MC Jhang is facing sanitation manpower shortage for rendering service to the entire city. For accruing the targeted benefits from the project, vehicle drivers and other allied staff needs to be recruited by MC for which sanction of the competent authority is required. Present ban on the recruitment needs to be lifted for this recruitment.</p>																																																							
<p>16-Certificate</p>	<p>Certified that the project proposal has been prepared on the basis of guidelines provided by the Planning Commission for the preparation of PC-I for social sectors projects</p>																																																							


 SUB ENGINEER
 MC JHANG

 CHIEF OFFICER
 MC JHANG


 MUNICIPAL OFFICER (I&S)
 MC JHANG


 ADMINISTRATOR
 MC JHANG

Annexure-D

Description of the Project

Section-II Project Proposal

1. Machinery & equipment

The design of machinery will be based on the design criteria mentioned in Annexure-C and the quantity of the machinery & equipment required for this city is worked out as below;

1.1. Total waste generated

Total population of the city as per 2017 census	Persons	493,108
Annual growth rate (P)	%	1.86
Projected population in the year 2026 = Population in 2017 x(1+ P/100) ⁹	Persons	582,070
Rate of waste generation per capita per day	Kg	0.35
Total waste generated per day	Kgs	203,725
Density of un-compacted waste per cubic meter	Kg/cub-m	400
Volume of un-compacted waste generated per day	cubic meters	509

1.2. Requirement of Arm Roll Vehicles

MC Jhang has 8 Arm Roll trucks (2 arm rolls having capacity to lift 10 m³ waste containers and 6 Nos having capacity to lift 5 m³ containers). These vehicles are not owned by MC but were obtained on rent by MC in October 2015 and a dispute has come up between the renting party and MC. Currently, six vehicles are operational. Further, 75 waste containers having 10 m³ capacity and 75 have 5 m³ capacities were procured by MC Jhang in year 2014-15. It has been proposed by MC Jhang (letter attached at Annex - L) that they need 03 Nos 10 m³ capacity arm rolls and 03 Nos 5 m³ capacity arm rolls to haul the existing waste containers placed in the city at various places and to handle rest of the waste, compactor trucks should be provided. Proposed Arm Roll vehicles would be carrying waste as per shown below:

Proposed arm roll capacity	No.	Waste handled daily with 4 trips
10 m ³ capacity	03	120 m ³
5 m ³ capacity	03	60 m ³
Total daily waste handled by arm roll trucks		180 m ³

Proposed arm roll truck zones in Jhang city are shown in Map M-4 (Compactors Waste Collection Zones).

1.3. Requirement of Compactor trucks

1.3.1. Number of trips of the compactor trucks per day

The distance of various remote and shortest routes of the proposed compactor trucks were actually measured at site in Jhang city which are given below and at Map M-3.

Mirajan Chowk, College Road to dumping site	24
Chungi Chowk, Jhang Road to dumping site	20
Near Textile Mill, Old Chiniot Road to dumping site	24
Near PSO, Jhang Faisalabad Road to dumping site	22
Near Flour Mill Railway Crossing, Jhang Toba Tekh Singh Road to dumping site	18
Total distance for 5 points to dumping sites	108

Average compactor route length	22
Average speed of the compactor for plying in congested areas of the city and on open roads	25 km/hour
Average time of travel from various points in the city to dumping site (round trip) including unloading of waste at dumping site	0.88 hour
Collection time as given in the design criteria	1.2 hours
Total time of round trip	2.08hours
Working hours / day	8 hours
Maximum possible number of compactor trucks trips per day	4 Nos

1.3.2. No of compactor trucks required

Proposed waste handled by arm roll trucks	180 m ³
Total waste generated per day	509m ³
Waste to be handled by compactor trucks	329 m ³
Compacted waste carried by compactor truck	8 m ³
Compression ratio	2
Quantity of loose waste carried by compactor truck	16 m ³
Trips per day	4 No
No of compactor trucks required	5No
Already available with MC	0
Net requirement	5 Nos

Proposed Compactor Zones in Jhangcity are shown in Map M-4 Compactors Waste Collection Zones

1.4. Requirement of mini tippers

1.4.1. Number of trips of mini tippers per day

Average waste collection time per trip	15 minutes
Average round trip travel time	20 minutes
Total round trip time	35 minutes
Working hours	8 hours
Average round trips per day	14 Nos

The number of mini tippers required for MC Jhang base on 14 round trips per day, have been worked out as below;

1.4.2. No of mini tippers required

The requirement of mini tippers will be worked out on the basis of quantity of waste to be collected through these vehicles. It has been observed that the waste can be collected by hand carts and discharged into the containers up to a maximum distance of 1000 Rft beyond which mini tippers will be used. The roads on which the compactors can ply have been marked on the plan in red color and the area served by the containers directly through hand carts has been shown as hatched. The total inhabited area of the city and the hatched area has been worked out and therefrom the quantity of waste handled through the mini tippers in the remaining area has been calculated as under and also graphically shown in Map M-2

Total inhabited area of the city	30 Sq. Km
Service length of hand carts directly discharging waste in the containers	1000 Rft
Area served by discharging the waste directly by hand carts into the containers	20Sq. Km
Area served by mini tippers	10 Sq. Km
% area served by mini tippers	33%
Total waste handled by mini tippers per day	170.0 m ³

Capacity of the mini tippers	1.0 m ³
Trips per day	14 No
Total Nos of mini tipper required	12Nos
Already available with MC	Nil
Net requirement	12Nos

1.5. Truck

mounted suction sweepers

Roads in Jhang to be swept by the sweeper	
1-Sargodha Jhang Multan Road 2x3 Km = 6 Km	6.0 Km
2- College Road = 1x4 Km = 4 Km	4.0 Km
3-Jhang Road = 1x6.0 Km = 6.0 Km	6.0 Km
4- Old chiniot Road = 1x4km = 4.0 Km	4.0 Km
5- Circular Road - Jhang Toba Tekh Singh Road Road = 1x5.0 Km = 5.0 Km	5.0 Km
6- Jhang-Gojra Road = 1x6 Km = 6.0 Km	6.0 Km
7-Darul Sakina (Canal Road) Road = 1x6Km = 6 Km	8.0 Km
Total length to be swept on both sides of road	39.0 Km
Total length on one side	78.0 Km
Speed of sweeper truck	10-12 Km/hour
Working hours per day	8 hours/day
Time required for travel to site and back to parking area, emptying the payload and recess	2 hours/day
Actual working time	6 hours/day
No. of sweeper trucks required	One

MC Jhang has one mechanical sweepers procured in 2012 which is quite old now. Therefore, one truck mounted vacuum sweeper of 4 cubic meter capacity is proposed.

1.6. Requirement of other machinery & equipment

S.N.	Detail of machinery & equipment	Total requirement as per design criteria			Existing machinery & Equipment			Additional required
		Description	Unit	Qty	Nos existing	Age in years	Usable	
1	0.8 m ³ containers	Total waste to be handled by compactor trucks	m ³	329	-	-	-	-
		Capacity of the container (un-compacted waste) in cub-m	m ³	0.8	-	-	-	-
		Total Nos of containers with 10% as standby	No	100	0	0	0	100
2	Hand carts	Waste to be handled by hand carts = 100% as per design criteria	m ³	509	-	-	-	-
		Capacity of hand cart (un-compacted waste)	m ³	0.25	-	-	-	-
		Total Nos of hand carts with 5 trips (Existing carts not catered for)=407 x 1.1	No	100	0	0	0	100
		10 % of the hand carts will be constructed with adjustable height for piloting to make them compatible with the garbage containers for direct discharge of waste in these containers. 90% will be conventional hand carts.						
		Hand carts compatible with containers						25
		Conventional three wheeled hand carts						228

3	Front blade tractor (One for 200,000 population with minimum as one)	No	3	2	9,8	0	2
4	Front end loaders (One for 150,000 population with minimum as one)	No	4	1	12	0	4
				3	8	0	
				2	3	2	
5	Water bowsers ((One for 150,000 population with minimum as one Nos)	No	2	3	30,14,14	0	2
6	Dumper trucks (one for 300,000 persons with minimum as one)	No	2	0	0	0	2
7	Excavators	No	1	0	0	0	1
8	Mobile workshop (Suzuki)	No	1	0	0	0	1
9	Motor bikes (one for 75000 population)	No	8	0	0	0	8
10	Mini Suction with 2500 liters Capacity	No	1	0	0	0	1
11	Mini Jetting with 2500 liter Capacity	No	01	0	0	0	1
12	Main Hole Desilting Machine	No	04	0	0	0	4
13	Mini Dumper Truck	No	02	0	0	0	2

2. Summary of scope of work

According to the above-mentioned design calculations below given machinery & equipment will be procured.

S.N.	Detail of machinery & equipment	Nos
1	Arm roll truck 5 cubic meter	4
2	Arm roll truck 10 cubic meter	4
3	Garbage Compactor 8 cubic meter capacity	5
4	Hand Cart Waste Tipping Trolley	25
5	Hand Cart Conventional	228
6	Mini Tipper 1 cubic meter	12
7	Water Truck Spray system SST	2
8	Commercial Front End loader without tractor for MF-385 4WD	4
9	Front Blade without tractor for MF-385 4WD	3
10	Mobile Workshop	1
11	Dump Truck 10 Cubic meter	1

3. Ultimate disposal of waste

- MC has no proper sanitary landfill site and the waste is presently being dumped near Jhang By-Pass on Gojra Road at a distance of 6 km from city center.
- No earth cover is being provided on the waste and no impervious lining has been provided beneath the waste which is creating health hazards as described in the existing situation.
- MC has no land at present which can be utilized for development of a landfill site. Hence measures for acquiring the land for landfill will be required to be taken up by MC.
- Alternately Government of Punjab may go for construction of Regional Landfills wherein MC Jhang can dump its waste. For this purpose a transfer station will be required to be built. Necessary steps will be taken by MC as per circumstances prevailing in future.

4. Parking area

- The solid waste and other vehicles of MC Jhang are being parked are being parked Satellite Chowk, Satellite Town at Gojra Road having three Kanal area. This is unpaved area not equipped with any type of sheds and all the vehicles are exposed to sever weather conditions. All required facilities remain to be provided in this area.

A separate PC-I will be prepared and got approved for provision of all required facilities in the parking area by the Detailed Design Consultants. The design of the parking area will comprise of under mentioned features:

- Boundary wall & gate
- Parking sheds
- Small office
- Toilets and waste water disposal arrangements
- Vehicles washing and servicing pits
- Arrangements of water for washing, toilets and drinking
- Guard hut
- Approach road

Annexure-A City Background

1. City Status

Jhang city is the headquarter of Jhang District, and is located in the central portion of the Punjab province. It is very old district and had Chiniote Tehsil as part of this district. In the year 2009 the tehsil of Chiniot was transformed into a separate district. It is known for the shrine of Sultan Bahoo and Heer and Ranjha's Tombs.

1.1. Location

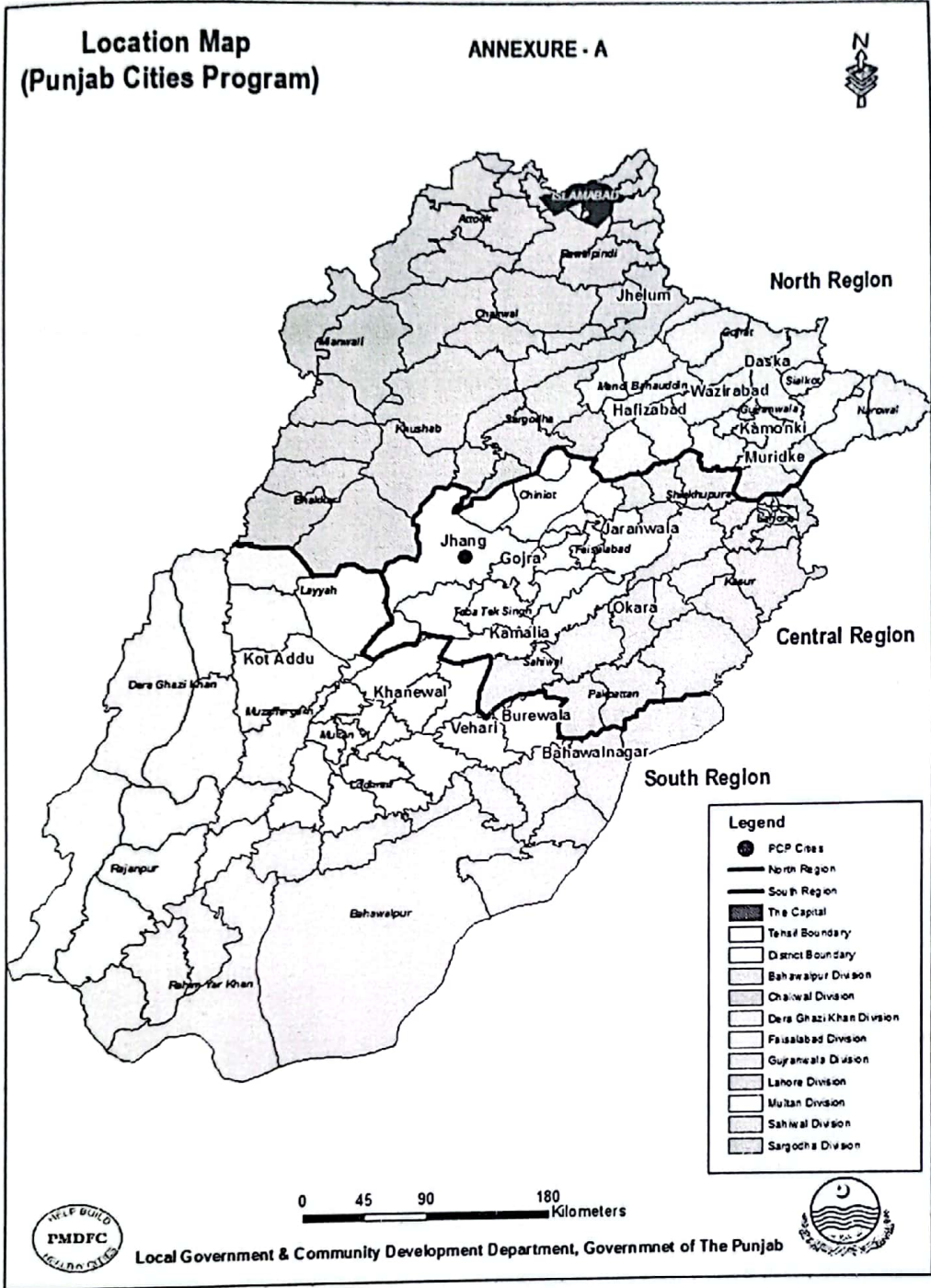
Jhang city is situated on the left bank of the Chenab River, about 210 km (130 mi) from Lahore, about 70 km (43 mi) from Faisalabad, about 160 mi (257 km) from Multan. It's coordinates are North 31° 16' and East 72° 19' and has an elevation of 200 m (700 ft). The city is connected with rail and road links with the entire country. It has also been connected with Motorway M-4 through Jhang-Gojra Road.

1.2. Climate

The climate in the district is extreme both in winter and summer. May June & July are the hottest months with maximum & minimum temperatures of 40 & 28 degree centigrade respectively. December to February are the coldest months with maximum and minimum temperature of 27 & 6 degree centigrade. The average annual rainfall is 288 mm mostly occurring in summer.

1.3. Demographic status

The provisional results of Census 2017 show population of 493,108 persons with an annual growth rate of 1.86 % which is expected to rise to 582,070 persons in the year 2026 which is planning horizon for this subproject.



Annexure-E

Punjab Cities Program

STANDARDS AND SPECIFICATIONS
FOR SOLID WASTE MACHINERY
& EQUIPMENT

Provision of Equipment and Machinery for solid waste management to Program MCs

Abbreviations

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
CC	Cubic Centimeters
CEN	European Committee for Standardization
CFC	Chlorofluorocarbon
DIN	German Institute for Standardization
DFT	Dry Film Thickness
EN	European Norms; European Standards
FHD	Full High Definition
GVW	Gross Vehicle Weight
HDMI	High Definition Multimedia Interface
HP	Horsepower
HCFC	Hydro chloro fluoro carbons
ISO	International Organization for Standardization
LED	Light Emitting Diode
LPM	Liter Per Minute
m	Meter
min.	Minimum
mm	Millimeters
NFPA	National Fire Protection Association
PLC	Programmable Logic Controller
PS	PS: Unit for Vehicle Power 1PS = 0.986 Horsepower
PTO	Power Take off
RHD	Right Hand Drive
SAE	Society of Automotive Engineers
VTMS	Vehicle Tracking Monitoring System
VDU	Video Display Unit

PUNJABCITIES PROGRAM (PCP)
Provision of Machinery & Equipment
For
Improvement of Solid Waste Management in Jhang City

Specifications and Standards

The scope of services for this project includes designing, manufacturing /fabrication as per applicable international standards mentioned here under, inspection /testing at manufacturer's works, supply in gat designated site, testing at site, training to the Client's designated personal for operation and maintenance, one (01) year's warranty, maintenance of the equipment/machinery for one(1)year during defect liability period (DLP)of each item of following equipment/machinery:

Sr.No.	Detail of machinery & equipment	Nos
1	Arm roll truck 5 cubic meter	4
2	Arm roll truck 10 cubic meter	4
3	Garbage container 0.8 cubic meters capacity	250
4	Garbage Compactor 8 cubic meter capacity	5
5	Hand Cart Waste Tipping Trolley	25
6	Hand Cart Conventional	228
7	Mini Tipper 1 cubic meter	12
8	Water Truck Spray system SST	2
9	Commercial Front End loader without tractor for MF-385 4WD	4
10	Front Blade without tractor for MF-385 4WD	3
11	Mobile Workshop	1
12	Dump Truck 10 Cubic meter	1
13	Mini Suction with 2500 liters Capacity	1
14	Mini Jetting with 2500 liter Capacity	1
15	Main Hole Desilting Machine	4

The design shall provide maximum level so for liability and availability, convenience of operation and maintenance, neat and orderly arrangement which shall take into account the functional requirements of various systems/component and pleasing physical appearance of equipment & machinery.

The design shall keep in view load distribution for better performance of the vehicle as per recommendations of the manufacturer of Chassis and design/drawings shall be submitted to the Employer/Engineer for review/approval.

The quantity shall be supplied as required in bill of quantities attached with these specifications Photos shown in these specifications are for illustration purposes only.

Section-I Specifications, standards and other requirements

Item No	Manufacturing & fabrication Standards
1	<p>The equipment/ machinery shall conform to the applicable requirements of ANSI/ASTM/ISO/BS/EN/SAE standards and specifically mentioned standards here under shall be followed:</p> <ul style="list-style-type: none"> • ANSI Z 245.1 – Mobile Refuse Collection and Compaction Equipment • ANSIB56.1–Safety Standard for Powered Industrial Trucks • AS 4123– Mobile Waste Containers • ASTM A 36 – Standard Specification for Carbon Structural Steel • ASTM A 240 – Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications • BSEN280–Mobile elevating work platforms–Design calculations, Stability criteria, Construction, Safety, Examinations and tests • BS EN840– Mobile Waste and Recycling Containers • BS EN ISO1461 -Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods • DINST52-StandardSpecificationforCarbonStructuralSteel • ISO3691–Industrial trucks—Safety requirements and verification • ISO3834–Quality Requirements for Fusion Welding of Metallic Materials • ISO 8501-1 – Preparation of steel substrates before application of paint sand related products- Group A. Visual assessment of surface cleanliness • ISO 8503 – Preparation of steel substrates before application of paints and related products– Surface rough ness characteristics of blast-cleaned steel substrates • ISO 8504 – Preparation of steel substrates before application of paintsand related products—Surface preparation methods • ISO5817–Welding-Fusion welded joints insteel, nickel, titanium and their alloys (beam welding excluded)— Quality levels for imperfections • ISO 3320 – Fluid power systems and components –Cylinder bores and piston rod diameters and area ratios– Metric series • ISO5597 – Hydraulic fluid power— Cylinders— Dimensions and tolerances of housings for single-acting piston and rod seals in reciprocating applications • ISO6020–Hydraulic Fluid Power–Mounting Dimension for Single Rod Cylinder, 16Mpa(160 bars)

	<ul style="list-style-type: none"> • ISO6022-Hydraulic Fluid Power-Mounting Dimension for Single Rod Cylinder, 25 Mpa (250 bars)Series • ISO 6015 - Earth-moving machinery -- Hydraulic excavators and back hoe loaders-Methods of determining tool forces • ISO 9606 – Qualification Test of Welders – Fusion Welding • ISO 9906 – Roto dynamic pumps — Hydraulic performance acceptance tests • ISO 9692 – Welding and Allied Processes-Recommendations for Joint Preparation • ISO9001– Quality Management Systems • ISO 12117-2-Earth-moving machinery-Laboratory tests and performance requirements for protective structures of excavators-Part2:Roll-over protective structures (ROPS) for excavators of over 6t • ISO 10262 – Earth-moving machinery - Hydraulic excavators- Laboratory test sand performance requirements for operator protective guards • ISO14001– Environmental Management Systems • ISO 17559 –Hydraulic Fluid Power – Electrically controlled Hydraulic Pumps- Test methods to determine performance characteristics • ISO 17559 –Hydraulic Fluid Power- Electrically controlled Hydraulic Pumps- Test methods determine performance characteristics • ISO 4409 – Hydraulic Fluid Power – Positive Displacement Pumps, motors and integral transmissions- Determination of Steady State Performance • ISO 10100 – Hydraulic fluid power -Cylinders-Acceptance tests • ISO21308 – Road vehicles— Product data exchange betweenchassisandbodyworkmanufacturers(BEP)— Part2:Dimensionalbodyworkexchange parameters • SAE J517– Hydraulic Hose Specifications • SAE J1334– Hydraulic Cylinder Integrity Test • SAE J745– Hydraulic Power Pump Test Procedure • SAE J1336-Hydraulic Cylinder Leakage Test • SAE-J1374 – Hydraulic Cylinder Rod Seal Endurance Test Procedure • SAE J1335-HydraulicCylinderNo-Load Friction Test • SAE J1097 – Hydraulic Excavator Lift Capacity Calculation and Test Procedure • JIS 3101 – Rolled Steel for General Structure • NFPA22-Standard for Water Tanks for Private Fire Protection • NFPA-T3.6.7-Fluid power systems and products-Square head industrial cylinders-Mounting dimensions • SAE Recommended Practice and Ground Vehicle Standards International Trucks Body Installation / Mounting Directives • Any other applicable international standards duly approved by the Employer/ Engineer.
2	<p>Submittal and Supplements</p> <p>The Contractor shall submit electronic copies of the applicable international Standards (latest editions). The following documents/drawings and other submit as required in both electronic and hard form shall be submitted for review and approval by the Employer/ Engineer:</p> <ul style="list-style-type: none"> • Shop drawings: General assembly, components, dimensions, thicknesses, weight sand methods of assembly including material specifications. • Load distribution design/drawings of vehicles • Technical brochure • Detailed specifications

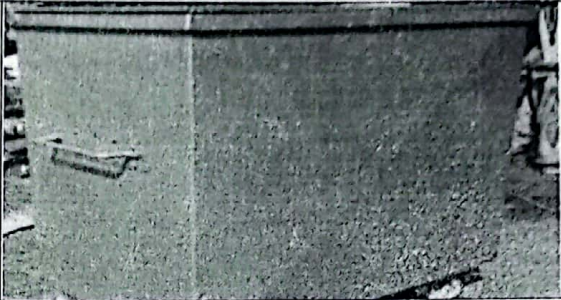

	<ul style="list-style-type: none"> • Operation/maintenance manual along with troubleshooting • Illustrated instruction book (one version English, one version Urdu language) covering the following: <ul style="list-style-type: none"> A. Description of unit and component parts: <ol style="list-style-type: none"> 1. Complete nomenclature and commercial number of replaceable parts 2. Metallurgy of Parts and their equivalence according to ASTM 3. Function, normal operating characteristics B. Operating procedures: <ol style="list-style-type: none"> 1. Start-up, break-in, normal and emergency operating instructions 2. Special operating instructions C. Maintenance Procedures: <ol style="list-style-type: none"> 1. Routine operations/maintenance (daily, weekly, monthly or annual) 2. Guide to "Trouble-shooting". 3. Disassembly, repair and reassembly D. Servicing and lubrication: <ol style="list-style-type: none"> 1. List of lubricants with their equivalents and their schedule for applying. These lubricants shall be easily available in Pakistan. 2. Sketches indicating all points where lubricants are to be applied. E. Predicted life of parts subject to wear, list of original manufacturer's spare parts, and recommended quantities to be maintained in storage. F. Other data as required under pertinent sections of Specifications or as required by the Employer/Engineer. G. Additional requirements for operating and maintenance as given below and as deemed necessary. <ul style="list-style-type: none"> • Manufacturer/Supplier's Quality Assurance/Quality Control Performance • Manufacturer/Supplier's valid ISO 9001 Certificate • Manufacturer/Supplier's valid ISO 14001 Certificate • Original Equipment Manufacturer's authorization letters for all the equipment • Original Equipment Manufacturer certificate for all the equipment • Material Test Certificates of material used in the fabrication. • Test certificates and OEM certificates of Hydraulic equipment including pumps and cylinders as per standards mentioned in Item No. 2. • Import Documents including Bill of Lading and Goods • Declaration form for all import equipment. • End User's Certificates for minimum years satisfactory operation in the Purchaser's country. • First aid kit and safety equipment as required according to <ul style="list-style-type: none"> • Pakistan legislation • Maintenance tool set required for each equipment/machinery.
3	<p>Warranty All equipment/machinery under each item to be furnished shall be guaranteed/warranted for a period of one (1) year from the date of Preliminary Acceptance against defective materials, design, performance or workmanship. Any deficiency shall be replaced or corrected by the Contractor as directed by the Employer/ Engineer at no additional expense to the Employer.</p> <p>3.1 Defects Liability Period All equipment/machinery shall have a defect liability period of one (1) year after taking over.</p>
4	<p>After Sales Services All the equipment/machinery to be supplied by the Contractor shall have 4S service workshops in Pakistan.</p> <p>Repair time</p>

	<p>Maximum one(1)month time period in case that major faults¹ are detected and maximum 10 days period in case of minor repairs².</p> <p>Response time On-site response by the end of next business day(17hour), following the request for service</p>
5	<p>Training</p> <p>The contractor/manufacturer/supplier shall arrange training to the Employer's designated personnel for operation and maintenance of each equipment/machinery as described herein below:</p> <ul style="list-style-type: none"> • Two (2) day straining for each equipment/machinery at Manufacturer's works/ factory at supplier's cost for four (4) persons nominated by the Employer. • Three (3)days training (mainly out door) at the project location for each equipment/machinery to the workshop staff, drivers and co-drivers.
6	<p>Equipment and machinery</p> <p>All the equipment/ machinery/ vehicles mentioned herein below shall be designed, manufactured, fabricated and tested as per specified international standards i.e. ANSI/ASTM/ ISO/BS/ EN/ SAE. The latest edition and amendments shall apply in all cases. The Bidder shall state in his bid the standards and codes which he proposes for any equipment.</p> <p>The country of origin of manufacturing/ fabrication shall be USA/Europe/Japan and any eligible ADB member country. The Contractor shall provide the name of country of origin or each equipment/machinery/vehicle for approval of the Employer/Engineer.</p> <p>The specifications of the equipment/ machinery/vehicles to be supplied by the Contractor are given herein below. The Contractor may submit alternate proposal having better performance and extended useful life of the equipment. However, for any alternate equipment, the Employer/ Engineer's approval shall be mandatory.</p>

Explanations

¹Majorfaults- cover any faults which do not allow functionality or operation of the equipment/machinery.

²Minorrepairs-cover everything which hinders full functionality or operation of equipment, or limits safety and security of personnel operating equipment/machinery

Section-II	
Specifications of the machinery and Equipment	
No.	Description, Specifications, and Standards
1	<p>Garbage Container 0.8 m³ capacity</p>  <p>The rectangular garbage container shall be provided with overall 0.8 m³ capacity. The material of the container shall be hot dip galvanized iron (GI) as per ISO 1461 or ASTM A123. Thickness of the main body shall not be less than 3 mm and thickness of top lid shall not be less than 2 mm. The container dimensions shall be approximately 1200mm x 1200mm x 800mm (±5%). The container shall be provided with six (6) nos. Teflon/steel wheels with NTN, SKF or FAG bearings and a wheel locking mechanism to prevent movement when placed at a location.</p>
2	<p>TRUCK MOUNTED GARBAGE COMPACTOR 8.0 m³</p>  <p>The Compactor shall be of Pack Plate Type Compactor with a minimum Compaction ratio of 1:2. The hopper loading height shall not be more than 900-950 mm and system-working pressure for compaction shall be about 160 to 180 bars. The body design shall be of independent construction and mounted to meet the Health and Safety of the working personnel. The superstructure's assembly shall be according to the truck's superstructure installation directives. The superstructure shall be mounted with rigid connection at rear, and flexible connection in front to provide the required elasticity. The design shall keep in view equal load distribution for better performance of the vehicle. All steel surfaces shall be applied with two coats of Zinc-rich Epoxy primers to give protection against rust and corrosion to enhance the design life, and one final coat outer side using 2-component polythane paint of min. 200 microns DFT in the colors had approved by Employer/Engineer. The paint shall be applied after and/or shot blasting according to SA2.5.</p>

The garbage compactor equipment shall conform to following specifications:

Chassis

GVW8800 ~9000kg on 6 tires

Engine Emission standards: Euro II

Type: Diesel, 4stroke, 4cylinders inline, water cooled, direct injection, turbo charged with intercooler

Power: 120~140 PS

Torque: 25~40 kgf-m

Displacement: 3500~4500cc

Clutch Dry single plate diaphragm type, hydraulic control

Transmission min. 5 forward & 1 reverse

Axle Front: Reverse Elliot "I" section beam

Rear: Full floating type

Brakes Service: Hydraulic with dual circuit

Exhaust: Vacuum operated

Parking: Mechanical expanding type on shaft

Dimensions Wheelbase: 3800 ~ 4000 mm

Width: 1900~ 2100 mm

Ground clearance: 200~ 210 mm

Electrical Batteries: 2x 12 V, minimum 65 AH

Generator: 24 V

Steering RHD

Suspension Semi-elliptic, laminated leaf springs, hydraulic double acting telescopic type shock absorbers on front and rear

Wheels Tiresize: 7.50-16 with 14 PR

No. of tires: 7 including one spare

Fuel tank Minimum 100 liters

Capacity

Cab Rigid cab all structural steel welded construction reinforced with beams in doors including air conditioning.

The cabin shall be factory built, beautifully designed, elegantly styled and comfortable finished. It shall have seating capacity for 3 persons (including driver).

Frame Ladder-shaped "I" channel section made of high strength structural steel

Authority letter from chassis manufacturer scribing that it is in operation in Purchaser's country for at least eight (8) years shall be attached with the bid.

Body

Capacity 8.0 m³ Excluding Hopper

Body Material DIN ST52, JIS SS 400, equivalent or better grade steel

Body floor 4.00~6.00mm

If steel grade used is of yield strength more than 340Mpa, only then 4mm thickness shall be allowed for Body floor. For DIN ST52 or equivalent material, 5.00 mm plate shall be used.

Body Roof 3.00 mm

Body Side Plate 4.00 mm

Stiffeners to be provided and these shall be full-seam welded on the body if required.

Safety Bars Locking & Sealing

2 Nos. Safety Bars under the hopper for maintenance. Hydraulic locking by means of two hydraulic tail gate lifting cylinders which shall also prevent the leakage of the wastewater.

Control Valves

Solenoid/Electro mechanical valve with safety relief valve for operation from hopper side for press & pack cylinders and on driver side of chassis for Dumping/Ejection Operation.

PTO

2 Gear type operated through Electro-vacuum act at or from Cab. This shall be close coupled with Hydraulic Pump.

Hydraulic Pump

Pump shall be close-coupled with PTO 50-55 cc / rev. Piston type. The operating pressure shall be minimum 180 bar and Max. Pressure 350 bars.

Hydraulic Cylinder Double Acting Type

There shall be 8 units of hydraulic double acting cylinders; 4 Nos for Press & Pack plate, 2 Nos for hopper lift and 2 Nos for Bin lift with honed tube and chrome plated rod as per applicable ISO and SAE Standards. The dimensions of cylinders shall be designed to accomplish the stipulated cycle times and compaction ratio. The cylinders shall be warranted for 02 years.

Hydraulic Oil Tank

Hydraulic Tank. Capacity min 75 liters, equipped with line return filter, suction filter, level & temperature gauge & breather cap.

Hydraulic Hoses

All high pressure hydraulic oil hoses shall be double braided according to SAE and shall have a burst pressure rating 2 times the working pressure. The hoses in motion are covered and Protected by steel wire.

Operation

Auto Cycle with Electro micro processor control with manual option shall be provided. The system shall be equipped with emergency stop for safety. The operational control shall be placed on driver side with proper weather protection. Following options shall be available.

Auto Continuous: With this option the hopper operation shall continuously operate until stopped.

Manual: With this operation each action can be done separately by push buttons.

Manual over ride: Manual over ride shall be provided in each valve for operation.

The system shall be controlled from the PLC control box, which enables start, stop, 1 cycle, continuous cycles, and rescue activities. Tail gate and eject or controls shall be in front side of the body. All devices for loading control shall be mounted on tailgate right side, and all shall be manual control for safety purposes. Compaction shall be controlled electrically via push buttons, and manually whenever required. An emergency stop button shall be provided on one side of the truck on the control panel.

Ejection/ Hopper Lift Operation

Solenoid operational Control be placed on driver side of body with emergency shut off for safety.

Water Tank

One tank of minimum 100 liters capacity under the hopper and other tank of minimum 70 liters capacity under the floor with discharge facility complete in all respects.

Mudguards

Two steel mudguards with rubber flaps at rear ends.

Footboard

Two fold able type rear foot boards for crew to stand.

Handles

One handle at each side 1/4" pipe handle for the crews.

Service and maintenance

A unauthorized sales and service point for the truck brand shall be nominated to grasp.

Frame Compactor

- Sub frame should be integral part of the container floor reducing to tall body weight.
- Oil tank shall be built into the compactor container for modern look and reduced build length.
- Container and compacting parts shall be made of high grade steel for intensive use.
- Hopper construction should be made from hard Steel wear plates with high strength and high hardness such as Hardox, Abrazo or equivalent. The ejector plate slides shall be special heavy duty sliding blocks for smooth operation and low maintenance cost.
- Water tight sealing shall be provided between body and tailgate.
- Self-cleaning function shall be present in hopper during unloading.
- Drain valves shall be available for convenient empty in go waste liquids from the body and the hopper.
- The following items shall also be provided in the vehicle:
 - Integrated sewage tank
 - Rear lights mounted on body.
 - Automatic release/engage tailgate lock.
 - Both sides emergency shut-off switches.

Cab Exterior

- Color of Cab: As approved by the Employer
- Labeling: Logo, Motives and other labeling in both English and Urdu on both sides of the tank as per approval of the Employer.
- Front mirror
- Ker mirror

Cab Interior

- Driver's seat with spring loaded type, seat belt and Co-drivers seats for 2 persons.
- Air conditioning system with temperature control without CFC and HCFC
- Instruments: Approved Tracking device, operational (fees paid) for the year in which the unit will be supplied to the Employer, Fuel eve monitor, Battery Condition & Water Temperature, Routing transmitter for tracking system. The vehicle tracking system, as minimum being capable to monitor speeding, harsh braking, mileage, etc.

Lights

- Standard twin headlights for right-hand traffic
- Two(2)standard revolving be a conson cabroof left and right; yellow;
- One (1)Standard revolving beacon on roof backside of vehicle; yellow
- Protective grid: Hazard-warning lamps; synchronic blinking

Safety Equipment and Drive

- According to Pakistan Law on technical conditions of vehicles.

Supplements

- First aid kit and safety equipment as required according to Pakistan legislation
- Toolset(jack and spanner for change of wheel)
- Side and rear protection for truck.
- AS pare wheel(mounted on suitable place on the truck chassis).

3 Mini tipper 1.0 cubic meter



The mini tipper shall be designed to dump the waste directly in to the road side containers or hopper of garbage compactor. The tipper shall be designed to complete operation with double action cylinder. Two hydraulic stabilizers shall be provided to cater for un even roads. Design shall be maintenance friendly and allow sanitary worker to directly load garbage into it. The design shall be idea for door to door or re collection of waste in combination with Garbage Compactors. The mini tipper equipment shall conform to following specifications:

Chassis

Type	RHD
Engine	800~1000 CC(+/-10 %)Petrol, EFI delivering 30~45HP Emission Standard: EuroII
Length	3200~3300 mm+/-10% Width 1400~1500 mm+/-10%
Height	1600~1700 mm+/-10%
Transmission	4 forward & 1 reverse
Fuel Tank	Minimum 35 liters
Tires	4.50 -12

Container Volume One Cubic Meter (Approx.)

Authority letter from chassis manufacture describing that it is in operation in Purchaser's country for at least eight (8) years shall be attached with the bid.

- Body Sides shall be made from minimum 3mm thick of material AS TMA 36, equivalent or better grade steel sheet corrugated for addition AL strength without increasing the weight of the body. The container shall have round profile near the floor joint to avoid corrosion and to assist the emptying of the container.
 - Body Floor shall be made from minimum 4mm thick of material AS TMA 36, equivalent or better grade steel. The floor shall be single piece for corrosion protection and built-in cab protector shall also be provided.
 - Floor Stiffeners shall be minimum 3mm thick of material AS TMA 36, equivalent or better grade steel "U" profile stiffeners shall be provided throughout the length of the floor for strength honing the floor.
 - 5mm thick Robust Hydraulic cylinder mounting brackets duly reinforced with mounting bracket plate (to avoid point load on the container) shall be provided.
 - Two pivot brackets duly reinforced with 5mm thick Gussets shall be provided.
 - All steel surfaces shall be applied with two coats of Zinc-rich Epoxy primers to give protection against rust and corrosion to enhance the design life, and one final coat outer side using 2-component poly urethane paint of min.200 microns DFT in the colors had approved by Employer/Engineer. The paint shall be applied after sand/shot blasting to SA2.5.
 - **Sub Frame:** Rectangular Pipes 1.5 x 3 inch having thickness of 5mm, suitably mounted on the pickup chassis. The Frame shall be mounted on the same cargo deck bracket originally installed by OEM to maintain strength of the chassis. Sub frame shall be attached to the chassis with High Tensile strength Nuts and Bolts. The canvas rubber Padding shall be provided.
 - **Sub Frame Pivot Brackets** 8mm thick of material AS TMA 36, equivalent or better grade steel brackets shall be provided with Bi-Metallic Bushes for retaining lubrication. All lifting pins shall be equipped with grease nipples and spiral grease path ways to increase the productivity and design life of the structure.
 - **Tipping Angle** shall be minimum 70 degrees which shall all complete emptying of the container
- Tipping Height** of the body shall all the waste to be emptied into a standard hopper of the compactor of 8.0 cubic meter capacity

- **Paint:** All steel surfaces shall be applied with two coats of Zinc-rich Epoxy primers to give protection against rust and corrosion to enhance the design life, and one final coat outer side using 2- component polyurethane paint of min. 200 microns DFT in the colors had approved by Employer/Engineer. The paint shall be applied after sand/shot blasting to SA2.5.

Hydraulic System

Hydraulic Power Pack

Hydraulic Pump: 2.1~2.5 cc/rev., DC Motor 1500 w, Tank Capacity = 7~10 Liters(+/-10%)
 Operating Pressures: 100~140bars

Hydraulic Fittings: High quality galvanized hydraulic fittings for leak free operations.

- **Hydraulic Hoses:** Double Braided SAE 100R2 (min.) hydraulic hoses with burst pressure twice as much as the working pressure.
- **Hydraulic Lifting Capacity:** 1200 Kg minimum using a hydraulic double acting cylinder.

Hydraulic Lifting System

- **Lifting Cylinders:** Double acting hydraulic cylinders made from hard chromed rod and honed tubes shall be provided. Hydraulic seals suitable for local 12 labeling shall be provided for efficient and long life of the cylinders. All Hydraulic Cylinders shall be equipped with hose burst protection; by means of Pilot operated check valves.
- **Stabilizing Cylinders:** 2Nos. Double Acting Hydraulic Cylinders made from Hard Chromed Rods and Honed Tubes with hydraulic Seals for efficient and long life of the cylinders.
- The honed tubes, chromed rods, hoses and hydraulic seals shall be as per applicable ISO and SAE Standards

Electrical System

- 12 Volt DC Electrical System, Weather Proof Control Panel with high quality imported switches with Single action tipping operation.
- Operating Buttons placed on side of the vehicle

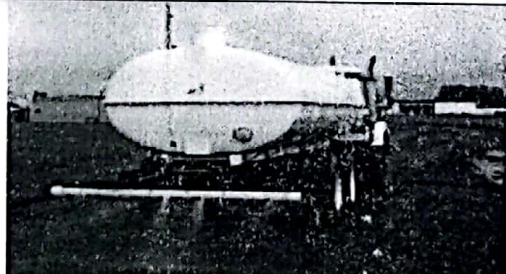
Accessories

Mudguards: Two MS mud guard with rubber flaps at the rear end. Reflective strips on the rear end of the mud guards.

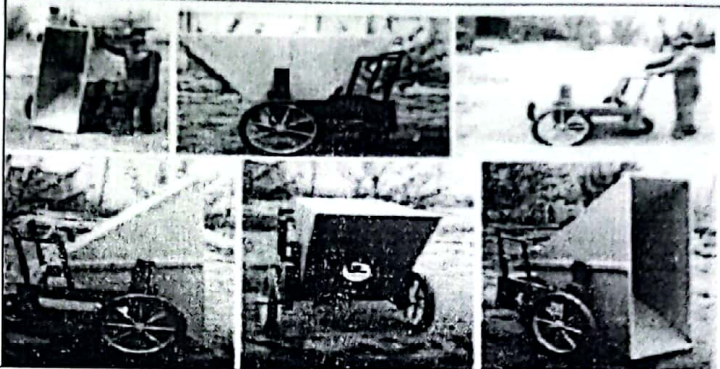

- **Rotating Beacon:** One Rotating Beacon Light on the cabin.
- **Working Light:** One working light for night time operations. Grill shall be provided for Rear Lights for protection.

Color: As per Employer/Engineer's approval

Visibility: Color and Labeling in English and Urdu on front and sides with Logo, Motive, slogan and city name as per Employer's approval.

5	<p>Water bowser with spray system</p>	
<p>The water tanker shall conform to the following specifications:</p> <p>Truck chassis</p> <p>Type Right Hand Drive 4x2 GVW 8800 ~9000kg on 6 tires Engine Emission standards: Euro-II Type: Diesel, 4stroke, 4cylinders inline, water cooled, direct injection turbocharged with intercooler Power: 120~140 PS Torque: 25~40 kgf-m Displacement: 3500~4500cc</p> <p>Clutch Dry single plate diaphragm type, hydraulic control</p> <p>Transmission Min. 5 forward & 1 reverse</p> <p>Axle Front: Reverse Elliot "I" section beam Rear: Full floating type</p> <p>Brakes Service: Hydraulic with dual circuit</p>		

Dimensions	Exhaust: Vacuum operated Parking: Mechanical expanding type on shaft Wheelbase: 3800 ~ 4000 mm Width: 1900 ~ 2100 mm Ground clearance: minimum 200 ~ 210 mm
Electrical	Batteries: 2x 12 V, minimum 65 AH Generator: 24 V
Steering	RHD
Suspension	Semi-elliptic, laminated leaf springs, hydraulic double acting telescopic type shock absorbers confronted rear
Wheels	Tire size: 7.50-16 with 14 PR No. of tires: 7 including one spare
Fuel tank Capacity	Minimum 100 liter
Cab	All structural steel welded construction reinforced with be indoors including air conditioning. The cabin shall be factory built, beautifully designed, elegantly styled and comfortable finished. It shall have seating capacity for 3 persons (including driver).
Frame	Ladder-shaped "C" channel section made of high strength structural steel Authority letter from chassis manufacture describing that it is in operation in Purchaser's country for at least eight (8) years shall be attached with the bid.
Main Frame	C Channel 100 x 200 x 100 mm of 6.0 mm thick Mild Steel
Bowser Tank	Mounted on Sub-frame of channel of size 100x200x100 x 6.0 mm thick through 100 mm x 100 mm x 6.0 mm thick angle supports Size ~5000 Liters Material of tank Stainless Steel SS 304 Thickness of tank 4.00 mm minimum Flow control valves Ball valves Top Manhole 500 mm with pipe inlets Pump 3"x3" Honda or equivalent Petrol driven Pump Set for filling of water from water reservoir of about 1000 lpm with suction lift more than 5 meters and discharge head more than 15 meters Discharge 3" delivery by force with Pump. Sprinkler discharge by graviton either side. Accessories 3" Hose Pipe 100' x 2 nos. 3" Suction Pipe 10' x 2 nos. Paint All steel surfaces shall be applied with two coats of Zinc-rich Epoxy primers to give maximum protection against rust and corrosion to enhance the design life, and one final coat outer side using 2-component poly urethane paint of min. 200 microns DFT in the color shade approved by Employer/Engineer. The paint shall be applied after sand/shot blasting to SA 2.5.
Cab Exterior	<ul style="list-style-type: none"> • Color of Cab: As approved by the Employer • Labeling: Logo, Motive and other labeling in both English and Urdu on both sides of the tank as per approval of the Employer. • Front mirror • Kerb mirror
Cab Interior	<ul style="list-style-type: none"> • Driver's seat with spring loaded type, seat belt and Co-drivers seats for 2 persons. • Instruments: All standard & necessary instruments and meters for safe operation of the vehicle.
Lights	<ul style="list-style-type: none"> • Standard twin headlights for right-hand traffic • Two (2) standard revolving beacons on cab of left and right; yellow; • One (1) Standard revolving beacon on roof backside of vehicle; yellow • Protective grid: Hazard-warning lamps; synchronic blinking • According to Pakistan Law on technical conditions of vehicles.
Safety Equipment and Drive	
Supplements	• First aid kit and safety equipment as required according to Pakistan

	<p>legislation</p> <ul style="list-style-type: none"> • Tool set (jack and spanner for change of wheel) • Side and rear protection for truck. • AS spare wheel(mounted on suitable place on the truck chassis)
<p>5</p>	<p>Handcart/waste tipping trolley</p> 
	<p>The hand cart shall be provided for house hold waste collection. Capacity of the cart shall be 0.25m³ and it shall be suitable for handling by single person. The material of the hand cart shall be galvanized iron as per ISO1461 or ASTM A123. Thickness of the sheet shall not be less than 2mm. The bucket/ pan shall be supported with stiff suitable size frame made from angle iron frames of 1/4" thickness and the substructure will also be fabricated from the same thickness of angle iron with suitable size to make it robust and sturdy.</p> <p>a) Three wheeled hand carts with adjustable height for their compatibility with 0.8 cubic meter container</p> <p>10% of the total Nos of hand carts will be built with adjustable height for discharging the waste directly into the container. The hand cart substructure will be fabricated so as to enable the pan / bucket to be easily lifted, by turning a handle, to a height where the pan / bucket can be easily tilted and the entire waste, in the bucket, can be tipped into the 0.8 m³ garbage container, the specifications of which have been described in the above sections of this table. The mechanism for tipping will be purely mechanical, user friendly and robust at the same time and no hydraulic mechanism will be used for this purpose. The balance of the trolley will be maintained during the tipping of waste into the container and inbuilt mechanism will be provided for that purpose.</p> <p>A pilot model of the hand cart will be fabricated originally and got tested to conform to the above-mentioned specifications. Mass production will be only done after testing, removal of bugs and approval of the client.</p> <p>b) Conventional three wheeled hand carts</p> <p>Rest of the hand carts as per actual requirement will be fabricated without adjustable height to allow discharge of the waste at ground. Except for the mechanism for lifting the bucket of the hand carts, all other specifications will be same as mentioned above or below.</p> <p>The super structure shall be hot dip galvanized iron (GI) as per ISO 1461 or AS TMA 123. The hot dipping will be carried with minimum film thickness of 70 to 90 micron after its complete fabrication and welding.</p> <p>Handle shall be made from GI pipe of light quality & weight with minimum diameter of 25 mm. Two nos. wheel with rigid rubber tire having diameter minimum 550mm shall be provided. One (1) no. jockey wheel of about 300 mm diameter shall be provided. The solid axle rod diameter shall be 30~35 mm. The substructure shall be painted with approved color with 200 microns DFT min.</p> <p>A cubic bucket made of ABS Plastic/HDPE of about 20 liters capacity shall be provided with the hand cart. A holding grating shall be welded with the hand cart to hold the basket.</p>
<p>6</p>	<p>Mobile workshop</p> 
	<p>The mobile work shop truck shall be provided for on-site technical maintenance services within shortest possible time. The mobile vehicle shall provide the technician with the mobility required and the quick action required with all the tools and equipment available to provide exceptional standard soft service and maintenance on site. The mobile work shop truck shall be customized</p>

with suitably sized cabinets for placement of tools for easy access to all equipment in the truck container.

The mobile workshop truck shall have compact cabin fitted on the chassis of GVW 8800-9000kg. The workshop shall have the following features:

- Cabin of steel body construction from following thickness sheets:
- Body Side: 4 mm (min.)
- Body Floor: 6 mm (min.)
- Sub Frame: 8 mm (min.)
- L x W x H: 6.5 m x 2.0 m x 2.0 m (min.).

The steel used shall be AS TMA 36, equivalent or better grade steel.

- a) Side wall and Roof Ceiling covered by Aluminum
 - Composite Panel.
 - Foam Insulation for all side walls and ceiling.
 - Flooring covered by Aluminum checkered plate.
 - Separate Storage Spaces and racks for Tool Kits, Spare Parts, Fire Extinguisher Labels and Tags, Brackets, Cleaning Materials, Fire Safety Signage, Safety booklets etc.
 - Four (4) Nos. Fluorescent Interior Lights.
 - Electric Panel with 220 VAC and 12 VDC electrical outlets.
 - 220 VAC Input sockets with plug and 10 meters extension cable.
- b) Two Nos. roof warning beacon lights.

Chassis

Type Right Hand Drive 4x2

GVW 8800 ~ 9000 kg on 6 tires

Engine Emission standards: Euro II

Type: Diesel, 4 stroke, 4 cylinders inline,

Water cooled, direct injection, turbocharged with inter cooler

Power: 120-140 PS

Torque: 25-40 kgf-m

Displacement: 3500-4500 cc

Clutch Dry single plate diaphragm type, hydraulic control

Transmission min. 5 forward & 1 reverse

Axle Front: Reverse Elliot "I" section beam

Rear: Full floating type

Brakes Service: Hydraulic with dual circuit

Exhaust: Vacuum operated

Parking: Mechanical expanding type on shaft

Dimensions Wheelbase: 3800 ~ 4000 mm

Width: 1900 ~ 2100 mm

Ground clearance: minimum 200 ~ 210 mm

Electrical Batteries: 2x 12 V, minimum 65 AH

Generator: 24 V

Steering RHD

Suspension Semi-elliptic, laminated leaf springs, hydraulic double acting telescopic type shock absorbers on front and rear.

Wheels Tire size: 7.50-16 with 14 PR

No. of tires: 7 including one spare

Fuel tank Minimum 100 liters

Capacity

Cab Rigid cab all structural steel welded construction reinforced with beams indoors including air conditioning.

The cabin shall be factory built, beautifully designed, elegantly styled and comfortable finished. It shall have seating capacity for 3 persons (including driver).

Frame Ladder-shaped "I" channel section made of high strength structural steel Authority letter from chassis manufacture describing that it is in operation in Purchaser's country for at least eight (8) years shall be attached with the bid.

Tools & Plants

The mobile workshop truck shall be furnished with all necessary tools required to carry out multiple tasks in the field for all vehicles described above. The mobile workshop container shall contain, inter-alia, the following items suitably mounted in the cabinets inside the container:

- 1) Diesel driven Generator 5 kVA with alternator for electrically powered tools
- 2) Diesel/petrol generator driven welding machine. The generator for welding machine shall be suitable for operating the machine without any overload with a minimum margin of +10% above the rated load.
- 3) Angle Grinder with Complete set of grinding discs
- 4) Hand drill machine with drill bit set
- 5) Air compressor: Industrial heavy-duty working pressure 8 bar and Air Tank of 100 liters capacity
- 6) Control panel
- 7) Spare wheels (7.00-16-14 PR) - 2 Nos.
- 8) Fire Hose Reel with coupler for swift connection
- 9) Heavy Duty Battery, min. 65 AH, each - 2 Nos.
- 10) Welding Rods (E 6013) - 5 packs of 5 kg each
- 11) Mechanical Grease Pumps - 2 nos.
- 12) Lube Oil -5 gallons
- 13) Dry Chemical Fire Extinguishers, 5 kg - 5 nos.
- 14) Lighting - 8 nos.
- 15) Foldable Aluminum Ladder - 1 no.
- 16) PPEs (Gloves, Shoes, Helmets) - 3 sets
- 17) Crane 1.5-ton including workshop crane Rail system from outside to inside of workshop
- 18) Plastic Storage Bins-3 nos.
- 19) Hydraulic Jack, 10Tons Capacity-2 nos.

20) Technicians Tool kit including:

S. Nr.	Detail	Unit	Quantity
A	For mechanical tasks		
1	Double operating wrench set(spanner/chabi set) packed in box	Set	1
2	Ring spanners set (Pana set 8 to 32 mm) packed in box	Set	1
3	Socket wrench set complete (Goti set) packed in box	Set	1
4	Screw wrench set (6", 8", 10", 12" & 18" sizes) packed in box	Set	1
5	Pipe wrench set (12" & 18" sizes)	Set	1
6	L-key sets (30 pieces) packed in box	Set	1
7	Flat File set (6",8",10" & 12" size)	Set	1
8	Round file set (6",8",10" & 12" size)	Set	1
9	Chain wrench set (12 size)	No	1
10	Chain wrench set (18" size)	No	1
11	Chain wrench set (24" size)	No	1
12	Vice	No	1
13	Dye set ½" to 2"	No	1
14	Dye set 2" to 4"	No	1
16	Hammer set (½ lb, 2 lbs& 5 lbs)	No	1
17	Chisel complete set (6",8",12")	No	1
18	MS rod (bari) 4 feet long	No	2
19	Chain pulley block 5 tons	No	1
20	Bearing puller set (Nr- 6,8,10,12,16)	No	1
21	Hack saw including packet of blades	No	1
22	MS pan	No	1
23	GI funnel (I Kg)	No	1
24	Electric cutter	No	1
25	Screw driver flat big size	No	1
26	Screw driver star end big size	No	1
B	For electrical Tasks	No	
1	Grip pliers set (main pliers, Nose pliers & cutter pliers)	set	1
2	Cable cutter	No	1
3	Tong tester (Amperes, volts, ohms & continuity (Germany or English made)	No	1
4	Simple touch tester	No	1
5	Thimble presser/punch	No	1

6	Electric drill (Germany)	No	1
7	Electric blower	No	1
8	Screw driver set imported except china	Set	1
9	Screw driver set flat	No	1
10	Screw driver set star	No	1

Cab Exterior

- Color of Cab: As approved by the Employer
- Labeling: Logo, Motive sand other labeling in both English and Urdu on both sides of the tank as per approval of the Employer.
- Front mirror
- Kerb mirror

Cab Interior

- Driver's seat with spring loaded type, seat belt and Co-drivers seats for 2 persons.
- Air conditioning system with temperature control without CFC and HCFC
- Instruments: Approved Tracking device, operational (fees paid) for the year in which the unit will be supplied to the Employer, Fuel Level monitor, Battery Condition & Water Temperature, Routing transmitter for tracking system. The vehicle tracking system, as a minimum being capable to monitor speeding, harsh braking, mileage.

Lights

- Standard twin head lights for right-hand traffic
- Two(2)standard revolving beacons on cabro of left and right; yellow;
- One (1)Standard revolving beacon on roof back side of vehicle; yellow
- Protective grid: Hazard- warning lamps; synchronic blinking

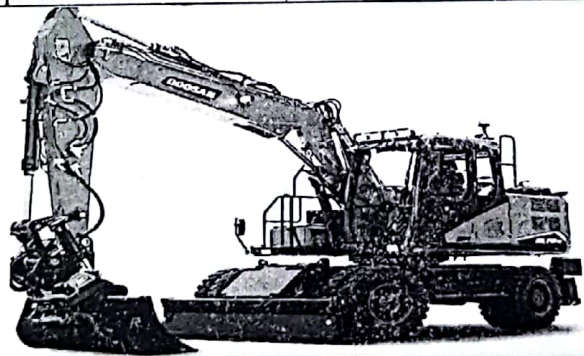
Safety Equipment and Drive

According to Pakistan Law on technical conditions of vehicles.

Supplements

- First aid kit and safety equipment as required according to Pakistan legislation
- Toolset(jack and spanner for change of wheel)
- Side and rear protection for truck.
- AS pare wheel(mounted on suitable place on the truck chassis).

Wheel Excavator



S.#

Name of Scheme

Wheel Excavator (Super Structure)

Engine Power operational weight SEJI1349

Power minimum 99 kw(132-HP) @ 2000-rpm operational weight 17700-15560 Kg(30213-34292) It cylinder diesel engine, piston displacement 5890cc (359 cu.in) Torque. 50 kgf.m(490 Nm) at rpm380-520 N m. The engine shall be equipped with one touch low idle control to the engine sp no operation is perfumed maximizing fuel efficiency and reducing sound level

Accessories/Dimensions

Bucket capacity

1

Bucket Type	Capacity				C/W (ton)	1.8 2.5					
	SAE/PCSA		Width			Weight	4.3m Boom		4.6m Boom		4.6m Boom
	CECE	W/O Cutter	With Cutter	2.1m Arm			2.1m Arm	2.1m Arm	2.1m Arm	2.5m Arm	
General Purpose Bucket	0.24m ³	0.22m ³	458 mm	534 mm	272 kg	A	A	A	A	A	
	0.39m ³	0.35m ³	736 mm	820 mm	338 kg	A	A	A	A	A	
	0.45m ³	0.40m ³	821 mm	911 mm	376 kg	A	A	A	A	A	
	0.51m ³	0.45m ³	907 mm	991 mm	389 kg	A	A	B	A	A	
	0.59m ³	0.51m ³	997 mm	1081 mm	408 kg	B	B	B	A	B	
	0.64m ³	0.55m ³	1083 mm	1167 mm	431 kg	B	B	C	A	B	
	0.76m ³	0.65m ³	1255 mm	1339 mm	479 kg	C	C	C	B	C	

DIGGING FORCE (ISO)

Bucket (PCSA)	0.24m ³	0.39m ³	0.45m ³	0.51m ³	0.59m ³	0.64m ³	0.76m ³
Digging force	10,140 kgf	10,140 kgf	10,140 kgf	10,140 kgf	10,140 kgf	10,140 kgf	10,140 kgf
	99.5 kN	99.5 kN	99.5 kN	99.5 kN	99.5 kN	99.5 kN	99.5 kN
	22,355 lbf	22,355 lbf	22,355 lbf	22,355 lbf	22,355 lbf	22,355 lbf	22,355 lbf

Travel speed	37 KM/hr
Tires	9.00-20-14PR
Maximum Grade ability	60-70%
Ground Clearance	350-400 mm
Swing Radius	-2500 mm
Counter weight clearance	1300-1500 mm
Cab height	300-3200 mm
Service Refill Capacities	
Fuel Tank	Minimum 280 liter
Cooling	Minimum 20 Litter
Engine oil	Minimum 22 liter
Rear Axle housing	2.40 liter
Front steering Axle	2.5 liter
Hydraulic system	Minimum 102 liters (including tank)

HYDRAULIC CYLINDERS

The piston rods and cylinder bodies are made of high-strength steel. A shock absorbing mechanism is fitted in all cylinders to ensure shock-free operation and extend piston life.

One-piece Boom

Cylinders	Quantity	Bore x Rod diameter x stroke
Boom	2	110 X 75 X 1,048mm(4.3" X 2.9" X 3'5")
Arm (short)	1	115 X 80 X 1,075mm(4.5" X 3.1" X 3'6")
Bucket	1	95 X 65 X 900mm(3.7" X 2.6" X 2'11")

Serviceability

For increased safety, all daily maintenance points shall be accessible from ground level. A central greasing system shall be provided allowing lubrication of critical points.

Operator Comfort

- The auto-weight adjusted air-suspension seat with heated and cooled ventilated cushions shall be provided to improve operator comfort. The color monitor and standard rear-mounted camera shall be provided to enhance the safety.
- The operator station shall be provided with maximum space and designed for simplicity of functionality. Frequently used switches shall be centralized and situated on the right-hand side console. The left-hand seat console shall control dozer blade and/or outriggers, and tilt-able for easy access to the cab. The fully automatic climate control shall be provided to adjust temperature and airflow for exceptional operator comfort.
- Viewing Area:** To maximize visibility, all glass shall be affixed directly to the cab, eliminating the use of window frames. Choice of fixed or easy to open split front windshield shall be provided to meet operator preference and application conditions.

Monitor

A compact color monitor shall display information in local language that is easy to read and understand. Functions shall include:

- Programmable "Quick Access" buttons for one-touch selection of favorite functions.
- Filter and oil change warnings displayed when the number of hours reach the maintenance interval.

Rearview Camera

The rearview camera shall display on the operator monitor. Together with the best visibility to the left and right the rearview cameras shall ensure the safe operation of the machine and fulfill the requirements of ISO 56006/EN474

Undercarriage

- Undercarriage and axle designer shall provide maximum strength flexibility and mobility wheel
- Heavy duty axle and stabilizers providing rigidity and long line effective hydraulic line to transmission protection and heavy duty axles to make the undercarriage perfect wheel excavation application. The front axle shall offer wide oscillating and steel angles. The transmission shall be mounted directly on the rear axle for protection optimum ground clearance.
- Advanced disc brake system the disc brake system shall act directly on the hub instead the drive shaft to avoid planetary gear backlash to minimize the rocking effect associated with working free on wheels.
- Fenders The fenders for excellent coverage of the front and rear tires protection machine from mud and dirt these fenders shall avoid water splashing up on windscreen or cooler. The fenders further protect machine from stones and debris thrown up by the tires providing additional safety for the machine and vehicle personal working close to the excavator

Boom & Sticks

- Designed for maximum flexibility to keep production high on all job boom and sticks shall be of welded box section structures with thick multi plate fabrication in high stress areas for rugged performance and long service life.
- Flexibility the choice of different booms and stick for right balance of reach and dig forces for application i.e variable adjustable boom one piece boom and offset boom working in tight quarters lifting heavy loads truck loading and digging dig along walls obstacles to grade while driving and turning under laid tube without damaging them such as shot medium and long stick for maximum breakout lifting capability reach requirement etc.

STEERING COLUMN

The Forward/Neutral/Reverse & gear selection switch is mounted on the steering column to minimize operator movements while traveling so that safety and operator comfort are ensured. The lower part of the Steering Column can be tilted for improved operator comfort.

FOOT PEDALS

The position of the Option, Brake and Accelerator Pedal have been set by ergonomic analysis to maximise operating efficiency while minimizing foot movement. The required pedal operating forces have also been decreased to reduce fatigue

AIR CONDITIONING

The high performance air conditioning provides an air flow which is adjusted and electronically controlled for the conditions. Five operating modes enable even the most demanding operator to be satisfied

ENGINE OIL FILTER

The engine oil filter offers a high level of filtration allowing the oil change interval to be increased to 1000 hours. It is easy to access and is positioned to avoid contaminating the surrounding environment

HYDRAULIC OIL RETURN FILTER

The protection of the hydraulic system is made more effective by the use of glass fiber filter technology on the main oil return filter. This means that with more than 99.5% of foreign particles filtered out, the oil change interval is increased

AIR CLEANER

The large capacity forced air cleaner removes over 99% of airborne particles, reducing the risk of engine contamination and making the cleaning and cartridge change intervals greater.

AIR-CONDITIONER FILTER

Since independent air-conditioner filter for internal and external machine, fresh air is supplied indoors

RADIATOR AND OIL COOLER

Radiator and oil cooler in high capacity and high efficiency are attached so that the best cooling function is maintained all the time.

SOLID SIDE DOOR

The muscular appearance and internal reinforced board in attachment type realize both appearance and solid strength.

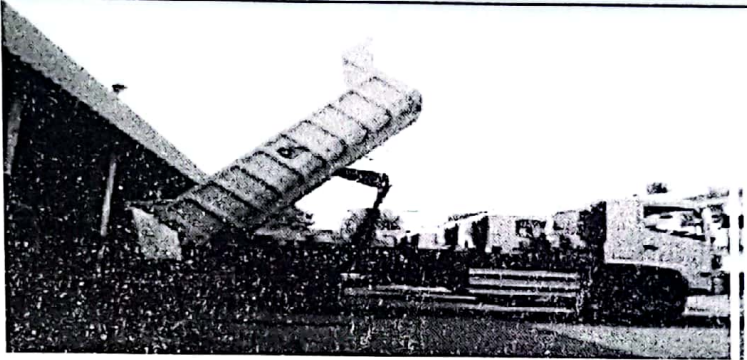
BATTERY COVER

As battery cover is applied, shortage is prevented and customer is protected from unexpected accidents

PUNCHING COVER IN ASTERISK SHAPE

As anti-skid cover punched in asterisk shape is added on the upper part, slippery is prevented for service

	increase safety.
	Work Tools
	<ul style="list-style-type: none"> • A wide variety of work tools to help optimize performance. • Quick couplers to enable the operator to simply release on work tool and connect to another of hydraulic and spindle quick coupler versions. • Buckets specialized buckets each designed and tested to function as an integral excavator bucket featuring the ground engaging tools such as excavation extreme excavation leveling ditch cleaning etc
	Electrical
	<ul style="list-style-type: none"> • Alternator minimum 70 Amp • Batteries 2x12 V minimum 100 AH • Starter 24 V/4.50 kw • Boom working light • Cab interior light • Two front road light and two rear light • Rotating beacon on cab • Working light cab mounted (front and rear) • Main shut off switch • Maintenance free batteries • Signal/warning horn

8	DUMPTRUCK 10.0 m³	
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The dump truck shall be used for transporting loose material in bulk. The dump truck shall be equipped with a mild steel body hinged at the rear and equipped with hydraulic rams to lift the front, allowing the material into be dumped on the land fill Site.

The Contractor shall be responsible to design/manufacture the dump truck compatible with frontend loaders already existing at site.

The dump truck of minimum 10.0 m³ capacity shall have equipment conforming to the following specifications:

Truck Chassis

Driver Cabin Rigid cab all structural steel welded construction reinforced with beams in doors.
The cabin shall be factory built, beautifully designed, elegantly styled and comfortable finished. It shall have seating capacity for 3 persons (including driver).

Drive 4x2 Right Hand Drive

Horse Power 200 ~ 240 PS GVW

Weight 17000 to 18000 kg

Wheel Base 4600 to 4700 mm

No. of Tires 07 including one spare

Torque 50 ~ 80 kgf. m

Emission Standard Euro II

Fuel Tank Capacity 200 ~ 400 Liters

Gear 6 forward 1 reverse

Clutch Hydraulic controlled, Dry single plate

Service Brake Full air brake or Air Over Hydraulic

Exhaust Brake With Pneumatic Control

Parking Brake Mechanical expanding type acting on the shaft

Electric System 24VDC

Ground Clearance 200 mm minimum

Tires minimum 10-20 with 16PR

Engine Emission Standard: Euro-II
 Intercooled, 4-stroke, 6 cylinder, Vertical in-line, water cooled, direct injection Diesel, turbo charged with intercooler
 Displacement: 7500~8500cc

- Authority letter from chassis manufacturer scribing that it is in operation in Purchaser's country for at least eight (8) years shall be attached with the bid.
- Wheel based dimensions shall be opted for proper weight distribution keep the balance and steering and load calculations shall be provided for approval of the Employer/Engineer.

Superstructure

Material DIN ST52, equivalent or better grade steel
Construction Steel body manufactured from steel sheets with appropriate stiffeners and tail gate to open automatically for dumping and locked during travelling.

The thickness of steel sheets shall be as follows:

Body Sides: 4.00 mm (min.)
 Body Floor: 8.00 mm (min.)
 Body Front: 4.00 mm (min.)
 Tail Gate: 4.00 mm (min.)
 Sub & Lift Frame: 10.00 mm (min.)
 Reinforcement Channels: 4.00 mm (min.)

PTO Side Mounted Power Take Off Unit
Hydraulic Pump Suitable for close couple arrangement with PTO
 Pump Flow: 60~65 cc/rev. Max. Pressure 350 bars
 Operating Pressure Shall not be less than 190 bars.

Lifting Scissor/Front End Hydraulic cylinder
Lifting capacity 10 Ton minimum

Hydraulic Cylinder Double action Hydraulic cylinder
 Chromed Rods as per applicable ISO and SAE Standards
Pressure Safety To prevent hose bursting valve
Oil Reservoir With level & temperature gauge
 Tank Capacity 50~60 Liters

Filters On line return filter, Suction Filter and Breather cap with strainer

Governor Full Hydraulic speed governor shall be provided to adjust the engine speed according to system pressure.

Paint All steel surfaces shall be applied with two coats of Zinc-rich Epoxy primers to give maximum protection against rust and corrosion to enhance the design life, and one final coat outer side using 2-component polyurethane paint min. 200 microns DFT in the color shade approved by Employer/Engineer. The paint shall be applied after sand/shot blasting to SA2.5.

Cab Exterior

- Color of Cab: As approved by the Employer
- Labeling: Logo, Motive and other labeling in both English and Urdu on both sides of the tank as per approval of Employer.
- Front mirror
- Kerb mirror

Cab Interior

- Driver's seat with spring loaded type, seat belt and Co-drivers seats for 2 persons.
- **Instruments:** All standard and necessary instrument and meters for assuring the safe operation of the vehicle will be provided.

Lights

- Standard twin head lights for right-hand traffic
- Two (2) standard revolving beacons on cab roof of left and right; yellow;
- One (1) Standard revolving beacon on roof back side of vehicle; yellow

- Protective grid: Hazard- warning lamps; synchronic blinking

Safety Equipment and Drive
According to Pakistan Law on technical conditions of vehicles.

DUMP TRUCK 5.0 m³



The dump truck shall be used for transporting loose material in bulk. The dump truck shall be equipped with a mild steel body hinged at the rear and equipped with hydraulic rams to lift the front, allowing the material into be dumped on the land fill Site.

The Contractor shall be responsible to design/manufacture the dump truck compatible with frontend loaders already existing at site.

The dump truck of minimum 5.0 m³ capacity shall have equipment conforming to the following specifications:

Truck Chassis

Driver Cabin Rigid cab all structural steel welded construction reinforced with beams in doors. The cabin shall be factory built, beautifully designed, elegantly styled and comfortable finished. It shall have seating capacity for 3 persons (including driver).

Drive	4x2 Right Hand Drive
GVW	8800 ~ 9000 Kg on 6 tyre
Engine	Emission Standards Euro II & III Intercooled, 4-stroke, 4 cylinder, Vertical in-line, overhead valve water cooled, direct injection turbocharged, intercooler
Power	120-140 PS
Torque	23-40 Kgf-m
Displacement:	3500~4500 cc
Clutch	Dry Single plate diaphragm type Hydraulic controlled, Transmission min 5 forward & 1 reverse
Axle type	Front Reverse Eillior :I" section beam Rear Full floating
Wheel Base	3800 to 4000 mm
No. of Tires	07 including one spare
Torque	50 ~ 80 kgf. m
Emission Standard	Euro III
Fuel Tank Capacity	100-Liters
Gear	6 forward 1reverse
Clutch	
Service Brake	Hydraulic with dual circuit
Exhaust Brake	Vacume Operated
Dimension	wheel base 3800-4000 mm
Width	1900-2100
Ground Clearance	200-210 mm minimum
Tires	minimum 10-20 with 16PR
Electrical	Batteries 2x12V minimum 65-AH

Screening	RHD
Suspension	Semi-elliptic laminated lead spring hydraulic double acting telescope type shock
Wheel	Tire size 7-50-16 with 14-PR
Fuel tank	Minimum 100-liters
	<ul style="list-style-type: none"> • Authority letter from chassis manufacturer stating that it is in operation in Purchaser's country for at least eight (8) years shall be attached with the bid. • Wheel based dimensions shall be provided for proper weight distribution keep the balance and steering and load calculations shall be provided for approval of the Employer/Engineer.
Superstructure	
Material	DIN ST52, equivalent or better grade steel
Construction	Steel body manufactured from steel sheets with appropriate stiffeners and tail gate to open automatically for dumping and locked during travelling. The thickness of steel sheets shall be as follows:
Body Sides:	4.00 mm(min.) Body Floor: 8.00 mm(min.)
Body Front:	4.00 mm(min.) Tail Gate: 4.00 mm(min.)
Sub & Lift Frame:	10.00 mm(min.) Reinforcement Channels: 4.00 mm(min.)
PTO	Side Mounted Power Take Off Unit
Hydraulic Pump	Suitable for close couple arrangement with PTO
Pump Flow:	60-65 cc/rev. Max. Pressure 350 bars
Operating Pressure	Shall not be less than 190 bars.
Lifting	Scissor/Front End Hydraulic cylinder
Lifting capacity	10 Ton minimum
Hydraulic Cylinder	Double action Hydraulic cylinder Chromed Rods as per applicable ISO and SAE Standards
Pressure Safety	To prevent hose bursting valve
Oil Reservoir	With level & temperature gauge Tank Capacity 50-60 Liters
Filters	On line return filter, Suction Filter and Breather cap with strainer
Governor Full	Hydraulic speed governor shall be provided to adjust the engine speed according to system pressure.
Paint	All steel surfaces shall be applied with two coats of Zinc-rich Epoxy primers to give maximum protection against rust and corrosion to enhance the design life, and one final coat outer side using 2-component polyurethane paint min. 200 microns DFT in the color shade approved by Employer/Engineer. The paint shall be applied after sand/shot blasting to SA2.5.
Cab Exterior	
	<ul style="list-style-type: none"> • Color of Cab: As approved by the Employer • Labeling: Logo, Motive and other labeling in both English and Urdu on both sides of the tank as per approval of Employer. • Front mirror • Kerb mirror
Cab Interior	
	<ul style="list-style-type: none"> • Driver's seat with spring loaded type, seat belt and Co-drivers seats for 2 persons. • Instruments: All standard and necessary instrument and meters for assuring the safe operation of the vehicle will be provided.
Lights	
	<ul style="list-style-type: none"> • Standard twin head lights for right-hand traffic • Two (2) standard revolving beacons on cab of left and right; yellow;

- One (1) Standard revolving beacon on roof back side of vehicle; yellow
- Protective grid: Hazard- warning lamps; synchronic blinking

Safety Equipment and Drive

According to Pakistan Law on technical conditions of vehicles.

Mini Dumper Truck



(Right-hand drive) Truck Chassis GVW 5,500 Kgs.

GEAR RATIOS & PERFORMANCE

ENGINE

Model Hino N04C (EURO III)
 Type Diesel, Turbo Charged & Intercooled, 4-Stroke, 4-cylinder, Vertical in-line, Overhead valve, Water cooled, Direct injection type.

Max. Output. 116 PS @ 2,500 rpm Max. Torque. 33 kgf.m @ 1,600 rpm Displacement 4.009 L

CLUTCH Dry single plate, diaphragm type With damper springs

Clutch Dia. 300 mm

TRANSMISSION Five forward and one reverse speeds, overdrive, synchromesh 1st ~5th.

REAR AXLE Full-floating, single reduction, single speed by hypoid gearings.

FRONT AXLE Reverse Elliot "I" section beam.

SERVICE BRAKE :Type: Hydraulic system with two leading shoes for front wheel and dual two leading shoes for rear wheels.

Control Vacuum assist, dual circuit

ABS Equipped

(Anti lock brake system)

PARKING BRAKE Mechanical, internal expanding, acting on transmission output shaft.

EXHAUST BRAKE Electro-Vacuum actuator.

STEERING Telescopic and tilt steering column with locking device recirculating ball with hydraulic booster integral type.

SUSPENSION Front Semi-elliptic leaf springs with double acting shock absorbers.

IMPORTANT The vehicle mass may vary when optional equipment & items are fitted. All specifications are with normal manufacturing allowances and tolerances. Hinopak Motors Ltd. reserves the right to alter this specification without notice.

Rear Semi-elliptic reinforced leaf spring with double acting shock absorbers.

WHEEL AND TIRE

Tire Size 7.00-16-14PR
 Wheel Type 5-stud disc wheel
 Disc size 16 X 5.50F
 No. of tires 7 (including one spare tire)

FUEL TANK:

Capacity 100 L

CHASSIS FRAME Ladder-shaped "I" section. Side rails

CAB All steel welded construction
 With torsion bar tilt mechanism. Reinforced cab with additional Safety door impact beams in doors. Seat belts & individual windshield washers. Metallic paint on cabin

SEATING CAPACITY Three

SEATBELT Equipped

& WARNING

SRS AIR BAG Equipped

POWER DOOR Centralized

POWER WINDOW Equipped

HEADLAMP Equipped

Leveling

ELECTRICAL EQUIPMENT:

Batteries Two, series connection, each 12V, 65 AH at 20-hour rate

Alternato 24V, 60A

DIMENSIONS AND WEIGHTS (Chassis only) approx.

Wheel base		mm	3375
Weight	Total	Kg	1418
	Front	Kg	2186
	Rear	Kg	768
Overall length		mm	5965
Overall width		mm	1695
Overall height		mm	2135
Overhang	Front	mm	980
	Rear	mm	1580
Turning radius		mm	
Drive	4X2		
Control	Forward		
Max. speed (Km/hour)	102		
Max. Grade ability (tanq)%	49.2		
Transmission gear ratios & speeds			RE50
	1st		5.342
	2nd		2.975
	3rd		1.604
	4th		1.000
	5th		0.712
	Rev.		4.970
Rear axle ratio			5.833

Mini Suction with 2500 liters Capacity



S No	Parameter	Descriptions
1	Tank	Locally fabricated tank with 2500 liters capacity, cylindrical in shape with dish end Full dish opening rear end with suitable manual locking system. The tank shall be fitted with external reinforcing channel ring. The tank body will be designed & fabricated to withstand an external pressure of 1 bar & internal pressure or 2 bars. Float & indicate type level gauge will be provided at the rear dish end of tank to alert the operator when tank is almost full. The complete tank will be fully electrically resistance welded. The tank body shell be fitted with full length pressed steel chassis rails manufactured in 6mm MS sheet & fully welded to the tank shell along their length.
2	Sheet	Shell MS 4mm & Dish Ends MS 5mm
3	Body Design	independent body design
4	Primary protection	Suction air out let of tank is fitted with automatic float shut off system to discontinue the suction process when tank is almost full thus avoiding the tank from over-filling
5	Relief valves	Adjustable vacuum relief valve to avoid tank from over vacuum & fix pressure relief valve for positive displacement of air pressure (Europe/UK/USA)
6	Pressure gauge	Compound gauge for both negative & positive Reading of pressure. (Europe)
7	Vent Valve	Air vent valve for safe & cool operation.
8	Secondary Protection	Locally developed secondary cut off for protection of vacuum pump in cases the first do not work.
9	Suction line filter	To provide vacuum pump air free of water vapors & other particulars. (Europe /UK/USA)

10	Combination valve	For changing the tank from vacuum to pressure without changing the RPM of pump. (Europe /UK/USA)
11	Lubrication tank	Vacuum pump lubricating oil tank, can be mounted remote from vacuum pump for easy access /Built-in Vacuum Pump (Europe /UK/USA)
12	Rear End	Full dish opening rear end with twin hydraulic jacks. Jacks with imported honed steel tubes & imported chrome plated shafts.
13	Hose Tray	Suitable hose tray to be provided along the length of tank for carrying suction hose

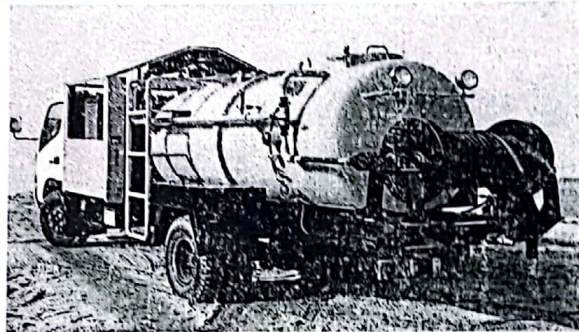
Technical Data For Vacuum Pump

S. N	Parameter	Descriptions
1	Make	Europe /UK/USA
	Max. Air flow (F.A.D) @1500 R.P.M	6000 to 7000 lit/min
	Max. Pressure (gauge)	1.0 bar (15 psi)
	Max. Vacuum (intermittent*) (gauge)	0.92bar/28 in Hg
	Max. Vacuum (continuous*) (gauge)	0.85 bar/24 in Hg
	Max. Rotation speed	1400 rpm
	Driven	Power Take off

Paint Of Equipment

1	Undercoating	The internal surface of tank will be painted applying two coats of suitable epoxy paint providing maximum resist to corrosion
2	External Finish	External finish will be done in imported 2K paint in any desire shade after applying 3 coats of suitable undercoating

Mini Jetting Machine 2500 liters



Sr #	Parameter	Descriptions
1	Tank Capacity	2500 liters capacity water tank locally fabricated with 1 No baffle, especially designed for storage and carriage of water.
2	Sheet	Shell of the tank shall be minimum 3.25mm sheet whereas end shall be minimum 4mm sheet.
3	Shape	Cylindrical/oval
4	Jetting Hose Reel	Rear mounted 180 degree Swivel hydraulically powered hose reel suitable for carrying 50 meter of jetting hose 1/2" diameter. Hydraulic motor of European origin operated by single spool mono block double acting control valve (with adjustable safety valve provision). Spool valve will be of Italian origin.
5	Level Gauge	Suitable liquid level indicator for observing water level in tank.
6	Filling Point	1 No Minimum of 18" Dia.
7	Pressure Gauge	Mounted suitably on hose work for indication of water pressure during operation (Italy).
8	Filter	Compatible with pump input suitable to protect pump from dirty water or any mud particle etc (Italy).
9	Jetting Nozzles	Bullet shaped nozzles with rearward facing angle and one central forward facing jet.
10	Storage Space	Suitably mounted along length of water tank for carrying safely all accessories and tools etc.

Specifications Of Water Jetting Pump

1	Flow	90-110 Lit/Min
2	Pressure	90-100 bar
3	Power Required	20-30-HP

4	RPM	1200-2000
5	Driven	Power Take Off
6	Pump Made	Europe/UK/USA

Paint of Equipment

The internal surface of tank will be painted applying two coats of suitable epoxy paint providing maximum resist to corrosion & external finish will done in imported deco-paint in any desire shade

Commercial Terms & Conditions

- Payment of the superstructure to be made in advance against Bank Guarantee of equaling amount.
- Delivery period will be 8-12 week after receipt of Truck chassis & advance payment
- Pre-delivery inspection of the machine will be made at the manufacturer's site before final coating of paint/Delivery
- Documents of imported parts/accessories can be provided at the time of pre-delivery inspection to ensure the usage of imported parts in the machine.
- Warranty period will be ONE YEAR against manufacturing fault or bad workmanship.
- The quoted prices of superstructures are valid for 30 days
- The quoted prices are inclusive of taxes and are based on current duties/taxes by Government. Any change in tax structure shall be on client's part.

On your disposal for any further information you may need we remain

Mini Dumper 2.5 Cubic Meter with Compaction Arm



Sr.	Parameter	Descriptions
1.	Capacity	2.5 Cubic Meter
2.	Body Sides	2.5 mm MS sheets with stiffeners.
3.	Back Side	3 mm MS sheets
4.	Body Floor	3mm MS sheet, Joint-less, anti-corrosion.
5.	Floor Structure	3mm MS sheet, Joint-less, anti-corrosion.
6.	Sub Frame	(Sheet Thickness 4-5 mm) High quality steel structure suitably mounted on the chassis. The Frame is mounted on the same cargo deck brackets originally installed by chassis manufacturer to maintain strength of the chassis. Sub frame attached to the chassis with High Tensile strength Nuts and Bolts & Canvas Rubber Padding.
7.	Body Top	The top area of Tipper shall be at least 70% covered and 30% uncovered
8.	Tipping Angle	75-80 Degrees. Allows complete emptying of the container.
9.	Tipping Height	Tipping Height of the body allows the waste to be emptied into a standard Hopper Compactor.
10.	Paint	All steel part surfaces free from Rust and Oil Residue. Two coats Zinc Based Epoxy Primer and two coat of final paint done with 2 components Poly-Urethane based Paints.

HYDRAULIC SYSTEM

1.	Hydraulic Pump	Hydraulic Pump pressure shall be 250 at minimum level while 350 maximum.
2.	PTO	Manufacturer Original Vacuum or electronically operated

3.	Hydraulic Hoses	Double Braided ISO 100 R2 type hydraulic hoses with burst pressure twice as much as the working Pressure.
4.	Control Valve	2 levers manual control valves with safety valves (Imported).
5.	Mechanical Kick-Out	Mechanical Kick-Out valve shall be (Imported)
HYDRAULIC CYLINDERS		
1.	Lifting Cylinders	1 No. Double Acting Hydraulic cylinders Imported Hard Chromed Rods of 50mm and Honed Tubes OD: 125, ID: 110 of (Imported). Imported Hydraulic Seals for efficient and long life of the cylinders. Special viper seals for dusty local conditions.
2.	Lifting Capacity	Hydraulic lifting Capacity 2500 kg.
3.	Compaction Pressure	Compaction pressure shall be between the ranges of 120-150 Bar.
4.	Waste Disposal System	The waste disposal method will be like tippers without compaction arm.
5.	Stabilizing Cylinders/ Outriggers	2 Nos. Double Acting Hydraulic Cylinders (Imported) Hard Chromed Rods and Honed Tubes of (Imported). Imported Hydraulic Seals for efficient and long life of the cylinders. Special Viper seals for dusty local conditions.
6.	Electrical System	12 Volt Electrical System. Weather Proof Control Panel with high quality imported switches. Single / Double action tipping operation.
ACCESSORIES		
1	Mudguards	Two MS mudguards with rubber flaps at the rear end. Reflective strips on the rear end of the mudguards.
2	Rotating Beacon Light	One Rotating Beacon Light on the Cabin.
3	Working Light	One Working light for night time operations.
4	Grill for Rear Lights	For protecting the Rear Lights
5	Bin Lifting Device	Variable mounting height, suitable for 180-200Kg load, 40-50 degree dump angle, adjustable flow control valve

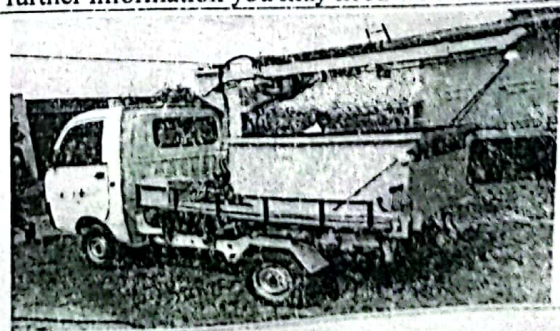
Commercial Terms & Conditions

- Payment of the superstructure to be made in advance against Bank Guarantee of equaling amount.
- Delivery period will be 8-12 week after receipt of Truck chassis & advance payment
- Pre-delivery inspection of the machine will be made at the manufacturer's site before final coating of paint/Delivery
- Documents of imported parts/accessories can be provided at the time of pre-delivery inspection to ensure the usage of imported parts in the machine.
- Warranty period will be ONE YEAR against manufacturing fault or bad workmanship.
- The quoted prices of superstructures are valid for 30 days
- The quoted prices are inclusive of taxes and are based on current duties/taxes by Government. Any change in tax structure shall be on client's part.

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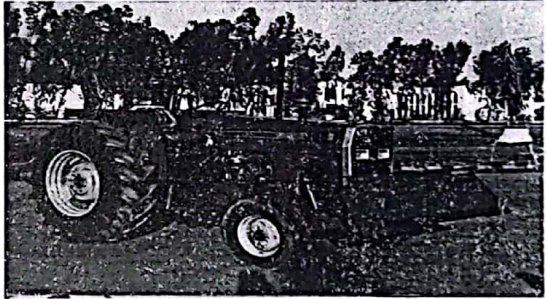
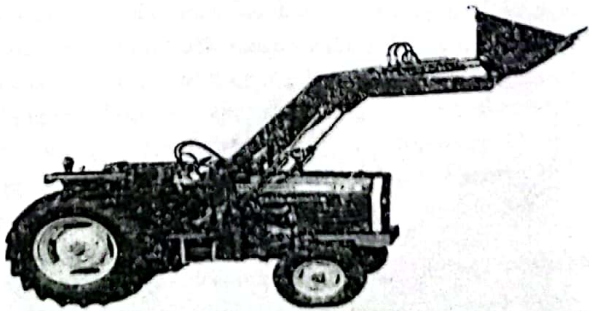
Main Hole De-silting Machine




Sr #	Descriptions
1.	<p>Superstructure</p> <ul style="list-style-type: none"> • The Capacity / Container of the De-silting shall be not less than 0.5 cubic meters. • The grab bucket shall be able to lift 40-50kg silt at one time. • The bucket shall be able to reach to the depth of 40-50ft.
2.	<p>Paint</p> <p>All steel part surfaces free from Rust and Oil Residue. Two coats Zinc Based Epoxy Primer and two coat of final paint done with 2 components Poly-Urethane based Paints.</p>

Commercial Terms & Conditions

- Payment of the superstructure to be made in advance against Bank Guarantee of equaling amount.
- Delivery period will be 8-12 week after receipt of Pickup & advance payment
- Pre-delivery inspection of the machine will be made at the manufacturer's site before final coating of paint/Delivery
- Documents of imported parts/accessories can be provided at the time of pre-delivery inspection to ensure the usage of imported parts in the machine.
- Warranty period will be ONE YEAR against manufacturing fault or bad workmanship.
- The quoted prices of superstructures are valid for 30 days
- The quoted prices are inclusive of taxes and are based on current duties/taxes by Government. Any change in tax structure shall be on client's part.

10	<p>Front blade tractors</p>	
	<p>Tractor</p> <p>Rate Engine Power</p> <p>Max Engine Torque</p> <p>Transmission</p> <p>Fuel Capacity</p> <p>Front End Blade</p> <p>Max. lift of blade</p> <p>Max. depth below ground</p> <p>Accessories</p>	<p>4-Wheel Drive</p> <p>85 HP @ 2200 rev/min</p> <p>291 Nm @ 1600 rev/min</p> <p>8 forward, 2 reverse</p> <p>108 liters</p> <ul style="list-style-type: none"> • Front blade for 85 BHP tractor • Blade size (7'x27") with cutting edge of 6"x1/2" of high carbon alloy steel • Ram type : Hydraulic Double acting <p>21 inches</p> <p>4 inches</p> <ul style="list-style-type: none"> • Pintle hook • Sun canopy • Standard toolkit
11	<p>Front End loader</p>	

	<p>Tractor 4-Wheel Drive</p> <p>Rated Engine Power: 85 HP @ 2200 rev/min</p> <p>Max Engine Torque 291 Nm @ 1600 rev/min</p> <p>Transmission 8 forward, 2 reverse</p> <p>Fuel Capacity 108 liters</p> <p>Front end loader</p> <ul style="list-style-type: none"> • Commercial for 85 BHP • Lifting capacity: 1300 Kg • Bucket: 5.5 feet • Bucket type: Close earth bucket with digging teeth with lift ram • Double acting pump • Rear weight box <p>Accessories</p> <ul style="list-style-type: none"> • Pintle hook • Sun Canopy • Standard tool kit
12	<p>Motor Cycle</p> 
	<p>Motor cycle 70 cc</p> <p>Engine 4-Stroke Single Cylinder Air Cooled</p> <p>Displacement 72 cm³</p> <p>Bore & Stroke 47.0 x 41.4 mm</p> <p>Compression Ratio 8.8 : 1</p> <p>Clutch Multiple wet plates</p> <p>Transmission 4-speed Constant mesh</p> <p>Starting Kick Start</p> <p>Frame Backbone Type</p> <p>Ground Clearance 135-140 mm</p> <p>Petrol Capacity 8-10 Liters</p> <p>Tire at front 2.25 – 17 (4 PR)</p> <p>Tire at back 2.50 – 17 (4 PR)</p> <p>Dry Weight 80 – 90 Kg</p>
13	<p>Paint and labeling</p> <p>The paint on the truck chassis shall be applied by the truck chassis manufacturer as per applicable international standards.</p> <p>The paint on all other fabricated bodies and superstructure of vehicles described in Item No.7 above, and hand cart shall be applied after thorough sand/shot blasting to SA2.5 and after achieving the appropriate surface profile for proper adherence of the paint. The surfaces shall be applied with two coats of Zinc-rich Epoxy primers to give maximum protection against rust and corrosion to enhance the design life, and one final coat outer side using 2-component poly urethane paint of min.200 microns DFT in the color shade approved by Employer/ Engineer. The paint shall be of internationally reputed paint manufacture such as Ak zonobel, Jotun, Sherwin William so equivalent approved by the Employer/Engineer.</p> <p>The paint color, labeling i.e. logo, motives, slogans etc. on the vehicles, garbage container and handcart etc. shall be applied after approval of the Employer.</p>

Allied Accessories (Vehicle Tracking and Monitoring System etc.)**Scope of Work**

The scope of works shall include the design, supply, installation, testing and commissioning of Vehicle Tracking Monitoring System (VTMS) complete with associated electrical and communication wiring works, control equipment, LED video display unit, works stations, mounting brackets and accessories. The Contractor shall be responsible for providing complete turnkey system solution including auxiliary equipment, and all such equipment with accessories shall be deemed to be included in the scope of Contractor and no extra payment shall be made to the Contractor for these. The system shall include Hardware and Software of Vehicle Tracking, wiring, termination, electrical boxes, and all other necessary material for a complete operating system in Control rooms. The bidders may raise the queries for any clarification, missing information or ambiguity if any, within one week after issuance of bidding documents. Any work to be carried out by the owner/Main contractor, should be mentioned clearly along with the bid, otherwise no claim against extra work shall be acceptable. Specification, Drawings and BOQ etc. should be read carefully to comply with specified loads, serving landings and other general and special safety features. Any deviation from specification/BOQ should be mentioned well in time before submission of bid.

The Hardware and Software of Vehicle Tracking and Monitoring System (VTMS) works are to be performed; the requirements given in the Technical Specification shall be fulfilled. The Contractor shall be responsible and provide the following:

- Hardware and Software of Vehicle Tracking, and Monitoring System (VTMS).
- Hardware and Software of Tracking, and Monitoring System (VTMS) to remotely control, and transmit information regarding status of each device from the Site to Control Room
- Operator Work station with LED Video Display Unit at the Central Control Room
- All software packages shall be provided in original installation media along with their licenses
- Preparing an Engineering Design Report covering, at least, the following sub systems:
 - 1) Detailed Construction Drawings and As-Built drawings for the Hardware and Software of Vehicle Tracking and Monitoring System (VTMS)
 - 2) Schematics and interconnection diagrams showing Hardware and Software of Vehicle Tracking and Monitoring System (VTMS) controllers and other elements to monitor and control the processes outlined above.
 - 3) The exact quantities and types of hardware and software required
 - 4) Technical detail software hardware and software of the complete systems
 - 5) Schematic drawing of the complete systems
 - 6) Layout drawings.
 - 7) Cable schedules and routing plan.
 - 8) Detailed description of the data acquisition software, user configurable functions and software features to be provided.
 - 9) Complete details, brochures and pictures of the proposed area.
 - 10) Installation, testing and commissioning procedures and methodology.
- Procure, transport and deliver equipment and hardware to site, after approval of the above report(s) by the Engineer.
- Design, install, test and commission of Hardware and Software of Vehicle Tracking and Monitoring System (VTMS) in accordance with the procedures given in the engineering design report.
- Provide training to the minimum four personnel nominated by Employer for 15 days. Bidder shall submit with his bid the following Documents/Data for all system equipment including Hardware and Software of Vehicle Tracking and Monitoring System (VTMS).
- Brochures and datasheets of each equipment
- Block diagram of Hardware and Software of Vehicle Tracking and Monitoring System (VTMS)
- Test standards and design
- Backup calculations showing that Hard Disks shall be able to record data of all systems for a period of two years.
- International Standard Reports/Certificates

Standards

Materials/Equipment shall be designed, manufactured, tested and installed according to relevant IEC/ISO/ITU/EN/CE Recommendations. Where no such Recommendations have been issued to cover a particular subject then a recognized international standard shall be applied. The latest edition and amendments shall apply in all cases.

The Bidder shall state in his bid the standards and codes of practice which he proposes for any items of system or equipment not covered by IEC/ISO/ITU/EN/CE Recommendations. If required by the Employer, the Contractor shall submit English language copies of any standard or code of practice. Equipment and design shall comply with international USA/ Europe or Any ADB eligible member Country standards.

General Specifications

All the vehicles described above shall be equipped with a Vehicle Tracking and Monitoring System (VTMS), as a minimum being capable to monitor vehicle routes, speed of travel, distance covered harsh braking, mileage in Control room etc.

Through VTMS all the operational vehicles and their working shall be easily recorded and monitored. By using this web application, the Client shall be able to monitor the operational vehicle route and speed to keep a strict eye on the vehicles. The Vehicles shall be equipped with approved Tracking device

Operational (fees paid) for the year in which vehicle is supplied to the Employer, routing transmitter for tracking system, and

Other instruments such as for Fuel Level, Battery Condition & Water Temperature and Tachometer etc.

All the vehicles shall be equipped with air-conditioning system, weight sensor and wi-fi compatibility approved by the Engineer/Employer. All the equipment/machinery shall be equipped with Vehicle Trip Counting System (VTCS) being automatically operated without any human involvement. This web-based system shall be accessible through internet.

Vehicles shall be equipped with a beacon light (yellow, commercial quality) on roof of driver's cab, to be operated from inside the cabin.

Warranty

The Contractor shall provide warranty for all equipment for a period of one (1) year through authorized local distributor commencing the hand-over and acceptance date to the Employer. No equipment shall be accepted without warranty certificate from the manufacturer (OEM). It shall cover all costs for warranty service, including parts replacement, labour, prompt field service, pick-up, transportation, and delivery. No extra cost shall be admissible for Warranty services.

Functional Description**Vehicle Tracking System**

The Vehicle tracking system shall be installed at every moving vehicle. The Vehicle Tracking System should have the following features

- Fleet management solution
- Satellite tracking system (GPS) with enhance real time GPRS connectivity
- Solution with nation wide coverage
- 24x7 location on call
- Multiple users' logins
- Geo fence alert
- Battery disconnect alerts
- Vehicle immobilization in case of emergency
- Activity report
- Activity summary report
- Geo fence in/out report (multiple fences)
- Stop report
- Trip wise report
- Mileage report
- Harsh breaking report
- Over speed report
- Live status page (all vehicles live status on one page)
- Bird eye view (graphical reporting)
- Oil change alert (system generated intimation by email) based on tracker kilometers.
- Daily, weekly, monthly, yearly reporting
- Vehicle specific reporting
- Raw data availability (for in-house customized reporting/data-processing)
- Route/geo-fence violations
- Data shall be provided to company in-format, as per agreed standards & format
- Complete activity report
- Reports will be fetched against company, category, vehicle type, and town against given time

period

- Summary option shall be for day, week, month
- Company geo fence defined in out report
- Trip report detail (during trip start from parking site till pick container then dump at dumping site) travel time, stop time, number of container pick, mileage and other fields
- Container visited summary
- Dumping site visited report
- Workshop visited report
- Continues driving report
- Area wise speed violation report

Fuel Kit

The fuel kit shall be installed at every moving vehicle. The Fuel Kit should have the following features

- Online fuel monitoring through web portal
- Fuel injection/refilling report (liters)
- Fuel consumption v/s driven km's report
- Fuel monitoring report
- Online as board

Operator Work station

The minimum configuration of the Operator work station PCs and the LED Monitors shall be an IBM compatible server computer based on the currently prevailing version of the Intel Core i7 microprocessor. One number Operator work station shall be installed at control rooms. The minimum configuration of the server shall be as per the following minimum specifications:

- Core i7 8th Generation processor latest version
- Intel series chipset Q370
- 16-GB RAM-DDR4
- 1T B Internal Hard disk drive 7200 RPM 3.5inch
- HD MI port for connection to the High-quality monitor
- DVD/RW drive
- 32" LED monitor FHD with HD MI and VGA
- R/W combination CDR and DVD, Keyboard, Mouse and Peripheral Interface Cards
- Latest MS WINDOWS 10 Professional 64-bit pre-installed Operating System and associated software.
- All components/equipment shall be same brands and shall be OEM Manufacture

4K55" LED VDU

The 4k 55" LED VDU (video display unit) shall be used to show and monitor all the vehicle routes, speed of travel, distance covered, harsh braking, mileage etc. One number 4k 55" LED VDU shall be installed at control rooms. The minimum configuration of the 4k 55" LED VDU shall be as per the following minimum specifications.

- 4k Resolution with HDR (High Dynamic Range),
- 8.3 Million Pixel RGB UHD,
- Quad Core Processor,
- Ethernet LAN Port with wireless Network Card built-in,
- All accessories, wall mounting brackets, Remote, user manual,
- Original manufacturer's with warranty card
- Vehicle Tracking and Monitoring System software shall be installed in Control Room.

EQUIPMENT DATA SHEET

The bidders are required to fill in the following form completely and clearly, for each equipment/machinery/vehicle along with the units of measurement.

Item		Particulars
	Name of Equipment	
	Manufacturer Details with Country of Origin	
	Name	
	E-mail address of the concerned person	
	Phone No.	
	Certifications	ISO 9001
		ISO 14001
		OHSAS 18001
	Service Interval (per-operating hours/per km)	
	Average Fuel Consumption (per operating hours/ per km)	
	Average Cost Per Service Interval (including fuel and scheduled maintenance)	



PUNJAB MUNICIPAL DEVELOPMENT FUND COMPANY

REGULATED UNDER SECTION 42 OF THE COMPANIES ORDINANCE 1984

PMDFC/CP/ID/1-01/0122

FAX/COURIER
January 17, 2022

To
Chief Officer
Municipal Comm. Jhang
Jhang

M. Ashiq
19/1/2022

89
19/1/2022

Subject: Punjab Cities Program - Amended Administrative Approval of PC-I of Machinery & Equipment for solid waste management

Your Reference: No-44/CO dated 14.01.2022

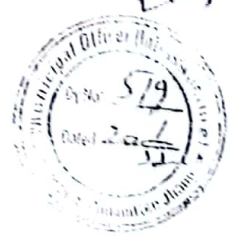
Kindly refer to your communication given above vide which you have requested PMDFC to issue Amended Administrative Approval of the PC-I named in the subject.

It may be clarified that PMDFC is not the competent forum for according Administrative Approvals. You are advised to refer the case to DDSC of LG & CD Department after preparation of the Amended PC-I along with the comparative statement, the format for which has already been sent to you and a fresh format handed over to your sub engineer to day.

Best regards

M. Ashiq Chaudhary
Senior Program Officer
Infrastructure Development

17/1/22



Ensure Compliance

[Signature]
19/1/2022

S/E H/C

A copy, for information, is forwarded to:

1. Program Director PCPL Lahore
2. Municipal Officer (I&S) MC Jhang
3. Program Officers-2 (ID) Lahore
4. Program Officer (ID) Central Region Faisalabad

Cost estimate for establishment of Mobile Workshop
(All costs in PKR)

Quotation attached dully
verified by Incharge

Tools & plants for mobile workshop
T&P for mechanical repairs

Description	Unit	QTY	Rate	Total cost
Double operating wrench set (spanner/chabi set) packed in box	Set	1	5000 ✓	5000 ✓
Ring spanners set (Pana set 8 to 32 mm) packed in box	Set	1	6000 ✓	6000 ✓
Socket wrench set complete (Goti set) packed in box	Set	1	8000 ✓	8000 ✓
Screw wrench set (6", 8", 10", 12" & 18" sizes) packed in box	Set	1	9000 ✓	9000 ✓
Pipe wrench set (12" & 18" sizes)	Set	1	5000 ✓	5000 ✓
Hex-key sets (30 pieces) packed in box	Set	1	3000 ✓	3000 ✓
Flat file set (6", 8", 10" & 12" size)	Set	1	2000 ✓	2000 ✓
Round file set (6", 8", 10" & 12" size)	Set	1	3000 ✓	3000 ✓
Chain wrench set (12 size)	Nr	1	3000 ✓	3000 ✓
Chain wrench set (18" size)	Nr	1	4000 ✓	4000 ✓
Chain wrench set (24" size)	Nr	1	6000 ✓	6000 ✓
Vice	Nr	1	12000 ✓	12000 ✓
Dye set 1/2" to 2"	Nr	1	14000 ✓	14000 ✓
Dye set 2" to 4"	Nr	1	18000 ✓	18000 ✓
AC Dry welding plant small size with all accessories	Set	1	56000 ✓	56000 ✓
Hammer set (1/2 lb, 2 lbs & 5 lbs)	Set	1	4000 ✓	4000 ✓
Chisel complete set (6", 8", 12")	Set	1	2400 ✓	2400 ✓
MS rod (bari) 4 feet long	Nr	2	5000 ✓	10000 ✓
Chain pulley block 5 tons	Nr	1	30000 ✓	30000 ✓
Bearing puller set (Nr- 6,8,10,12,16)	Set	1	20000 ✓	20000 ✓
Hack saw including packet of blades	Nr	1	2000 ✓	2000 ✓
MS pan	Nr	1	3000 ✓	3000 ✓
GI funnel (1 Kg)	Nr	1	2400 ✓	2400 ✓
Electric cutter/grinder 5" size	Nr	1	22000 ✓	22000 ✓
Screw driver flat big size	Nr	1	600 ✓	600 ✓
Screw driver star end big size	Nr	1	600 ✓	600 ✓
Sub Total				251000 ✓
T&P for electrical repairs				
Grip pliers set (main pliers, Nose pliers & cutter pliers)	set	1	3000 ✓	3000 ✓

Quotation attached dully
verified by Engineer in charge

2	Cable cutter	Nr	1	1200 ✓	1200 ✓
3	Tong tester (Ampers, volts, ohms & continuity (Germany or English made)	Nr	1	10000 ✓	10000 ✓
4	Simple touch tester	Nr	1	600 ✓	600 ✓
5	Thimble presser/punch	Nr	1	6000 ✓	6000 ✓
6	Electric drill (germany)	Nr	1	16000 ✓	16000 ✓
7	Electric blower	Nr	1	8000 ✓	8000 ✓
8	Screw driver set imported except china	Set	1	3000 ✓	3000 ✓
9	Screw driver flat big size	Nr	1	600 ✓	600 ✓
10	Screw driver star end 15"	Nr	1	600 ✓	600 ✓
Sub Total					49000 ✓

Summary of cost

Nr.	Detail of Equipment	Total cost (PKR)
1	T&P for mechnical repairs	251,000 ✓
2	T&P for electrical repairs	49,000 ✓
3	Cost of seating, wooden boxes, internal wooden body lining, and vice substructure	200,000 ✓
Grand total		500,000

The rates i/c all Govt taxes and contractor profit.