

**CHISINAU URBAN ROAD SECTOR PROJECT
PARKING SYSTEM SUPPORT**
BRIEF PRESENTATION

Glossary of Terms

All definitions are set in the context of this parking study and are therefore related to this theme.

CCTV – Closed-Circuit Television.

Clamping – temporary immobilisation of vehicles, e.g. using wheel clamps, pending payment for enforcement action.

Commuter parking – all-day parking demand by drivers who travel to the area of their place of work/education.

Contract Specification – the definition of outcomes required by the procurement package.

Controlled Parking Zone (CPZ) – defined area within which stronger parking policies will be implemented, and where all on-street parking is regulated and enforced.

Design Guidance – standards and rules for development of parking areas.

Duration – length of parking event.

Enforcement – process for organizing, administering and operating parking regulations.

KPI – Key Performance Indicator.

Long-stay parking – parking for a period greater than 4 hours.

MEAT - Most Economically Advantageous Tender.

MOC – Municipality of Chisinau.

Off Street Parking – parking provision in areas or structures not directly on roads.

On Street Parking – provision of parking in publically accessible road side areas.

Parking Bay – area marked to accommodate 1 or more parked vehicles.

Parking charge – fee to be paid to park a vehicle for a specified period of time.

Parking contractor – operator of the parking concession.

Parking demand – number of vehicles observed or estimated to park in a specific area.

Parking permit – pre-paid license to be displayed within the vehicle.

Parking space – a cell marked to accommodate 1 parked vehicle.

Parking tariff – charge per period of parking (e.g. Lei per hour).

Parking ticket – penalty notice issued to illegally parked vehicles.

Pay and display (P&D) ticket – proof of payment, displayed within the parked vehicle.

Payment machines – Facilities for the public to purchase their P&D ticket.

Penalty charge – Fine for illegal parking.

Procurement Package – contract document specifying the detailed requirements for the defined services.

Procurement strategy – process for the identification and appointment of an agreed supplier.

Public private partnership (PPP) – Government and business joint funding and or operation of a specified service or facility.

Short-stay parking – parking for a period of 4 hours of less.

Taxi rank – identified waiting area for use by taxis licensed by the City of Chisinau.

Ticket transfer – drivers passing P&D tickets between vehicles.

Turnover – Relative rate of parking demand and space utilisation, normally measured in relation to the number of times a parking space is used per unit of time, and the proportion of the available total time the space is occupied.

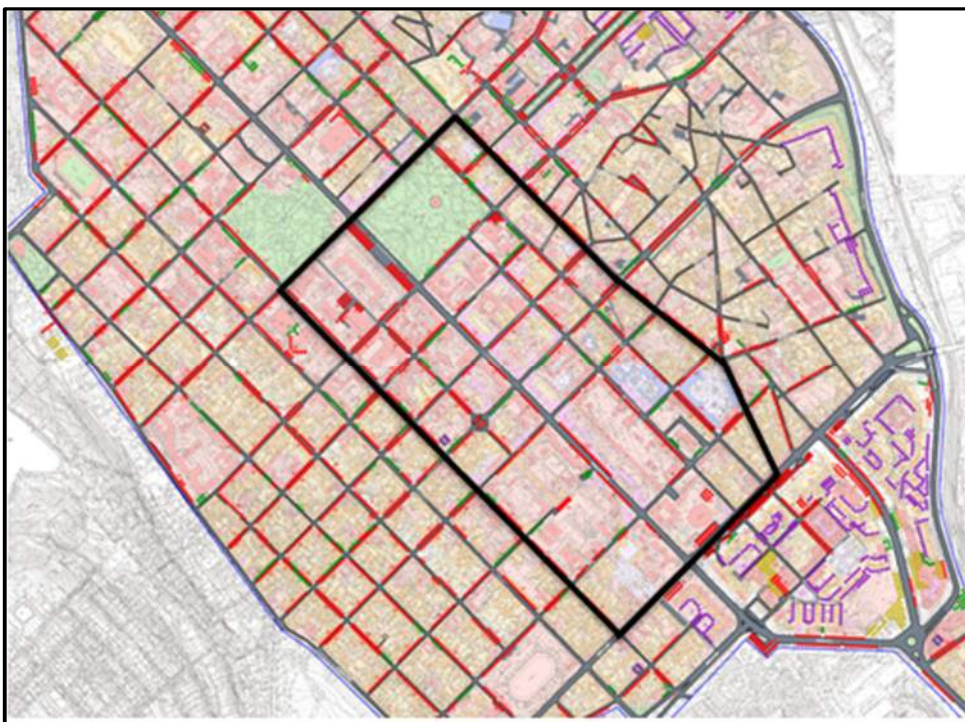
Controlled Parking Zone

3.1 Parking Demand Data

3.1.1 Observations

During site visits, informal observation was made of parking activity in the centre of Chisinau. In discussion with the Project Implementation Unit (PIU) it was agreed that this is the main focus for parking problems within the City. An initial, indicative controlled parking zone (CPZ) was identified, bounded by Str 31 August 1989, Str Mitropolit G. Banulescu-Bodoni, Str Alexandru cel Bun and Str Ismail – as shown on Figure 3.1 below:

Figure 3.1: Initial Suggested Controlled Parking Zone (CPZ) Boundary.



It was expected that survey data available to the Municipality would be available and that analysis of this data would inform finalisation of the proposed CPZ. It emerged that the data that had been discussed had been collected in 2008, and never processed. It was agreed that the Municipality would collect current data, based on the parking survey scope document prepared by WSP (attached at Appendix 2), along with a range of sample survey forms.

The emerging data was provided to WSP in December 2012 for further analysis.

Checking the base data identified the following issues:

- 41 survey routes were defined by the PIU, of which sufficient data is available for analysis of 32 survey routes. These were:
 - Route 1 -2;
 - Route 5-22;
 - Route 24-31;
 - Route 33-34; and

- Route 37 & 41.
- The remaining routes were discounted for one (or more) of the following reasons:
 - 37 routes were identified on the survey plan provided by the PIU, not 41;
 - Not all counts are available in 30 minute increments;
 - Lack of data after 17:00;
 - Lack of and / or error in the data;
 - No data in the spreadsheet for routes 38 – 40;
 - Lack of / no data between 08:00 – 09:00; and
 - No data available.

It was however concluded that the data provided for the 32 survey routes was sufficient to inform this stage of work. Collection of updated and more accurate data is recommended in advance of appointment.

The data was analysed in relation to:

- Parking accumulation

Overall, as would be expected, parking demand grows through the AM period and peaks in the late afternoon. There are variations in this demand however by location and throughout the survey period.

There is significant demand at the eastern end of Bd Stefan cel Mare, along Ismail and in the area of Ciuflea, with demand generally exceeding capacity. This level of demand is reflected in the area of the market and bus station, however reduces as you move away from Stefan cel Mare.

The high demand seems to be reflected on streets running parallel to Stefan cel Mare, generally back one to two blocks deep, though demand is not as excessive on southern streets (beyond str 31 August 1989).

Demand seems to remain high in some central areas well into the evening period, particularly where there is a concentration of shops, bars and restaurants – e.g. the eastern end of Stefan cel Mare.

There are some areas where high demand is observed away from the main concentrations, for example:

- In the vicinity of the State University of Moldova;
- The Necropolis to the south-west of the central area;
- In the vicinity of the Academy for Economic Studies, north of the central area.

It is likely that on-street charges alone will not address the issues in these areas, and provision of off-street parking will be required to fully address demand.

- Duration of stay

Overall duration of stay information is summarised in Table 3.1 below. The parking duration tables show that over 62% of parking events are for less than 30 minutes duration. Significant proportions of demand are noted for up to 2 hours duration, beyond which levels of demand fall significantly in the areas surveyed.

Table 3.1: Parking Duration Summary

| Parking Duration (mins) | Demand (vehicles) | Proportion (%) | Total Proportion (%) |
|-------------------------|-------------------|----------------|----------------------|
| Up to 30 | 19,123 | 62.1 | 62.1 |
| 30 to 60 | 4,367 | 14.2 | 76.3 |
| 60 to 90 | 2,640 | 8.6 | 84.9 |
| 90 to 120 | 1,674 | 5.4 | 90.3 |
| 120 to 150 | 952 | 3.1 | 93.4 |
| Longer than 150 mins. | 2,035 | 6.6 | 100 |

The high volume of short stay demand has implications for choice on both payment method and tariff. It is suggested that the tariff levels adopted reflect this pattern of demand, targeting short stay demand both in terms of the level of tariff and the duration allowed (maybe charge for a 15 minute period, though this has implications for enforcement). There does seem to be a step change in at the 30 minute period for each, suggesting a straightforward banding for longer stay demand.

- Inappropriate parking (e.g. on pavement/sidewalk).

Inappropriate parking was also recorded in the surveys, though it appears less accurately than for overall demand. It is clear however that observed inappropriate parking – that is parking on sidewalks, at junctions and away from recognised parking locations, is a significant problem and this is consistent with our observations.

The complete survey analysis is included at Appendix 3.

3.2 Recommended Controlled Parking Zone

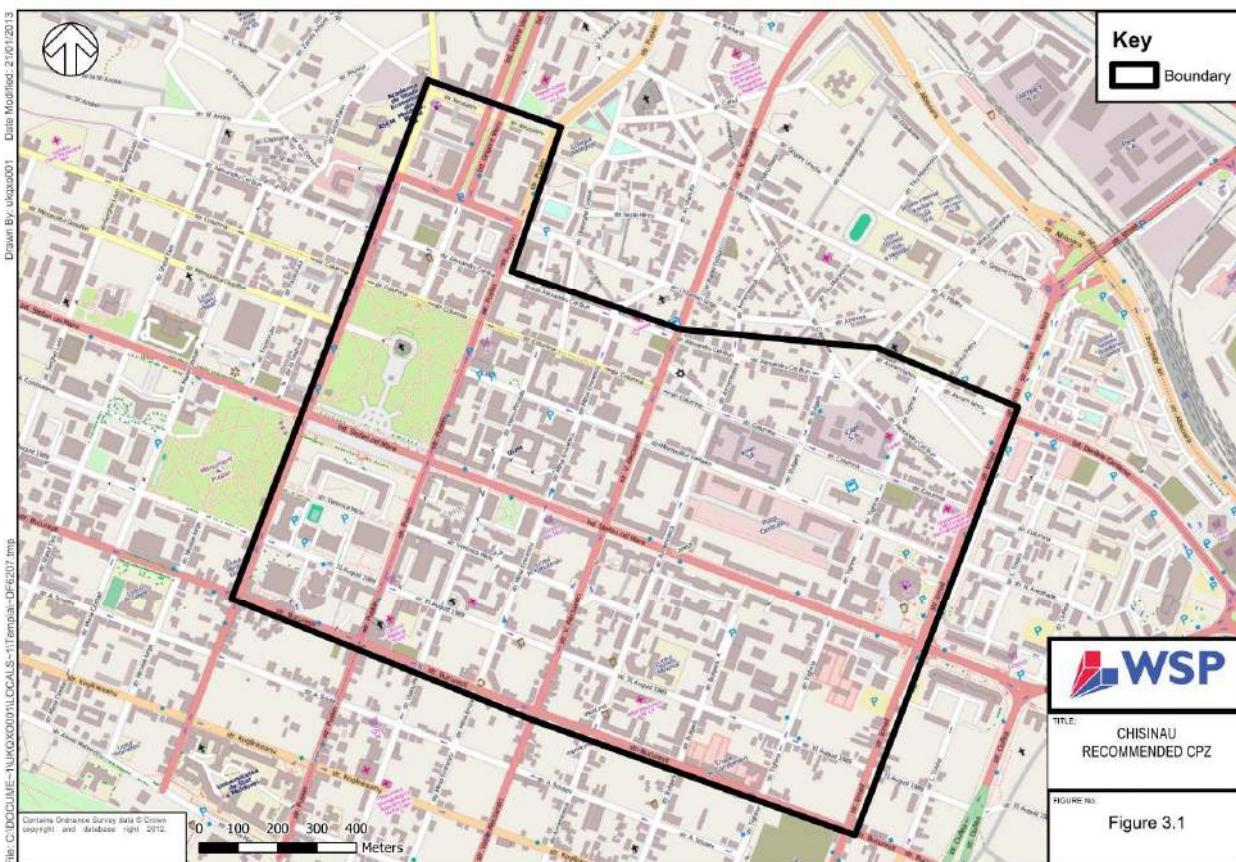
Based on the data collected it is considered that the indicative CPZ is broadly correct, however does need to be adjusted to reflect the outcome of the survey analysis. High demand was noted particularly in the following areas:

- Ismail;
- Ciuflea and
- Cosmonaut areas.

As indicated by the results for Beats 1, 3, 4 and 41, and our discussions with the PIU. This is consistent with our observations and it is therefore recommended that the initial CPZ be expanded to include these areas.

Outside much of the proposed CPZ there is a clear reduction in demand for parking, outside Ismail, str 31 August 1989 and str Mitropolit G Banulescu-Bodoni. The boundary along the north eastern side, however is less clear as there is not such a marked change in parking demand patterns. It is suggested that str Alexandru cel Bun/str Avram Iancu for this boundary as they would make a consistent demarcation with the remaining boundaries and would envelope key areas of parking demand, e.g. the Central Market and bus station, however some areas of current lower demand would be included. Str Alexandru cel Bun in particular is considered to be a major route and would seem a sensible boundary both in terms of public perception and demand.

Figure 3.1: Recommended Controlled Parking Zone (CPZ) Boundary (Option 3).



The above CPZ does not include some areas of higher demand, e.g. the area of the State University of Moldova and the Necropolis to the south-west of the central area. It is considered that demand for parking in these locations is related to the functions of the area and a different strategy may be required.

Parking demand and patterns of parking usage will change as a result of the implementation of this parking policy and CPZ. It is critical that the boundary of the CPZ is kept under review and expanded as necessary. This could take the form of straightforward expansion of the proposed area (with the same regulations etc.), or it could be in the form of identifying 'secondary' parking zones, on the edge of the CPZ where parking demand has shifted or where higher demand is observed (such as the areas mentioned above).

Whilst the data provided is considered to be sufficient to inform the current stage of the proposal, it is recommended that the Municipality or the parking contractor collect better quality and more comprehensive base data to supplement that collected to date. This will be required to monitor the impact of the parking policy and to benchmark parking operations. Whilst the data collected to date is adequate for this exercise, its quality is questionable and care should be taken in basing policy and/or investment decisions solely on this survey data.

A summary of the parking demand analysis was presented to the City Council on Wednesday 30 January 2013. A copy of the presentation is included at Appendix 4. The presentation included 6 options for the CPZ for consideration. It was agreed that Option 3, above, would be the most appropriate CPZ for the pilot parking control project.

4 Economic Appraisal of Car Parking

4.1 Introduction

The economic appraisal examines economic viability of the proposed parking scheme in the centre of Chisinau, and demonstrates the economic impact of the scheme.

This section details the approach taken in the economic appraisal, outlining the issues raised and assumptions made, and provides details of the results of the appraisal. Issues covered in this context include:

- The approach to the Economic Evaluation;
- Data Collection;
- Project Assumptions;
- Economic Evaluation; and
- Sensitivity Analysis.

4.2 Approach

Urban transport improvement schemes generate considerable interaction in which improvements at one location will affect conditions, not only locally, but also across a wider area.

The approach taken for the economic analysis has been to use a parking assessment tool in the form of an Excel model. The assessment tool has been developed using a number of parameters and assumptions agreed with the PIU.

The model calculates income and expenditure associated with proposed Pay & Display parking schemes, and provides a forecast of the annual net benefits along with an annual net present value. A further calculation has been undertaken to extend the economic analysis over a 20 year period, and to calculate the Internal Rate of Return.

MODEL PARAMETERS

The assessment tool works around certain key parameters agreed with the PIU to calculate the income and expenditure, including the following inputs:

- Extent of Controlled Parking Zone
- No. parking spaces on each street
- Average occupancy of parking spaces
- Operating period
- Ticket cost and collection rates
- Salaries of staff (operational management, on-street enforcement, clamps and removals, ticket and permit processing)
- Infrastructure costs
- Enforcement costs and income
- Vehicle Compound costs
- Annual inflation
- Contractor profit margin and contribution
- Payment periods

BASELINE MODEL

The model has been set up with a base case which represents the proposed scheme and expected costs. The parameters used in the base case have been agreed with the PIU, and include the following key inputs:

- Parking Tariff = 4 MDL per hour
- Average Occupancy = 60%
- Contractor Costs = as per the agreed costs

SENSITIVITY TESTS

In order to challenge the base case, sensitivity tests have been carried out which will identify the impact of any changes in these variables. The economic appraisal therefore also tests the following scenarios:

- Parking Tariff increased to 6MDL, 8MDL
- Average Occupancy increased to 70%, 85%
- Contractor Costs increased by 10%, 20%, 30%

FURTHER TESTING

The parking assessment tool will be provided to the PIU to enable further testing to be carried out with different scenarios.

The majority of the parameters in the model are costs or figures agreed with the PIU, and are not items that should be tested as variables. However, the model may be used by the PIU to test the impact of certain key variables relating to the operation or potential utilisation of the parking scheme, such as:

- Parking Tariff (cost of parking in lei per hour)
- Average Occupancy (% of spaces)
- Extent of CPZ (exclusion of certain streets or sections of streets)

4.3 Project Assumptions

KEY ASSUMPTIONS

A number of assumptions have been made in order to assess the economic viability of the proposed parking scheme. The assumptions are set out below.

Base Year Evaluation – it has been assumed that the start date for the scheme is 2013

Evaluation Period – the parking assessment tool provides a detailed analysis for the first 5 years of operation. A more detailed analysis has been carried out separately for a 20 year period, i.e. 2013 to 2032.

Operating Periods – It has been assumed that the operating period for the parking restrictions is between 07:30 and 17:00, six days a week (excludes Sundays), for 48 weeks of the year.

Total Parking Spaces – the maximum capacity of the parking spaces is assumed to be 85%. Occupancy levels higher than this would impact on circulating vehicles.

Demand – the model assumes uniform conditions across the CPZ

Cost Inflation – the model assumes that costs will increase at a rate of 5% per year

Income inflation – the model assumes that income from the scheme will be increased every 5 years to account for inflation. An assumed level of 10% every 5 years has been applied to income.

Ticket Payment Rates – the model assumes that in total, 70% of all tickets will be paid. 30% will pay on time, 30% will pay early, and 10% will pay late. This rate can be achieved but only with strong enforcement, effective follow up on tickets and effective legislation.

Enforcement Parameters – the model assumes the time to issue a parking ticket is 240seconds, the time to enforce one space is 15 seconds, and that each officer will issue 2 tickets per hour. This rate is an estimate, and may be lower.

P&D Machines – the model assumes that in the baseline scenario, the average number of parking spaces per P&D machine is 12. The model adjusts this for different tariff options, such that there will be more machines if the tariff is higher. Furthermore, the model assumes that parking spaces are laid parallel to the kerb. If an echelon style parking layout is used instead, the number of P&D machines can be reduced.

Ticket Transfer – the model assumes that the ability to transfer tickets between vehicles is prohibited

Enforcement – the model assumes that both clamps and removal systems will be operating

Capital Costs – the model defines which items are annual expenses, set-up costs, or set-up capital. This can be adjusted for different items depending on the purchasing arrangement

NPV – the model uses a discount rate of 6% per annum.

KEY COST ASSUMPTIONS

The economic analysis has largely been based on data provided by or agreed with the PIU. The data provide by the PIU includes costs for items such as marking out parking bays and staff salaries. Table 4.1 below presents the main cost assumptions agreed with the PIU for this analysis.

Table 4.1: Parameter Costs confirmed with PIU

| Category | Item | Cost |
|---|--|------------|
| Ticket Cost | Cost of a parking ticket | 200 lei |
| | Cost of a parking ticket paid early | 100 lei |
| | Cost of a parking ticket paid late | 300 lei |
| Operational Management Staff Salaries | Parking Manager | 75,000 lei |
| | Deputy Manager | 55,000 lei |
| | Contract Administrator / Financial Audit | 45,000 lei |
| | Administration Staff | 35,000 lei |
| | Contract performance monitors | 50,000 lei |
| On-Street Enforcement Staff Salaries | Supervisor | 40,000 lei |
| | Team Leaders | 38,000 lei |
| Clamps and Removals Staff Salaries | Enforcement Officers | 35,000 lei |
| | Manager | 40,000 lei |
| | Supervisor / pound Manager | 35,000 lei |
| | Drivers | 25,000 lei |
| | EOs (clamps and removals) | 25,000 lei |
| Ticket and Permit Processing Staff Salaries | Manager | 40,000 lei |
| | Supervisor | 35,000 lei |
| | Notice Processing Staff | 25,000 lei |
| | Court & Appeals staff | 25,000 lei |
| | Permit Processing Staff | 25,000 lei |
| | Parking Counter Staff | 25,000 lei |
| Infrastructure Costs | Cost to mark out/Bay | 20 lei |
| | Parking Payment Machine - Cost per sign: | 1,000 lei |
| | Zone sign - Cost per sign: | 1,000 lei |
| | Parking Payment (P&D) machine | 54,000 lei |

| Category | Item | Cost |
|--------------------|----------------------------------|-------------|
| | The cost of a van (for clamping) | 105,000 lei |
| | The cost of a suitable IT system | 500,000 lei |
| Vehicle Compound | Securing Site | 350,000 lei |
| | Provision of Payment Office | 90,000 lei |
| | Annual Costs | 180,000 lei |
| Enforcement Income | Income per vehicle removal | 900 lei |
| | Income per clamp | 250 lei |

4.4 Scale of Parking Proposals

An economic cost benefit analysis has been undertaken to assess the viability of the proposed city centre car parking scheme. The proposal is to introduce Pay & Display parking spaces on-streets, as set out below.

The assessment assumes that 15% of spaces are used by people with parking permits, leaving the remaining spaces to be chargeable through the Pay & Display scheme.

The car parking analysis has been based upon the following car parking numbers and the cost estimates set out in Section XX above, agreed with the PIU.

Table 4.2: Car Parking Space Allocation by Street

| Street No. | Street Name. | Total Parking Spaces | Chargeable Parking Spaces |
|------------|-------------------------------|----------------------|---------------------------|
| 1 | 31st August 1989 | 396 | 337 |
| 2 | Veronica Micle | 100 | 85 |
| 3 | Stefan cel Mare si Sfint | 351 | 297 |
| 4 | Mitropolit Varlaam | 154 | 131 |
| 5 | Columna | 214 | 182 |
| 6 | Alecandru cel Bun | 194 | 165 |
| 7 | Ismail | 272 | 231 |
| 8 | Tighina | 120 | 101 |
| 9 | Bulgara | 52 | 44 |
| 10 | Armeneasca | 101 | 86 |
| 11 | Vasile Alecsandri | 96 | 81 |
| 12 | Minai Eminescu | 128 | 108 |
| 13 | Vlaicu Pircalab | 90 | 77 |
| 14 | Puskin | 244 | 207 |
| 15 | Mitropolit G Banulescu Bodoni | 168 | 142 |
| 16 | George Cosbuc | 0 | 0 |
| 17 | Al Diodita | 86 | 73 |
| 18 | Negruzzi | 0 | 0 |
| 19 | str. Cosmonautilor | 47 | 39 |
| 20 | str Ierusalim | 53 | 45 |
| 21 | str. Balanescu | 41 | 35 |
| 22 | str. Avram Iancu | 12 | 10 |
| 23 | str St Georghe | 9 | 8 |

4.5 Implementation Cost

The implementation costs associated with the proposed scheme have been discussed and agreed with the PIU, and are set out in the parking assessment tool. The costs have been split into capital costs and maintenance costs. The cost estimates are shown in Tables 4.3 and 4.4 below.

SET UP CAPITAL COSTS

The set-up capital costs include one-off items such as marking of parking bays, road signs, P&D machines, staff equipment (radios, cameras etc.), staff training, and office equipment.

Table 4.3: Estimation of Set-Up Capital Costs

| Component | Description | Total Set Up Capital (MDL) |
|---|---|----------------------------|
| Operational Management | Staffing / Salary | 0 |
| | Other Staffing Costs (e.g. overheads, accommodation, uniform) | 0 |
| | Office Equipment | 0 |
| | Other Costs (e.g. PR, car, training, P&D machines) | 14,947,710 |
| | TOTAL | 14,947,710 |
| On-Street Enforcement | Staffing / Salary | 0 |
| | Other Staffing Costs | 0 |
| | Office Equipment | 1,144,880 |
| | Other Costs | 5,000 |
| | TOTAL | 1,149,880 |
| Clamps and Removals | Staffing / Salary | 0 |
| | Other Staffing Costs | 0 |
| | Office Equipment | 39,600 |
| | Other Costs | 105,000 |
| | TOTAL | 144,600 |
| Ticket & Permit Processing | Staffing / Salary | 0 |
| | Other Staffing Costs | 0 |
| | Office Equipment | 929,200 |
| | Other Costs | 0 |
| | TOTAL | 929,200 |
| Equipment Maintenance and Cash Collection | Staffing / Salary | 0 |
| | Other Staffing Costs | 0 |
| | Office Equipment | 59,600 |
| | Other Costs | 300,000 |
| | TOTAL | 359,600 |
| TOTAL SET UP CAPITAL (MDL) | | 17,530,990 |

SET-UP EXPENSES

The set-up expenses indicated below are one-off costs incurred before commencement, such as staff uniforms, public relations, consultancy costs, training, recruitment costs, securing of pound site, preparation of payment centre, cost of trucks, cost of clamps, and computer systems.

In the assessment, an additional one month of annual expenses are added to the start-up expenses set out below to allow for expenses incurred prior to the commencement date.

Contractor profit and contribution on costs is also added to the set-up expenses at a rate of 18% of the total set-up costs. This is not included in the Table below.

Table 4.4: Estimation of Set-Up Expenses

| Component | Description | Total Set Up Expense (MDL) |
|---|---|----------------------------|
| Operational Management | Staffing / Salary | 0 |
| | Other Staffing Costs (e.g. overheads, accommodation, uniform) | 16,000 |
| | Office Equipment | 36,000 |
| | Other Costs (e.g. PR, car, training, P&D machines) | 284,000 |
| | TOTAL | 336,000 |
| On-Street Enforcement | Staffing / Salary | 0 |
| | Other Staffing Costs | 183,000 |
| | Office Equipment | 3,800 |
| | Other Costs | 228,000 |
| | TOTAL | 414,800 |
| Clamps and Removals | Staffing / Salary | 0 |
| | Other Staffing Costs | 91,800 |
| | Office Equipment | 8,000 |
| | Other Costs | 1,739,900 |
| | TOTAL | 1,839,700 |
| Ticket & Permit Processing | Staffing / Salary | 0 |
| | Other Staffing Costs | 0 |
| | Office Equipment | 379,368 |
| | Other Costs | 240,136 |
| | TOTAL | 619,504 |
| Equipment Maintenance and Cash Collection | Staffing / Salary | 0 |
| | Other Staffing Costs | 22,500 |
| | Office Equipment | 8,100 |
| | Other Costs | 63,000 |
| | TOTAL | 93,600 |
| TOTAL SET UP CAPITAL (MDL) | | 3,303,604 |

ANNUAL COSTS

The annual costs associated with the parking scheme include staff salaries, staff accommodation costs, staff overhead costs, office maintenance, office equipment lease, office car, on-going training, P&D machine insurance and maintenance, tickets, stationary, departmental overheads, IT support, communications, and adjudication service costs.

The costs are increased at a rate of 5% per year to account for inflation. Furthermore, contractor profit and contribution on costs is added at 18% each year. Inflation and contractor costs are not included in the figures set out below.

Table 4.5: Estimation of Annual Costs

| Component | Description | Total Annual Expenses (MDL) |
|---|---|-----------------------------|
| Operational Management | Staffing / Salary | 380,000 |
| | Other Staffing Costs (e.g. overheads, accommodation, uniform) | 137,000 |
| | Office Equipment | 275,208 |
| | Other Costs (e.g. PR, car, training, P&D machines) | 2,011,901 |
| | TOTAL | 2,804,109 |
| On-Street Enforcement | Staffing / Salary | 1,347,000 |
| | Other Staffing Costs | 644,200 |
| | Office Equipment | 491,786 |
| | Other Costs | 480,138 |
| | TOTAL | 2,963,124 |
| Clamps and Removals | Staffing / Salary | 475,000 |
| | Other Staffing Costs | 118,250 |
| | Office Equipment | 142,960 |
| | Other Costs | 409,229 |
| | TOTAL | 1,145,439 |
| Ticket & Permit Processing | Staffing / Salary | 631,490 |
| | Other Staffing Costs | 513,821 |
| | Office Equipment | 642,789 |
| | Other Costs | 3,117,139 |
| | TOTAL | 4,905,239 |
| Equipment Maintenance and Cash Collection | Staffing / Salary | 253,000 |
| | Other Staffing Costs | 166,550 |
| | Office Equipment | 2,700 |
| | Other Costs | 124,327 |
| | TOTAL | 546,577 |
| TOTAL SET UP CAPITAL (MDL) | | 12,364,488 |

4.6 Annual Revenue

Revenue is generated through the following ways:

- Payments of enforcement notices
- Clamp and removal payments
- Permit payments
- On-street charging
- Net debt recovery proceeds

To account for inflation over time, the economic model increases the annual income by 5% every 5 years. A summary of the baseline income is presented in Table 4.6 below.

Table 4.6: Annual Revenue

| Income | Annual Income (MDL) (for the first 5 years) |
|---------------------------------|---|
| Payments of Enforcement Notices | 10,404,000 |
| Clamp & Removal Payments | 3,946,000 |
| Permit Payments | 4,300,000 |
| On Street Charging | 16,646,000 |
| Net Debt Recovery Proceeds | 85,000 |
| Total | 35,381,000 |

4.7 Car Parking Economic Analysis

The car parking analysis has been undertaken for the baseline scenario, using the following key factors:

- Parking Tariff 4 MDL / hour
- Contractor Costs as budgeted
- Average Utilisation 60%

The results of the economic analysis are presented in Table 4.7 below.

Table 4.7: Baseline Economic Analysis

| Year | Capital Costs | Operational Annual Costs | Total Costs | Income | Benefits (MDL) | |
|--------------------|---------------|--------------------------|-------------|------------|--------------------|-------------|
| 0 | START | 22,478,703 | 0 | 22,478,703 | 2,580,000 | -19,898,703 |
| 1 | 2013 | - | 14,590,096 | 14,590,096 | 32,041,992 | 17,451,896 |
| 2 | 2014 | - | 15,319,601 | 15,319,601 | 35,380,530 | 20,060,929 |
| 3 | 2015 | - | 16,085,581 | 16,085,581 | 35,380,530 | 19,294,949 |
| 4 | 2016 | - | 16,889,860 | 16,889,860 | 35,380,530 | 18,490,670 |
| 5 | 2017 | - | 17,734,353 | 17,734,353 | 35,380,530 | 17,646,177 |
| 6 | 2018 | - | 18,621,070 | 18,621,070 | 38,918,583 | 20,297,513 |
| 7 | 2019 | - | 19,552,124 | 19,552,124 | 38,918,583 | 19,366,459 |
| 8 | 2020 | - | 20,529,730 | 20,529,730 | 38,918,583 | 18,388,853 |
| 9 | 2021 | - | 21,556,216 | 21,556,216 | 38,918,583 | 17,362,367 |
| 10 | 2022 | - | 22,634,027 | 22,634,027 | 38,918,583 | 16,284,556 |
| 11 | 2023 | - | 23,765,729 | 23,765,729 | 42,810,441 | 19,044,713 |
| 12 | 2024 | - | 24,954,015 | 24,954,015 | 42,810,441 | 17,856,426 |
| 13 | 2025 | - | 26,201,716 | 26,201,716 | 42,810,441 | 16,608,725 |
| 14 | 2026 | - | 27,511,802 | 27,511,802 | 42,810,441 | 15,298,640 |
| 15 | 2027 | - | 28,887,392 | 28,887,392 | 42,810,441 | 13,923,050 |
| 16 | 2028 | - | 30,331,761 | 30,331,761 | 47,091,485 | 16,759,724 |
| 17 | 2029 | - | 31,848,349 | 31,848,349 | 47,091,485 | 15,243,136 |
| 18 | 2030 | - | 33,440,767 | 33,440,767 | 47,091,485 | 13,650,719 |
| 19 | 2031 | - | 35,112,805 | 35,112,805 | 47,091,485 | 11,978,680 |
| 20 | 2032 | - | 36,868,445 | 36,868,445 | 47,091,485 | 10,223,040 |
| NPV | | | | | 180,005,566 | |
| 5 Year IRR | | | | | 89% | |
| 20 Year IRR | | | | | 93% | |

The results of the analysis indicate that the scheme is viable, providing an Internal Rate of Return of 89% after 5 years, and an IRR of 93% after 20 years. This presents a very positive long term business case, despite the assumptions used in the base case scenario being relatively conservative. The application of new technology and innovation throughout the appraisal period would only strengthen the business case.

4.8 Sensitivity Analysis

A sensitivity analysis has been carried out to test the impact of different parking tariffs, contractor costs, and occupancy levels. The sensitivity tests are intended to demonstrate the robustness of the assumptions used in the base case scenario, and the strength of the business case against cost and demand variations.

The scenarios tested were agreed with the PIU, and are as follows:

- Parking Tariff increased to 6MDL, 8MDL
- Average Occupancy increased to 70%, 85%
- Contractor Costs increased by 10%, 20%, 30%

The results of the sensitivity tests are set out below in Tables 4.8 to 4.14.

SENSITIVITY TEST - TARIFF

Table 4.8: Sensitivity Test - Tariff increased to 6 MDL per hour

| Year | Capital Costs | Operational Annual Costs | Income | Benefits (MDL) |
|--------------------|---------------|--------------------------|------------|--------------------|
| 0 | START | 22,478,703 | 0 | -19,898,703 |
| 1 | 2013 | - | 14,590,096 | 40,364,904 |
| 2 | 2014 | - | 15,319,601 | 43,703,442 |
| 3 | 2015 | - | 16,085,581 | 43,703,442 |
| 4 | 2016 | - | 16,889,860 | 43,703,442 |
| 5 | 2017 | - | 17,734,353 | 43,703,442 |
| 6 | 2018 | - | 18,621,070 | 48,073,786 |
| 7 | 2019 | - | 19,552,124 | 48,073,786 |
| 8 | 2020 | - | 20,529,730 | 48,073,786 |
| 9 | 2021 | - | 21,556,216 | 48,073,786 |
| 10 | 2022 | - | 22,634,027 | 48,073,786 |
| 11 | 2023 | - | 23,765,729 | 52,881,165 |
| 12 | 2024 | - | 24,954,015 | 52,881,165 |
| 13 | 2025 | - | 26,201,716 | 52,881,165 |
| 14 | 2026 | - | 27,511,802 | 52,881,165 |
| 15 | 2027 | - | 28,887,392 | 52,881,165 |
| 16 | 2028 | - | 30,331,761 | 58,169,281 |
| 17 | 2029 | - | 31,848,349 | 58,169,281 |
| 18 | 2030 | - | 33,440,767 | 58,169,281 |
| 19 | 2031 | - | 35,112,805 | 58,169,281 |
| 20 | 2032 | - | 36,868,445 | 58,169,281 |
| NPV | | | | 287,041,852 |
| 5 Year IRR | | | | 132% |
| 20 Year IRR | | | | 134% |

Table 4.9: Sensitivity Test - Tariff increased to 8 MDL per hour

| Year | Capital Costs | Operational Annual Costs | Income | Benefits (MDL) |
|--------------------|---------------|--------------------------|------------|--------------------|
| 0 | START | 24,145,589 | 0 | -21,565,589 |
| 1 | 2013 | - | 14,792,725 | 33,895,091 |
| 2 | 2014 | - | 15,532,362 | 36,493,992 |
| 3 | 2015 | - | 16,308,980 | 35,717,374 |
| 4 | 2016 | - | 17,124,429 | 34,901,925 |
| 5 | 2017 | - | 17,980,650 | 34,045,704 |
| 6 | 2018 | - | 18,879,683 | 38,349,307 |
| 7 | 2019 | - | 19,823,667 | 37,405,323 |
| 8 | 2020 | - | 20,814,850 | 36,414,139 |
| 9 | 2021 | - | 21,855,593 | 35,373,397 |
| 10 | 2022 | - | 22,948,372 | 34,280,617 |
| 11 | 2023 | - | 24,095,791 | 38,856,097 |
| 12 | 2024 | - | 25,300,580 | 37,651,308 |
| 13 | 2025 | - | 26,565,609 | 36,386,279 |
| 14 | 2026 | - | 27,893,890 | 35,057,998 |
| 15 | 2027 | - | 29,288,584 | 33,663,304 |
| 16 | 2028 | - | 30,753,014 | 38,494,063 |
| 17 | 2029 | - | 32,290,664 | 36,956,413 |
| 18 | 2030 | - | 33,905,197 | 35,341,880 |
| 19 | 2031 | - | 35,600,457 | 33,646,620 |
| 20 | 2032 | - | 37,380,480 | 31,866,597 |
| NPV | | | | 388,912,057 |
| 5 Year IRR | | | | 160% |
| 20 Year IRR | | | | 161% |

The results of the sensitivity test indicate far higher returns are achievable if the tariff is increased to 6 or 8 MDL per hour. However, this assessment does not account for any displacement of parking as a result of higher fares.

SENSITIVITY TEST – CONTRACTOR COSTS

Table 4.10: Sensitivity Test – Contractor Costs increased by 10%

| Year | | Capital Costs | Operational Annual Costs | Income | Benefits (MDL) |
|------|-------|---------------|--------------------------|--------------------|--------------------|
| 0 | START | 24,726,573 | 0 | 2,580,000 | -22,146,573 |
| 1 | 2013 | - | 16,049,105 | 32,041,992 | 15,992,887 |
| 2 | 2014 | - | 16,851,561 | 35,380,530 | 18,528,969 |
| 3 | 2015 | - | 17,694,139 | 35,380,530 | 17,686,391 |
| 4 | 2016 | - | 18,578,846 | 35,380,530 | 16,801,684 |
| 5 | 2017 | - | 19,507,788 | 35,380,530 | 15,872,742 |
| 6 | 2018 | - | 20,483,177 | 38,918,583 | 18,435,406 |
| 7 | 2019 | - | 21,507,336 | 38,918,583 | 17,411,247 |
| 8 | 2020 | - | 22,582,703 | 38,918,583 | 16,335,880 |
| 9 | 2021 | - | 23,711,838 | 38,918,583 | 15,206,745 |
| 10 | 2022 | - | 24,897,430 | 38,918,583 | 14,021,153 |
| 11 | 2023 | - | 26,142,301 | 42,810,441 | 16,668,140 |
| 12 | 2024 | - | 27,449,417 | 42,810,441 | 15,361,025 |
| 13 | 2025 | - | 28,821,887 | 42,810,441 | 13,988,554 |
| 14 | 2026 | - | 30,262,982 | 42,810,441 | 12,547,459 |
| 15 | 2027 | - | 31,776,131 | 42,810,441 | 11,034,310 |
| 16 | 2028 | - | 33,364,937 | 47,091,485 | 13,726,548 |
| 17 | 2029 | - | 35,033,184 | 47,091,485 | 12,058,301 |
| 18 | 2030 | - | 36,784,843 | 47,091,485 | 10,306,642 |
| 19 | 2031 | - | 38,624,086 | 47,091,485 | 8,467,400 |
| 20 | 2032 | - | 40,555,290 | 47,091,485 | 6,536,195 |
| | | | | NPV | 152,562,171 |
| | | | | 5 Year IRR | 71% |
| | | | | 20 Year IRR | 77% |

Table 4.11: Sensitivity Test – Contractor Costs increased by 20%

| Year | | Capital Costs | Operational Annual Costs | Income | Benefits (MDL) |
|------|-------|---------------|--------------------------|--------------------|--------------------|
| 0 | START | 26,974,443 | 0 | 2,580,000 | -24,394,443 |
| 1 | 2013 | - | 17,508,115 | 32,041,992 | 14,533,877 |
| 2 | 2014 | - | 18,383,521 | 35,380,530 | 16,997,009 |
| 3 | 2015 | - | 19,302,697 | 35,380,530 | 16,077,833 |
| 4 | 2016 | - | 20,267,832 | 35,380,530 | 15,112,698 |
| 5 | 2017 | - | 21,281,223 | 35,380,530 | 14,099,307 |
| 6 | 2018 | - | 22,345,284 | 38,918,583 | 16,573,299 |
| 7 | 2019 | - | 23,462,548 | 38,918,583 | 15,456,034 |
| 8 | 2020 | - | 24,635,676 | 38,918,583 | 14,282,907 |
| 9 | 2021 | - | 25,867,460 | 38,918,583 | 13,051,123 |
| 10 | 2022 | - | 27,160,833 | 38,918,583 | 11,757,750 |
| 11 | 2023 | - | 28,518,874 | 42,810,441 | 14,291,567 |
| 12 | 2024 | - | 29,944,818 | 42,810,441 | 12,865,623 |
| 13 | 2025 | - | 31,442,059 | 42,810,441 | 11,368,382 |
| 14 | 2026 | - | 33,014,162 | 42,810,441 | 9,796,279 |
| 15 | 2027 | - | 34,664,870 | 42,810,441 | 8,145,571 |
| 16 | 2028 | - | 36,398,113 | 47,091,485 | 10,693,372 |
| 17 | 2029 | - | 38,218,019 | 47,091,485 | 8,873,466 |
| 18 | 2030 | - | 40,128,920 | 47,091,485 | 6,962,565 |
| 19 | 2031 | - | 42,135,366 | 47,091,485 | 4,956,119 |
| 20 | 2032 | - | 44,242,134 | 47,091,485 | 2,849,351 |
| | | | | NPV | 125,118,776 |
| | | | | 5 Year IRR | 57% |
| | | | | 20 Year IRR | 63% |

Table 4.12: Sensitivity Test – Contractor Costs increased by 30%

| Year | | Capital Costs | Operational Annual Costs | Income | Benefits (MDL) |
|------|-------|---------------|--------------------------|--------------------|-------------------|
| 0 | START | 29,222,314 | 0 | 2,580,000 | -26,642,314 |
| 1 | 2013 | - | 18,967,124 | 32,041,992 | 13,074,868 |
| 2 | 2014 | - | 19,915,481 | 35,380,530 | 15,465,049 |
| 3 | 2015 | - | 20,911,255 | 35,380,530 | 14,469,275 |
| 4 | 2016 | - | 21,956,817 | 35,380,530 | 13,423,712 |
| 5 | 2017 | - | 23,054,658 | 35,380,530 | 12,325,872 |
| 6 | 2018 | - | 24,207,391 | 38,918,583 | 14,711,192 |
| 7 | 2019 | - | 25,417,761 | 38,918,583 | 13,500,822 |
| 8 | 2020 | - | 26,688,649 | 38,918,583 | 12,229,934 |
| 9 | 2021 | - | 28,023,081 | 38,918,583 | 10,895,502 |
| 10 | 2022 | - | 29,424,235 | 38,918,583 | 9,494,348 |
| 11 | 2023 | - | 30,895,447 | 42,810,441 | 11,914,994 |
| 12 | 2024 | - | 32,440,220 | 42,810,441 | 10,370,222 |
| 13 | 2025 | - | 34,062,230 | 42,810,441 | 8,748,211 |
| 14 | 2026 | - | 35,765,342 | 42,810,441 | 7,045,099 |
| 15 | 2027 | - | 37,553,609 | 42,810,441 | 5,256,832 |
| 16 | 2028 | - | 39,431,290 | 47,091,485 | 7,660,196 |
| 17 | 2029 | - | 41,402,854 | 47,091,485 | 5,688,631 |
| 18 | 2030 | - | 43,472,997 | 47,091,485 | 3,618,489 |
| 19 | 2031 | - | 45,646,647 | 47,091,485 | 1,444,839 |
| 20 | 2032 | - | 47,928,979 | 47,091,485 | -837,494 |
| | | | | NPV | 97,675,381 |
| | | | | 5 Year IRR | 44% |
| | | | | 20 Year IRR | 52% |

The results of the sensitivity test indicate that a small increase in contractor costs would not deem the scheme unviable; however it would reduce the long term return. Contractor costs increasing by 30% however would have more serious long term impacts, with the analysis suggesting that annual costs could outweigh the annual income in 20 years' time. If this were the case and costs were evidently higher than predicted, it would be necessary for the Municipality to increase the parking tariffs more than the model has assumed (10% every 5 years) to ensure a long term profitable business case.

SENSITIVITY TESTS – PARKING SPACE UTILISATION

Table 4.13: Sensitivity Test – Utilisation increased to 70%

| Year | | Capital Costs | Operational Annual Costs | Income | Benefits (MDL) |
|------|-------|---------------|--------------------------|--------------------|--------------------|
| 0 | START | 22,478,703 | 0 | 2,580,000 | -19,898,703 |
| 1 | 2013 | - | 14,590,096 | 34,816,296 | 20,226,200 |
| 2 | 2014 | - | 15,319,601 | 38,154,834 | 22,835,233 |
| 3 | 2015 | - | 16,085,581 | 38,154,834 | 22,069,253 |
| 4 | 2016 | - | 16,889,860 | 38,154,834 | 21,264,974 |
| 5 | 2017 | - | 17,734,353 | 38,154,834 | 20,420,481 |
| 6 | 2018 | - | 18,621,070 | 41,970,317 | 23,349,247 |
| 7 | 2019 | - | 19,552,124 | 41,970,317 | 22,418,194 |
| 8 | 2020 | - | 20,529,730 | 41,970,317 | 21,440,587 |
| 9 | 2021 | - | 21,556,216 | 41,970,317 | 20,414,101 |
| 10 | 2022 | - | 22,634,027 | 41,970,317 | 19,336,290 |
| 11 | 2023 | - | 23,765,729 | 46,167,349 | 22,401,620 |
| 12 | 2024 | - | 24,954,015 | 46,167,349 | 21,213,334 |
| 13 | 2025 | - | 26,201,716 | 46,167,349 | 19,965,633 |
| 14 | 2026 | - | 27,511,802 | 46,167,349 | 18,655,547 |
| 15 | 2027 | - | 28,887,392 | 46,167,349 | 17,279,957 |
| 16 | 2028 | - | 30,331,761 | 50,784,084 | 20,452,323 |
| 17 | 2029 | - | 31,848,349 | 50,784,084 | 18,935,735 |
| 18 | 2030 | - | 33,440,767 | 50,784,084 | 17,343,317 |
| 19 | 2031 | - | 35,112,805 | 50,784,084 | 15,671,279 |
| 20 | 2032 | - | 36,868,445 | 50,784,084 | 13,915,639 |
| | | | | NPV | 215,684,328 |
| | | | | 5 Year IRR | 103% |
| | | | | 20 Year IRR | 107% |

Table 4.14: Sensitivity Test – Utilisation increased to 85%

| Year | Capital Costs | Operational Annual Costs | Income | Benefits (MDL) |
|--------------------|---------------|--------------------------|------------|--------------------|
| 0 | START | 22,478,703 | 0 | -19,898,703 |
| 1 | 2013 | - | 14,590,096 | 24,387,656 |
| 2 | 2014 | - | 15,319,601 | 26,996,689 |
| 3 | 2015 | - | 16,085,581 | 26,230,709 |
| 4 | 2016 | - | 16,889,860 | 25,426,430 |
| 5 | 2017 | - | 17,734,353 | 24,581,937 |
| 6 | 2018 | - | 18,621,070 | 27,926,849 |
| 7 | 2019 | - | 19,552,124 | 26,995,795 |
| 8 | 2020 | - | 20,529,730 | 26,018,189 |
| 9 | 2021 | - | 21,556,216 | 24,991,703 |
| 10 | 2022 | - | 22,634,027 | 23,913,892 |
| 11 | 2023 | - | 23,765,729 | 27,436,982 |
| 12 | 2024 | - | 24,954,015 | 26,248,696 |
| 13 | 2025 | - | 26,201,716 | 25,000,995 |
| 14 | 2026 | - | 27,511,802 | 23,690,909 |
| 15 | 2027 | - | 28,887,392 | 22,315,319 |
| 16 | 2028 | - | 30,331,761 | 25,991,221 |
| 17 | 2029 | - | 31,848,349 | 24,474,633 |
| 18 | 2030 | - | 33,440,767 | 22,882,215 |
| 19 | 2031 | - | 35,112,805 | 21,210,177 |
| 20 | 2032 | - | 36,868,445 | 19,454,537 |
| NPV | | | | 269,202,471 |
| 5 Year IRR | | | | 125% |
| 20 Year IRR | | | | 127% |

The results of the sensitivity test demonstrate that, as to be expected, any increase in utilisation above the predicted 60% will have a positive impact on the business case. An increase in utilisation from 60% to 70% would increase the 5 year IRR by 14%, and the 20 year IRR by 36%.

RESULTS SUMMARY

A summary of the base case and scenario test results is presented in Table 4.15 below.

Table 4.15: Modelling Outcome Summary.

| Scenario | NPV | 5 Year IRR | 20 Year IRR |
|--|-------------|------------|-------------|
| Base Case Tariff 4 MDL / hour Contractor Costs on Target Utilisation 60% | 180,005,566 | 89% | 93% |
| Sensitivity Test - Tariff Tariff 6 MDL / hour | 287,041,852 | 132% | 134% |
| Sensitivity Test - Tariff Tariff 8 MDL / hour | 388,912,057 | 160% | 161% |
| Sensitivity Test - Costs Contractor Costs + 10% | 152,562,171 | 71% | 77% |
| Sensitivity Test - Costs Contractor Costs + 20% | 125,118,776 | 57% | 63% |
| Sensitivity Test - Costs Contractor Costs + 30% | 97,675,381 | 44% | 52% |
| Sensitivity Test - Utilisation Utilisation 70% | 215,684,328 | 103% | 107% |
| Sensitivity Test - Utilisation Utilisation 85% | 269,202,471 | 125% | 127% |

Table 4.15 above summarises the results of the economic analyses carried out. The results demonstrate that the parking tariff and contractor costs have the greatest impact on the return, whereas the average utilisation of the parking scheme, a variable that is not within the Municipality's control, has less of an impact. The results also highlight the importance of controlling costs, as a 30% rise in costs can reduce the IRR to just 52% over 20 years.

In conclusion, the proposed parking scheme has a strong business case for the short and medium term, and as long as the tariff is reviewed at regular intervals, the scheme should remain profitable to the Municipality over the study period of 20 years. The proposed tariff of 4 MDL / hour has been demonstrated to make financial sense as a starting point, so long as sufficient enforcement measures are in place to secure the income.

Chisinau Parking Policy Document

3 Policies

3.1 Introduction

3.1.1 This purpose of this chapter is to provide a policy summary for the Chisinau Parking Strategy.

3.2 Policy Summary Table

3.2.1 The section provides a brief policy statement followed by an explanation and justification for the policies identified in the Chisinau Urban Road Sector Project – Parking System Support: Gap Analysis Report, which are set out in Table 4-1 below.

Table 4-1: Policy Summary Table

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|---------------------------------|---|--|--|---|
| General Parking Policies | | | | |
| 1.1 | Implementation of controlled parking zones (CPZs) to rationalise and manage parking in areas currently experiencing parking stress or areas where this is likely to occur due to land use changes. | <p>Policies will set out types of areas where controlled parking is required, the times and appropriate fee levels for parking. Parking policies will consider alternative modes of transport available at present and in the future as this will influence zone boundaries. The zoning for controlled parking will be determined by the current land uses and future land use aspirations for Chisinau.</p> <p>The initial CPZ has been identified based on analysis of key parking related issues in the centre of Chisinau. It is likely that other areas affected by similar parking issues that can be controlled by these parking policies will, in due course, be added.</p> <p>The policy and controlled parking zone should be kept under review to ensure that both remain relevant and address specific issues in relation to demand for movement and parking in and around Chisinau.</p> | <p>Parking management is required in order to ensure on-street parking spaces are available for those on business, shopping and leisure purposes and ensure that car commuters do not occupy parking spaces for extended periods throughout the day.</p> | <p>Meets objectives</p> <p>1.1</p> <p>1.2</p> <p>2.1</p> <p>2.2</p> |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|----|------------------|-----------------------|---------------|-----------|
|----|------------------|-----------------------|---------------|-----------|

Initial Proposed Controlled Parking Zone (CPZ):



| | | | | |
|-----|---|---|--|-------------------|
| 1.2 | The Municipality will procure an appropriate body to operate, maintain and enforce on-street parking infrastructure and policies in the defined CPZ area(s). | On-street parking operations will be packaged up to allow an experienced contractor to manage services most efficiently, to promote safe and appropriate parking and secure a revenue stream for re-investment in the city. | Parking operations, management and enforcement has become a specialist area and to ensure efficient operation it is proposed that a partnership be established to allow the Municipality to retain overall direction and control, while benefiting from the application of current best practice and technology by a recognised expert parking service provider. | 1.2 1.3 1.5 |
|-----|---|---|--|-------------------|

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|--|--|---|---|---|
| 1.3 | <p>The Municipality will designate appropriate controlled parking zones (CPZs) in the City, in which parking will only be allowed in designated parking bays.</p> <p>The CPZ boundaries will be kept under review to ensure that changes in parking activity can be managed.</p> | <p>The CPZ should be flexible and expandable, to respond to changes in driver's parking patterns and one-off event days – allowing phased expansion. The approach to designation of CPZ and managing parking should be adaptable to other areas of the city. This flexibility will ensure efficient management of parking in areas of high demand, and ensure that redistribution of parking does not lead to parking overspill in non CPZ areas.</p> | <p>This flexible approach will safeguard the objectives of achieving sustainable parking practices and will allow phasing and the identification of new zone areas where different tariff structures or regulations, e.g. time limits, may apply.</p> | <p>1.1</p> <p>1.2</p> |
| Pricing Policy to promote short stay on-street and longer stay off-street | | | | |
| 2.1 | <p>Pricing for parking will be structured to encourage longer stay parking in off-street car parks and short stay parking on-street.</p> | <p>To manage on-street parking spaces through charges and time limits in order to increase turnover, provide spaces close to key destinations and reduce circulating volumes of traffic.</p> <p>The Parking policies will specify when parking management is operational and this will correspond with local conditions and times of demand. This will set out the reasons why parking is being charged at particular times and if appropriate, will specify times when parking controls are not applied.</p> | <p>Parking stress in the city centre results in traffic circulating to find a parking space and inability to easily find a parking space deters people from stopping for a short time in the city to do business, shop or spend their time. Management of the overall parking supply is necessary to increase opportunities to park appropriately throughout the day.</p> | <p>1.1</p> <p>1.2</p> <p>2.1</p> <p>2.2</p> |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|-----------------------------------|---|---|---|--------------------------|
| On-street Parking Policies | | | | |
| 3.1 | Parking fees will apply to all on-street parking bays within the designated Controlled Parking Zone. | <p>This will encourage turnover of parking spaces to provide sufficient parking supply for those on business, retail or leisure purposes. The turnover benefits the city in terms of supporting the economy through increasing the likelihood of finding an available parking space close to core destinations. No return to the on-street parking area is permitted within one hour in order to deter parking meter feeding. This will help ensure parking turn over and assist in chances of finding a parking space on-street.</p> <p>The increase in turnover and chance of finding a parking space will reduce the number of vehicles circulating looking for a place to park.</p> | <p>Limits on parking duration and return periods helps to ensure that car commuters do not park in on-street parking bays throughout the day. On-street parking is intended to cater primary for short-stay trips that support economic and commercial activity. The Municipality will seek to ensure alternative provision, off-street or external to the controlled parking zone, for longer stay and commuter parking.</p> <p>Turnover of parking will benefit residents through the increased likelihood of parking spaces being available and the reduction of long-stay parking and traffic associated with this in more residential areas of the controlled parking zone. Residents' parking on-street however will still be limited by on-street regulation and time restrictions.</p> <p>The Municipality will take forward the obligation to provide increased levels of supply for long-stay demand in off-street locations through a combination of direct provision, e.g. multi-level car parks at key locations and ensuring appropriate levels of off-street parking are provided with new-build projects.</p> | 1.1 1.2 2.1 2.2 |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|--|--|--|---|---------------------------------|
| Parking Requirements for new developments | | | | |
| 4.1 | Parking standards for all new developments will be applied to ensure adequate parking provision for each development to minimise reliance on on-street parking. | <p>To obtain consent to provide a new development there will be a requirement on developers to demonstrate that sufficient and appropriate off-street car parking is available for future users or that sufficient provision of alternative, more sustainable travel modes are in place.</p> <p>At present parking standards for all new developments are set out in SNIP 2.07.01-89 (2000).</p> | Development parking standards should be implemented in line with SNIP 2.07.01-89 (2000) to ensure that there is a balance in parking provision and the development strategy that compliments the transport strategy. | 1.1 1.4 1.5 2.1 2.2 |
| Motorcycle Parking Provision | | | | |
| 5.1 | Within the CPZ, designated motorcycle parking bays will be provided on-street and in the most appropriate locations as defined by the Municipality. Motorcycle parking within the CPZ will be limited to these defined spaces, which will be subject to charging. | Motorcycle parking areas will be designated to ensure that this group have adequate, secure and well located parking areas. For security reasons, motorcycle parking will be in locations that are well over-looked. | Motorcycles are a sustainable form of travel which take up less road space than private cars and which require designated parking areas on-street. | 1.3 2.1 2.3 |
| Disabled parking supply | | | | |
| 6.1 | Parking will be permitted free of charge in parking bays by those in possession of a disabled badge. | Assessments determine those in society with accessibility limitations who can obtain a disabled badge. Limited mobility drivers often require increased journeys to drive or be driven closer to their destination. Thus, allowing them free parking in on-street bays and on limited waiting areas will provide increased access. | Provision of free on-street parking for the disabled will improve their accessibility to destinations. Often, the disabled have limited travel options thus should not be disadvantaged by having to pay for on-street parking. | 1.3 1.4 2.1 |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|-------------------------------|--|--|---|---|
| CPZ times of operation | | | | |
| 7.1 | Controlled parking zone operation will be restricted to days and times of high demand – Monday to Saturday, 08:00 to 18:00. | <p>To manage on-street parking spaces through charges and time limit in order to increase turnover, provide spaces close to key destinations and reduce circulating volumes of traffic.</p> <p>The Parking policies will specify when parking management is operational and this will correspond with local conditions and times of demand. This will set out the reasons why parking is being charged at particular times and if appropriate, will specify times when parking controls are not applied.</p> | <p>Parking stress in the city centre results in traffic circulating to find a parking space and inability to easily find a parking space deters people from stopping for a short time in the city to do business, shop or spend their time. Management of the overall parking supply is necessary to increase opportunities to park appropriately throughout the day.</p> | <p>1.1</p> <p>1.2</p> <p>2.1</p> <p>2.2</p> |
| Holidays | | | | |
| 8.1 | <p>Parking charges will not operate on the following public holidays.</p> <p>1 January - New Year;</p> <p>Orthodox Christmas – cJan;</p> <p>Easter Saturday and Monday;</p> <p>Memorial Easter Monday;</p> <p>27 August - Independence Day;</p> <p>31 August – Limba Noastra; and</p> <p>14 October – Chisinau City Day.</p> | <p>Restrictions on parking charges for public holidays will be lifted allowing free parking within the CPZ area(s).</p> | <p>The implementation of the CPZ is not intended solely as a revenue raising exercise and is focused on managing general parking demand. Demand patterns change significantly during the identified public holidays and alternative management approaches will be applied if required.</p> | <p>1.1</p> <p>1.2</p> |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|--|--|---|---|--------------------------|
| Time restriction and no-return policy | | | | |
| 9.1 | On-street parking provision will provide short stay parking only with parking duration in parking bays limited to a maximum of four hours with no return permitted within one hour. | <p>This will encourage turnover of parking spaces to provide sufficient parking supply for those on business, retail or leisure purposes. The turnover benefits the city in terms of supporting the economy through increasing the likelihood of finding an available parking space close to core destinations. No return to the on-street parking area is permitted within one hour in order to deter parking meter feeding. This will help ensure parking turn over and assist in chances of finding a parking space on-street.</p> <p>The increase in turnover and chance of finding a parking space will reduce the number of vehicles circulating looking for a place to park.</p> | <p>Limits on parking duration and return periods helps to ensure that car commuters do not park in on-street parking bays throughout the day. On-street parking is intended to cater primary for short-stay trips that support economic and commercial activity. The Municipality will seek to ensure alternative provision, off-street or external to the controlled parking zone, for longer stay and commuter parking.</p> <p>Turnover of parking will benefit residents through the increased likelihood of parking spaces being available and the reduction of long-stay parking and traffic associated with this in more residential areas of the controlled parking zone. Residents' parking on-street however will still be limited by on-street regulation and time restrictions.</p> <p>The Municipality will take forward the obligation to provide increased levels of supply for long-stay demand in off-street locations through a combination of direct provision, e.g. multi-level car parks at key locations and ensuring appropriate levels of off-street parking are provided with new-build projects.</p> | 1.1 1.2 2.1 2.2 |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|----------------------------|--|--|---|-------------------|
| Loading / Unloading | | | | |
| 10.1 | Appropriate provision will be maintained on-street for businesses to ensure that loading and un-loading can be achieved in proximity to business premises and that loading/unloading is carried out at appropriate times. | In order for a business to operate efficiently it is essential that loading and unloading of goods can be achieved close to the premises in order to minimise delivery durations and distances to carry goods. Loading and unloading locations, times and durations of stay will be defined and managed within the CPZ to ensure that this activity can be accommodated. Management and enforcement is required to ensure that loading/unloading is co-ordinated with other activities and does not interrupt or disrupt other essential activities in the area. Enforcement will also be required to ensure that this space is available for unloading/loading and is not open to abuse by other users. | Limiting loading and unloading times and locations will ensure that all users of the city streets are considered and that a balance in access demands is maintained. Loading areas will ensure that space is available for vehicles to get close to premises for servicing needs. Design requirements for loading/unloading bays will be set out in the accompanying design guidance. | 1.1 2.1 |
| Taxi Ranks | | | | |
| 11.1 | A limited number of Taxi rank locations will be identified within the controlled parking zone and provision made to provide designated space for licenced (on-duty) taxi drivers to wait for passengers on a first come first served basis. Appropriate provision of taxi ranks will be supplied in consultation with taxi operators. | To support the role that taxis perform in the overall transport strategy for Chisinau and to provide a waiting space known to both licenced drivers and potential customers, to provide potential customers with set locations where they can hire licenced taxis. | Taxi ranks are intended to support taxi operations and promote their use by the public as part of the overall transport strategy (and instead of using the car and tying up on-street parking space for long stay trips). Ranks will be located in high-traffic locations, places where people most need taxis, for example bus and rail stations, dense business areas and major shopping locations. The taxi rank should be the only place where the public can hire a taxi while it is stationary. Taxi ranks cannot be used by other private hire vehicles. | 1.1 1.2 2.4 |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|-------------------------|---|--|--|---------------------------------|
| Resident Permits | | | | |
| 12.1 | Residents Parking Schemes will be introduced to allow rationalisation and prioritisation of on-street parking spaces in mixed use and residential areas. | The resident parking scheme will designate principal areas where there is a demand for on-street parking by residents (a discussion note on residents parking permits is attached at Appendix 1). A parking permit scheme will be introduced where one permit per household will be available for purchase and this permit will allow parking on-street at designated times. Application by the householder can be made for additional parking permits required. The permit scheme will address stress on parking supply in residential areas | In some mixed use/residential areas parking demand outstrips supply with insufficient on-street parking spaces available at certain times of the day. By designating an area as a resident parking zone, management of the parking spaces can be implemented. The cost of the resident parking permit would be set at a level to cover the scheme running costs within the context of the wider parking control operation. | 1.1 1.5 2.2 2.3 2.4 |
| Business Permits | | | | |
| 13.1 | Business Parking Permit Scheme will be introduced to allow prioritisation of on-street parking spaces in predominantly business and commercial zones. | The business parking scheme will make a provision for commercial users to pre-pay for parking where required to support business operations (a discussion note on business parking permits is attached at Appendix 1). A Business Parking Permit Scheme will be introduced, replacing the licence scheme, allowing a limited number of permits for purchase. These permits will allow parking on-street in close proximity to the business address at designated times. The permit scheme will address stress on parking supply in commercial and mixed-use areas. | There are high parking demand zones within central Chisinau and key commercial areas where land and availability of space is at a premium. This is particularly where residential development does not provide parking or insufficient parking to reflect current and projected levels of car ownership. The business permit scheme will replace the current licence scheme and allow businesses to pre-purchase a permit that can be used within the vicinity of the business address by different employees or different business vehicles where parking is required to support business operation. It will be for the business to demonstrate this requirement on a case by case basis. | 1.1 1.5 2.1 2.2 2.3 |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|--|---|--|---|--------------------------|
| Tariff Structures | | | | |
| 14.1 | The Parking Fee tariff structure will provide a range of fees that will alter according to duration of stay. | The tariff for parking fees will be implemented to encourage short stay parking on-street and longer stay parking in off-street parking facilities. However, in order to deter car commuting, the fee tariff scale will be set to influence mode choice and discourage car commuters from parking in core / central parking areas. | The range of parking fees is set to ensure that charges are comparable to other world cities and consider public transport fares. The fee tariff will provide charges that increase exponentially after a duration of stay of 4 hours is reached. This fee for commuter parking will be set in relation to the cost of public transport fares and thus will assist in delivering the transport strategy objective of encouraging commuters to travel by more sustainable modes. | 1.1 1.2 2.1 2.2 |
| Ticket Facility provision and method of payment | | | | |
| 15.1 | Ticketing facilities for parking will be provided within a reasonable walking distance of all on-street parking bays and access to ticketing will be available to all. | In order to ensure that parking tickets are available to all, a variety of ticketing options will be made available. This will ensure easy access to tickets via direct card / cash payment, permit, and pre-paid parking card. Parking ticket machines will be located on-street, be visible to users, easy to use, maintained regularly by the parking concession operator. | Parking fees and parking duration is measured via providing a ticket for each vehicle. It is essential that ticketing is accessible by all, easy to obtain and restrictions understandable. A move towards cashless ticketing is desirable to remove cash collection needs. | 1.2 2.1 2.2 |
| Signing | | | | |
| 16.1 | Signing will be provided on principal pedestrian and vehicle routes to/from centres/key destinations/attractions/interchanges and parking facilities in order to assist in way finding and reduce unnecessary traffic movements. | Adequate signing is required to/from major interchanges and parking facilities/destinations in order that drivers can directly access parking facilities. Where their first parking choice is unavailable, signage should direct drivers to other facilities. Pedestrian signage between parking facilities and destinations will also provide improved direction finding and improve the overall journey experience for users, particularly visitors. | Signing will direct vehicles from interchanges to destinations via the most suitable routes and will ensure that if a parking facility is full then the driver is signed to the next parking area. This will reduce unnecessary vehicle movements within the CPZ area. | 1.3 2.3 |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|--------------------------|---|--|---|-------------------------------------|
| Courtyard Parking | | | | |
| 16.2 | <p>The Municipality will procure an appropriate study to identify the locations and quantify the problems associated with parking demand in Courtyard areas within Chisinau. The study will specifically consider:</p> <p>Observed demand in relation to existing supply;</p> <p>Investigate the legal framework for this scheme, including land ownership issues;</p> <p>Document and agree a consistent approach to parking management; and</p> <p>Draw up the detailed procedures in relation to identification of space, allocation, charging and monitoring/ enforcement;</p> <ul style="list-style-type: none"> ■ The Municipality will review options for implementation of the recommended approach in the context of on-street and off-street parking provision and control in the City. ■ The Municipality will work with the appointed delivery body to promote the scheme extensively across the City. | <p>There is an observed issue in terms of demand for courtyard parking in densely populated areas across Chisinau. The extent of this problem must be quantified in the first instance to ensure an adequate evidence base is in place to support action.</p> <p>Management options, e.g. access control, permit provision, traffic regulation and enforcement, should be considered, and an appropriate option developed that can be consistently applied across the City. This option may be procured as an addition to existing services operated on behalf of the City or separately.</p> <p>This will allow a clear and understood approach to be implemented across the city to control courtyard parking as part of the control of parking as a whole within the context of the General Urban Plan and wider transport strategies for promoting public transport and controlling car use.</p> | <p>It is accepted that there is a problem related to parking demand, control and management in courtyard areas in specific sectors of the City, however this problem has not been quantified as yet. Evidence is required to inform consideration of options and identify the most appropriate approach for implementation in Chisinau. It is considered that a single approach, coordinated and in-line with wider on-street and off-street parking regulation and control be developed that can be applied city-wide.</p> | 1.1, 1.3, 1.5, 2.1, 2.4 |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|--------------------|--|--|---|--------------------------|
| Enforcement | | | | |
| 17.1 | A progressive enforcement process (comprising parking tickets/fines, wheel clamping and ultimately vehicle removal) will be developed and rigorously enforced to ensure effective use of the parking supply to ensure achievement of the policy objectives. | To promote effective use of parking supply and reasonable driver behaviour by providing a clear system penalising those who do not park within the bays to ensure drivers follow the CPZ parking regulations and pay the appropriate tariff. | <p>Without adequate enforcement to deal with drivers who do not conform to the rules, no charged parking system will operate effectively. Fair and equitable access to the parking bays will be achieved through both a change in driver behaviour and implementation of a clear and progressive process comprising regular, planned checking of all parked vehicles within the parking bays. Those that have failed to pay to park, have parked inappropriately or have overstayed beyond the time bought, will be issued with a parking ticket.</p> <p>For contraventions which are more serious, but where the vehicle is not parked obstructively or dangerously, the Contractor will be able to clamp vehicles, which will mean they will be immobilised until an extra charge is paid. The ultimate threat will be to remove contravening vehicles, e.g. in the most serious circumstances, such as when a vehicle is parked in a dangerous position, or is blocking traffic flows, to a car compound where the driver/owner will have to pay outstanding parking fees, fines and costs to allow recovery of the vehicle.</p> | 1.1 2.1 2.2 2.3 |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|------------------------------------|---|--|--|---|
| Off-street Parking Policies | | | | |
| 18.1 | Provision of appropriate, secure and high quality off-street parking facilities will be encouraged in line with the policy set out in the Chisinau Downtown Urban Area Plan. | <p>Off-street parking facilities are an asset that benefits the city through accommodating visitors, workers, shoppers and residents who undertake business and contribute to sustaining the local economy.</p> <p>Appropriate locations have been identified separately and these are set out in the Chisinau Downtown Urban Area Plan.</p> <p>The Municipality will look to provide appropriate facilities through PPP arrangements.</p> | <p>To encourage parking in off-street facilities, the parking areas should be determined through undertaking a study to identify the most suitable locations close to interchanges and adjacent to key destinations. Off-street car parking facilities should be sited in suitable locations close to key destinations, be safe and secure for the user and provide sufficient parking spaces to accommodate demand. Those who require to park for longer periods (i.e. above 3 hours) will be encouraged to park in off-street car parks through tariff policies and on-street parking duration restrictions.</p> | <p>1.1</p> <p>1.2</p> <p>2.1</p> <p>2.2</p> |
| 18.2 | Publically owned Off-street parking facilities will be provided, targeting longer stay parking (over 3 hours) though available for short-stay. | <p>Off-street parking facilities are provided to accommodate those who require to park for a longer period. Parking fees and time restriction on-street will displace parking to off-street facilities.</p> | <p>Removes longer stay parking from on-street locations where a higher turnover is desired to provide access for business, retail and leisure users. Off-street facilities will provide a safe and secure area for those who wish to park for longer durations.</p> | <p>1.1</p> <p>1.2</p> <p>2.1</p> <p>2.2</p> |
| 18.3 | In publically owned/operated off-street car parks, those who car share will be allocated priority car parking spaces in the most desirable parking spaces. | <p>The purpose of this policy is to increase the attractiveness of car sharing and support the strategy of increasing sustainable travel modes.</p> | <p>Car sharers contribute to delivering a sustainable transport strategy through reducing the number of single occupancy vehicles on the roads. Thus providing the best car parking spaces as an incentive will encourage more people to car share.</p> | <p>1.1</p> <p>1.2</p> <p>2.1</p> <p>2.2</p> |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|-------------------|---|---|---|---|
| 18.4 | Off-street car parks will provide designated motorcycle parking bays in desirable locations within the facility. | Motorcycle parking areas will be designated to ensure that this group have adequate, secure and well located parking areas. For security reasons, motorcycle parking will be in locations that are well over-looked. | Motorcycles are a sustainable form of travel which take up less road space than private cars. They require designated parking areas within car parks in order that they do not occupy a full parking bay unnecessarily. Responsibility for payment, display and proof of purchase of tickets will lie with the driver of the motorcycle. | 1.1 1.2 2.1 2.2 |
| Monitoring | | | | |
| 19.1 | Key Performance Indicators will be used to monitor and manage delivery of parking services for the City. | The KPIs will allow the municipality to monitor overall operation and effectiveness of parking policy and to undertake contract management of the on-street parking concession, to ensure that all contractual liabilities are being met. | KPIs will be the benchmark by which operation of the parking regime can be benchmarked and monitored. This will allow monitoring and inform review of overall parking policy through collection of information on elements such as parking stock availability, parking demand in key areas, journey purpose and duration of stay. KPIs will also allow performance measurement of the on-street parking contract and will be monitored on an on-going basis by the Municipality, this is likely to include aspects such as proportion of parking events paid for, number of enforcement notices issued, clamping event, removals, appeals, proportion of appeals won/lost etc. The actual KPIs for the contract are to be agreed. | 1.1 1.2 1.3 1.4 1.5 2.1 2.2 2.3 2.4 |

| No | Policy Statement | Explanation / Purpose | Justification | Objective |
|---------------------|--|---|---|---------------------------------|
| Reinvestment | | | | |
| 20.1 | The income stream derived from parking charges will be used to cover the costs of parking management and operations, to maintain and to improve the roads, transport and parking infrastructure in Chisinau. | Re-investment of revenue will support maintenance and improvement of the asset to the benefit of the citizens of Chisinau by contributing to improved infrastructure to support economic, social and commercial vitality of the City. | Income derived from on-street and off-street parking is often a contentious issue unless the public are made aware of how the parking income is re-invested in improved parking facilities or public transport projects which address the overall development and transport plan for the area. This virtuous circle between parking income, changes in travel behaviour and improvements to public transport is a common and well tested approach used in many global cities and regions. | 1.1 1.2 1.5 2.1 2.4 |
| 20.2 | Undertake publicity and marketing campaign (align with campaign highlighting new and improved public transport systems) including provision of electronic media, leaflets, web site, posters and multi-media advertising. | The publicity and marketing campaign is key to informing the public the rationale behind the introduction of CPZ and the goals it intends to achieve. The marketing initiatives will be supported with stakeholder engagement and consultation with local residents and businesses. | The public must understand the objectives and the function of a CPZ in order to improve the local transport environment. Proper consultation along with advertising will ensure a successful publicity and marketing campaign. | 1.1 1.2 1.5 2.1 2.4 |

On-Street Parking Design Guidance

2 Purpose and Application of Guidance

2.1 Purpose of Guidance

- 2.1.1 This Guidance has been developed through desk-top research of worldwide guidance using a number of tools including web-based research and consultation with professionals in the industry. Local consultation was also held with the Municipality of Chisinau Project Implementation Unit (PIU), Chisinau Traffic Police, the Moldovan Vehicle Registry Office (VRO) and the Chisinau Project.
- 2.1.2 The production of the guidance is intended as a reference tool for current and future proposals that fall under the Municipality's jurisdiction, highlighting best practice on-street parking design standards for consultants and private developers to consider when submitting proposals. It will ensure that a consistent approach is taken across the City, which will aid public perception and the use of on-street parking facilities.
- 2.1.3 Prior to the release of this document, there has not been any specific design guidance for the provision of on-street car parking within Chisinau. Management of parking within the City has historically fallen to the Traffic Police. With the relatively low traffic volumes in previous years this set-up was deemed sufficient, however a more structured approach is now required due to the significant increase in traffic flows observed throughout the Municipality.

2.2 Application of Guidance

- 2.2.1 The Municipality of Chisinau intend to improve the existing urban environment within the City through the implementation of the Urban Road Sector Project. This project seeks to rehabilitate existing streets through enhanced surfacing, improved pedestrian facilities, parking, signage etc.
- 2.2.2 The introduction of controlled on-street parking facilities is an integral part of the rehabilitation project and a structured approach to on-street parking can only complement the aims of the project.
- 2.2.3 As well as being applicable to the Municipality of Chisinau projects to rehabilitate streets within the city, the guidance should also be used as a reference tool for future public and private sector proposals within the Municipality to ensure proposals are consistent and complement the existing parking infrastructure.
- 2.2.4 This guidance only relates to the provision of on-street car parking facilities. Designers should make reference to SNIP 2.07.01-89 which recommends the appropriate level of off-street car parking provision for different forms of new development. For example the SNIP indicates that for new residential developments the off-street car parking provision should be one space per 25m² of residential floor-space
- 2.2.5 Included within this guidance is a general overview of on-street car parking standards to adhere to with specific examples, backed up with detailed sketches, of the different parking layouts that can be used in any given situation, providing the base criteria are met. Other aspects of on-street parking, the consideration of surrounding building's requirements, street furniture, pedestrian accessibility and local considerations have also been covered.
- 2.2.6 The Designer should also take into consideration the volume of traffic using a street where on-street car parking is to be provided and make an informed decision over which layout is appropriate based on vehicular delay, risks of conflict, etc. Section 3.9 discusses this further.

- 2.2.7 In preparing this guidance an independent desk-top study of international best practice car park design guidance has been undertaken. The advice and parameters from the guidance reviewed were analysed and drawn together with the specific dimensions of parking bays recorded. *Table 2.1* summarises this information along with the average parking bay dimensions. Consideration has been given to what is appropriate for Chisinau based on this best practice & through observation of the size of vehicles in Chisinau. This is also presented in *Table 2.1*. In addition to this, other relevant, useful design guidance has been amalgamated into the guidance to reflect an internationally recognisable best practice guide.
- 2.2.8 The long-term aspirations of the Municipality of Chisinau are to control on-street car parking within the centre of the city. As with rehabilitation works the introduction of controlled parking will be phased, with an initial central CPZ implemented to cover streets which experience the heaviest demand for parking. This initial CPZ has been agreed with the Municipality of Chisinau to cover the area shown in *Figure 2.1* below.

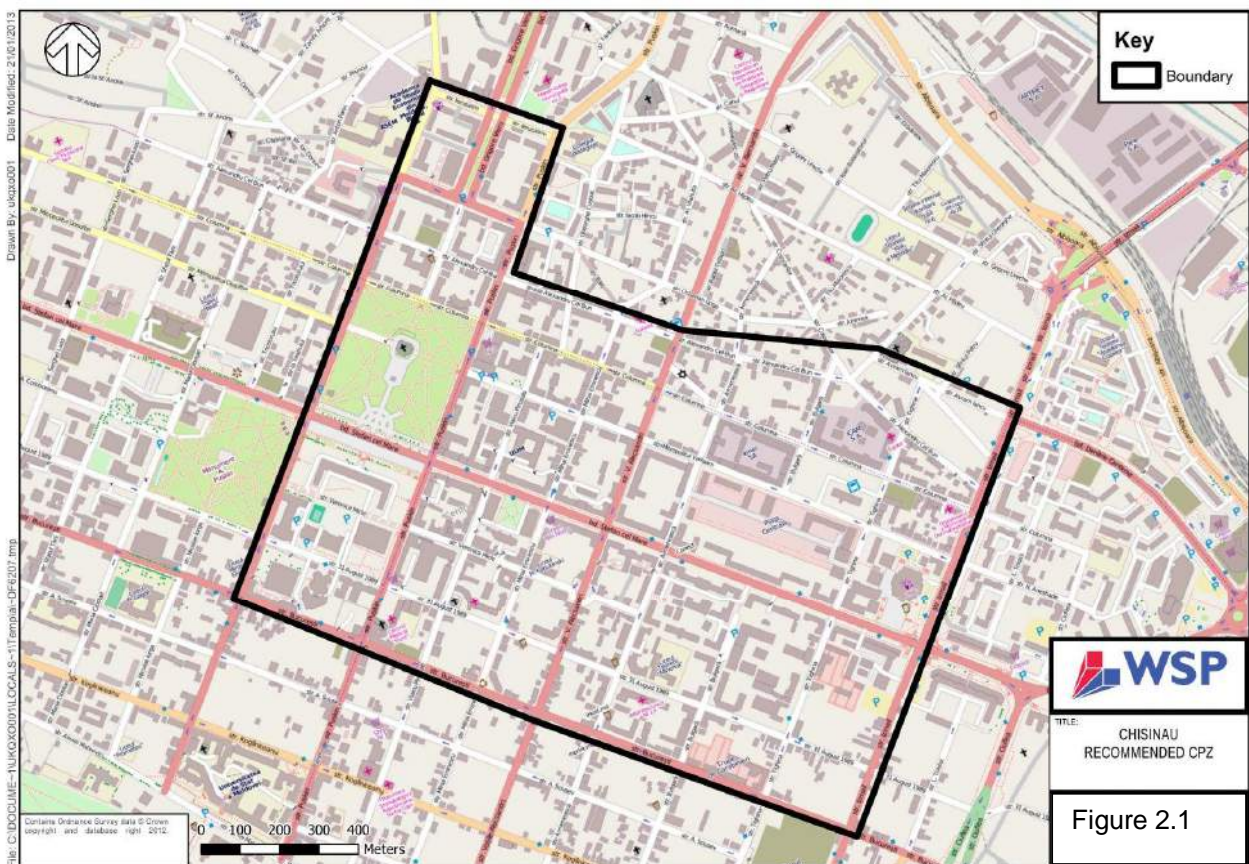


Figure 2.1 – Extent of CPZ

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- 2.2.9 There are a number of streets that fall within the proposed CPZ, but which are not included within the initial phase of the road rehabilitation project. Whilst introducing new on-street parking in streets being rehabilitated forms part of the overall rehabilitation work it is not so straight forward for streets not included in that program. As a result this guidance identifies what should be considered for both rehabilitated and non-rehabilitated streets in Chapters 3 and 4 respectively.
- 2.2.10 There are also lengths of streets to be rehabilitated that lie outside the initial CPZ. The intention of the Municipality of Chisinau is that the CPZ will be extended over time as the city grows and the demand for parking increases, as well as complementing a suite of measures being adopted to enhance public transport facilities within the City. As a result it is important that the design of any street to be rehabilitated takes into account the recommendations made within this guidance to ensure that the expansion of the CPZ is not compromised and to avoid abortive construction work in the future.
- 2.2.11 The CPZ will be signed such that motorists are informed when they are entering / leaving it and parking within the CPZ will only be permitted within formally marked parking bays. Enforcement measures will be carried out on vehicles which are not parked in a formally marked bay within the CPZ or on those motorists who have violated payment for use of the bay.

Table 2.1 International Design Parameters

| Angle of Bays | Width of Bays (by Design Guidance) | | | | | | | | | |
|---------------|--|-----------|-----------|-------|------|-------|------|------|---------|--------------------------|
| | A | B | C | D | E | F | G | H | Average | Recommended for Chisinau |
| 30' | 2.4m | 2m–2.5m | 2m–2.5m | | 2.5m | | | 2.5m | 2.5m | 2.5m |
| 45' | 2.4m | 2m–2.5m | 2m–2.5m | 2.75m | 2.5m | 2.5m | 2.5m | 2.5m | 2.5m | 2.5m |
| 60' | 2.4m | 2m–2.5m | 2m–2.5m | 2.75m | 2.5m | 2.5m | 2.5m | 2.5m | 2.5m | 2.5m |
| 90' | 2.4m | 2m–2.5m | 2m–2.5m | 2.75m | 2.5m | 2.5m | 2.5m | 2.5m | 2.5m | 2.5m |
| Parallel | 2m | 1.8m-2.7m | 1.8m-2.7m | 2.6m | 2.5m | | 2.5m | 2.5m | 2.4m | 2.5m |
| Angle of Bays | Length of Bays (by Design Guidance) | | | | | | | | | |
| | A | B | C | D | E | F | G | H | Average | Recommended for Chisinau |
| 30' | 4..8m | 4.5m-6.6m | 4.5m-6.6m | | 5.5m | | | 5m | 5.1m | 5m |
| 45' | 4.8m | 4.5m-6.6m | 4.5m-6.6m | 5.8m | 5.5m | 5.5m | 5.5m | 5m | 5.3m | 5m |
| 60' | 4.8m | 4.5m-6.6m | 4.5m-6.6m | 6.4m | 5.5m | 5.5m | 5.5m | 5m | 5.4m | 5m |
| 90' | 4.8m | 4.5m-6.6m | 4.5m-6.6m | 5.5m | 5.5m | 5.5m | 5.5m | 5m | 5.3m | 5m |
| Parallel | 6m | 1.8m-2.7m | 1.8m-2.7m | 7.3m | 6.5m | | 6m | 5m | 6.1m | 6m |
| Angle of Bays | Aisle Width (by Design Guidance) | | | | | | | | | |
| | A | B | C | D | E | F | G | H | Average | Recommended for Chisinau |
| 30' | 3.6m | | | | 4m | | | | 3.8m | 4m |
| 45' | 3.6m | | | 4m | 4m | 3.75m | 4m | | 3.9m | 4m |
| 60' | 4.2m | | | 5.5m | 4.5m | 4.5m | 5.5m | | 4.8m | 5m |
| 90' | 6m | | | 7.3m | 6m | 7m | 6m | | 6.5m | 6m |
| Parallel | 3m | | | 3.65m | 4m | | 3m | | 3.4m | 3.5m |
| Angle of Bays | Safety Buffer Strip (by Design Guidance) | | | | | | | | | |
| | A | B | C | D | E | F | G | H | Average | Recommended for Chisinau |
| Angled Bays | | | | | | 1m | | | 1m | 1m |
| Parallel | | | | | | 1m | | | 1m | 1m |

The dimensions recommended in Table 2.1 should be considered in conjunction with the guidance presented in Chapters 3 and 4 of this document

INTERNATIONAL GUIDANCE CONSIDERED

A = UK, Manual for Streets

B = UK, the Traffic Signs Regulations & General Directions 2002

C = UK, Traffic Signs Manual, Chapter 5 Road Markings

D = South Pasadena, USA, South Pasadena Municipal Code

E = Abu Dhabi Department of Transport, Car Parking Design Standards document

F = Qatar, Transportation Master Plan for Qatar

G = Dubai, Jebel Ali Free Zone Authority, Maritime City, Building Regulations & Design Guidance

H = Hong Kong Transport Department, Transport Planning & Design Manual, August 2008

2.3 Other Relevant Guidance

- 2.3.1 Moldova does not currently have its own highway design standards instead relying on the use of Russian standards, set out in a number of GOSTS and SNIPS. Therefore this guidance identifies the most relevant aspects of the GOSTS and SNIPS to ensure that the design of streets and on-street parking facilities are complementing one another. A number of GOSTS and SNIPS provided by the Municipality of Chisinau were reviewed and those of relevance are referred to herein and summarised below.
- 2.3.2 GOST R 52289-2004 references Road Markings and Traffic Signs and we have extracted some relevant pages from this document, which can be found *in Figures 17 and 18*. The document details where and how signage is to be used, provides examples of signage required and is a useful reference tool for Designers.
- 2.3.3 SNIP 2.07.01-89 gives guidance on the planning of urban environments. Designers are to consider the impact of a high frequency bus route within an urban environment and Section 3.4 of this document outlines this. This SNIP also addresses the provision of on and off street parking spaces and the recommended proximity for the siting of associated parking for new developments and this is summarised in Section 2.2.3 of this document.

3 Rehabilitated Roads

3.1 Introduction

3.1.1 This Chapter focuses on the design parameters for on-street parking facilities in streets to be rehabilitated or where proposed development seeks to provide new on-street car parking facilities. It includes guidance on the following key aspects;

- Layouts;
- Parking Bay Dimensions;
- Disabled and Motorcycle parking provision;
- Provision for delivery/waste collection vehicles;
- Consideration of pedestrians; and
- Markings, signage and street furniture

3.1.2 In addition to the detailed layout and information associated with on-street parking bays there are a number of overarching factors which Designers should take into consideration when designing on-street car parking facilities. These include the interaction between on-street parking and road junctions, the location of pedestrian crossing facilities, buses/trams, traffic flow volumes etc. These are set out below and Designers should consider Chapter 3 in its entirety to ensure they have fully understood the implications of their design.

3.2 Proximity of Junctions

3.2.1 Parking should be provided such that it does not encroach within the visibility splays of a junction as shown by *Figure 3.1* to ensure inter-visibility between vehicles and other road users, and to reduce the risk of conflicts between vehicles turning at the junction and vehicles manoeuvring into and out of parking bays.

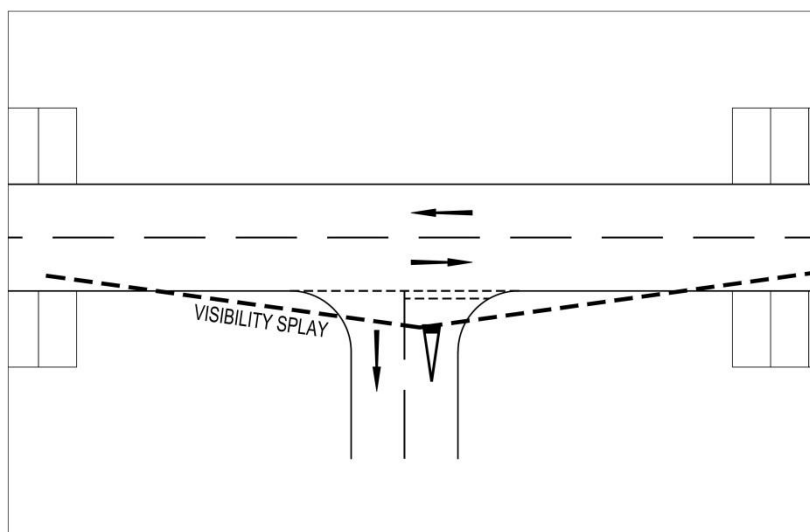


Figure 3.1 – Junction clearance

3.3 Proximity of Pedestrian Crossings

3.3.1 Parking should not be provided within the visibility splay of a pedestrian crossing; see *Table 3.1* below for the required standards.

| | | | | | | |
|---|----|----|----|-----|-----|-----|
| 85 th Percentile Approach Speed (<i>kph</i>) | 40 | 48 | 56 | 64 | 72 | 80 |
| Desired Minimum Visibility (<i>metres</i>) | 50 | 65 | 80 | 100 | 125 | 150 |
| Absolute Minimum Visibility (<i>metres</i>) | 40 | 50 | 65 | 80 | 95 | 115 |

Table 3.1 Visibility Requirements for Pedestrian Crossings

3.3.2 The proximity of parking to a pedestrian crossing will depend on how the crossing is formed; e.g. a pedestrian build-out improves the visibility between pedestrians and vehicles, enabling parking to be provided closer to the crossing point. *Figures 3.2 and 3,3* below diagrammatically show the without and with build-out scenarios, demonstrating that additional parking can be provided if a build-out is adopted.

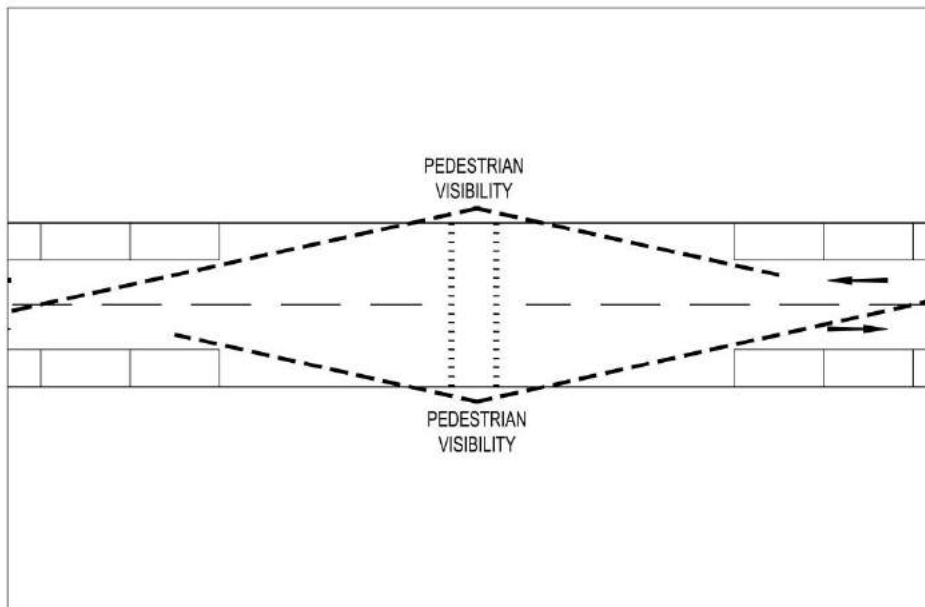


Figure 3.2 – Formal pedestrian crossing – no build out

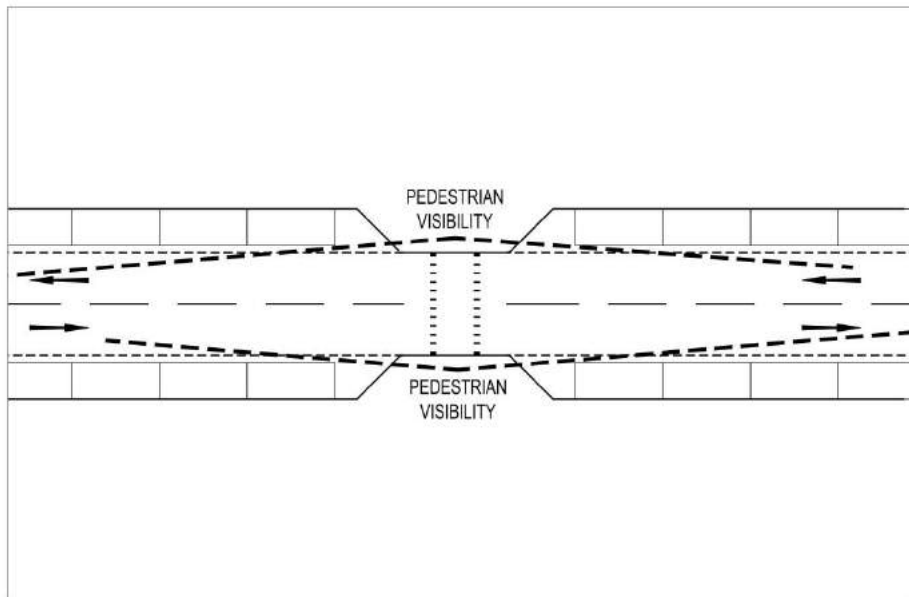


Figure 3.3 – Formal Pedestrian crossing with build-out

3.4 Consideration of Buses and Trams

- 3.4.1 Many of the streets within central Chisinau are bus/tram routes and as such there will be an interaction between on-street car parking facilities and bus/tram stops. As a result the Designer shall ensure that there is adequate space for a bus/tram to safely enter and exit the stop without being impeded by parked vehicles.
- 3.4.2 SNIP 2.07.01-89 (BRT parking capacity) suggests that streets which are to be used as primary routes for buses and trolley buses should be wide enough to accommodate two way bus / trolley bus movements at peak times and recommends that the carriageway is a minimum width of 8m; i.e. 4m in either direction. Designers shall therefore take into consideration the guidance in this SNIP when designing on-street car parking facilities on bus / tram routes.

3.5 Layout Options for On-Street Car Parking Bays

- 3.5.1 The provision of on-street car parking bays can be broken down into four layout options which are discussed below. The most appropriate layout is ultimately down to the Designer's discretion after due consideration of the space available and other physical constraints. Designers should consider which arrangement is best suited for the specific location being designed, dependent on available space, potential demand etc.
- 3.5.2 The Designer should take into consideration the volume of traffic using a street where on-street car parking is to be provided and make an informed decision over which layout is appropriate based on vehicular delay, risks of conflict etc. Section 3.9 discusses this further,

- Parallel parking. *Figure 3.4* depicts a standard parallel parking layout, and identifies recommended and absolute minimum dimensions which should be adhered to. The table within *Figure 3.4* demonstrates the relationship between the bay widths and the manoeuvring width required to manoeuvre into the bay without encroaching into the opposing carriageway.

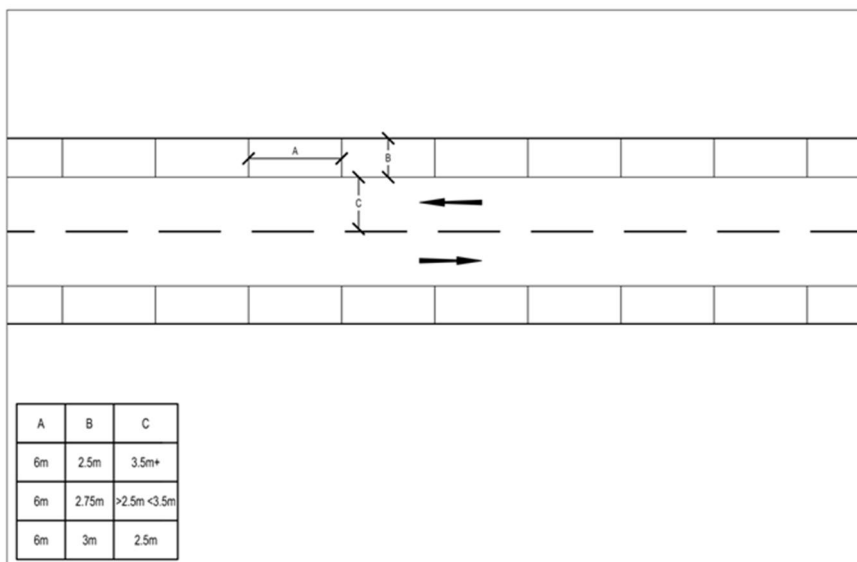


Figure 3.4 – Parallel parking

- Perpendicular parking. *Figure 3.5* depicts a standard perpendicular parking layout and identifies recommended and absolute minimum dimensions which should be adhered to. The table within *Figure 3.5* demonstrates the relationship between the bay widths and the manoeuvring width required to manoeuvre into the bay. With perpendicular bays encroachment into the opposing carriageway will almost always be necessary due to the space required to manoeuvre the vehicle into and out of the space.

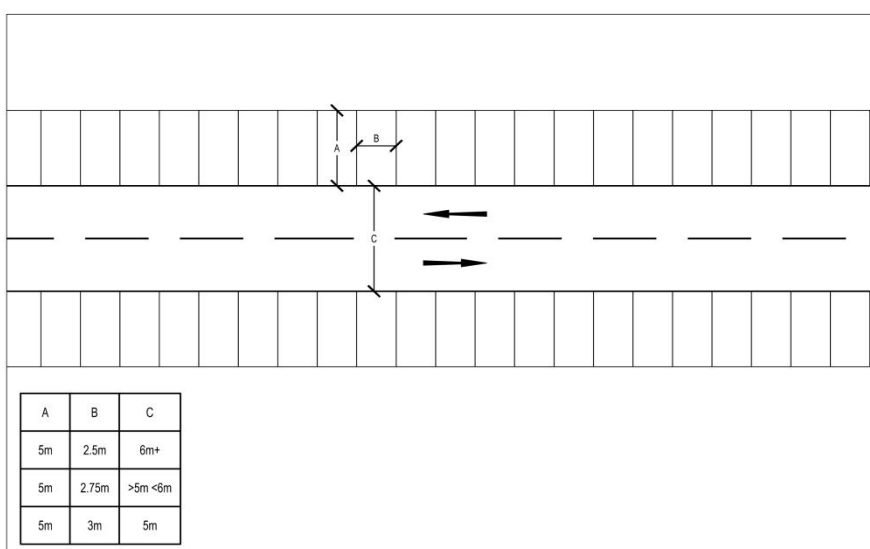


Figure 3.5 – Perpendicular parking

- Angled parking. *Figures 3.6, 3.7 & 3.8* depict the standard angled parking options used which are 30', 45' and 60' respectively. Designers should note that by increasing the angle of the bay fewer bays can be provided within the same length of street. However manoeuvring space and consequently lane width requirements are reduced as the angle of the bay increases. Careful consideration taking into account the physical space available will therefore enable Designers to make an informed decision as to which angle would be best adopted for the location being designed. The tables within *Figures 3.6, 3.7 & 3.8* demonstrate the relationship between the bay widths and the manoeuvring width required to manoeuvre into the bay without encroaching into the opposing carriageway.

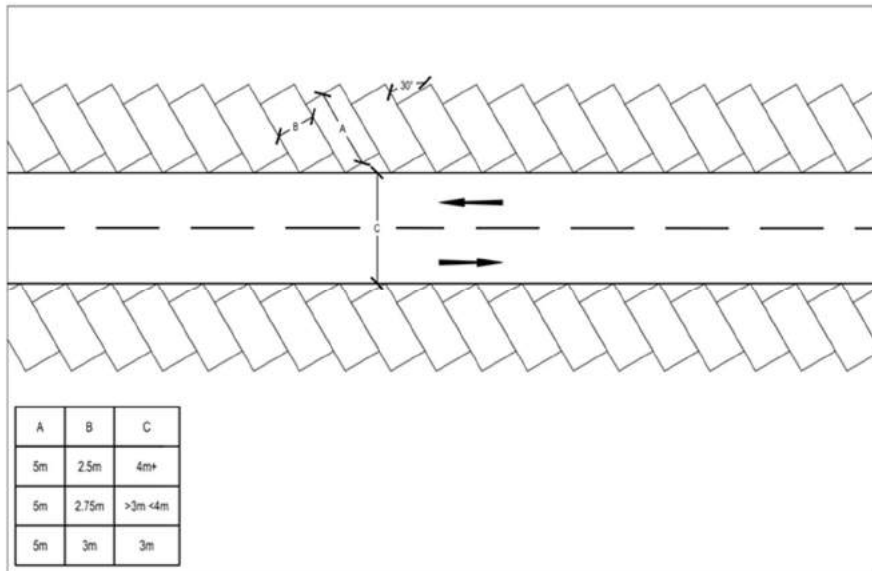


Figure 3.6 – 30' Angled parking

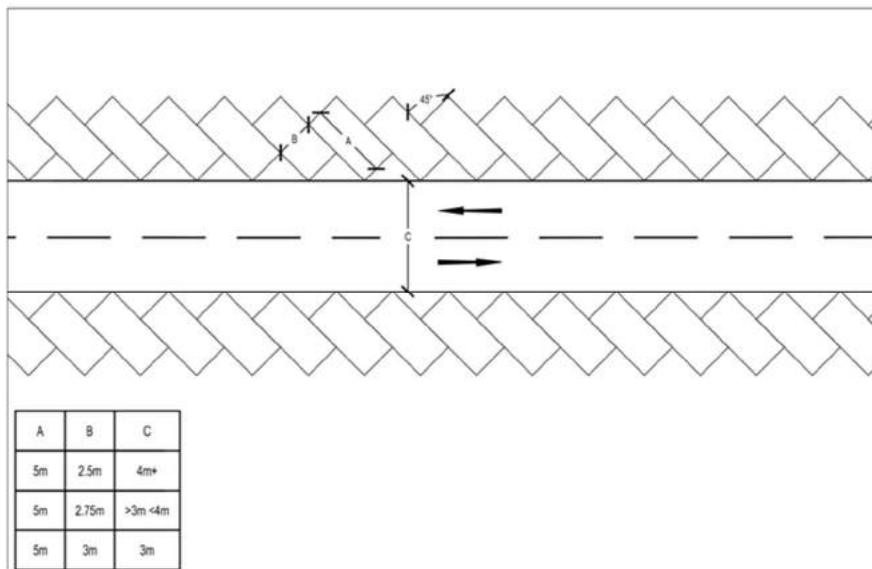


Figure 3.7 – 45' Angled parking

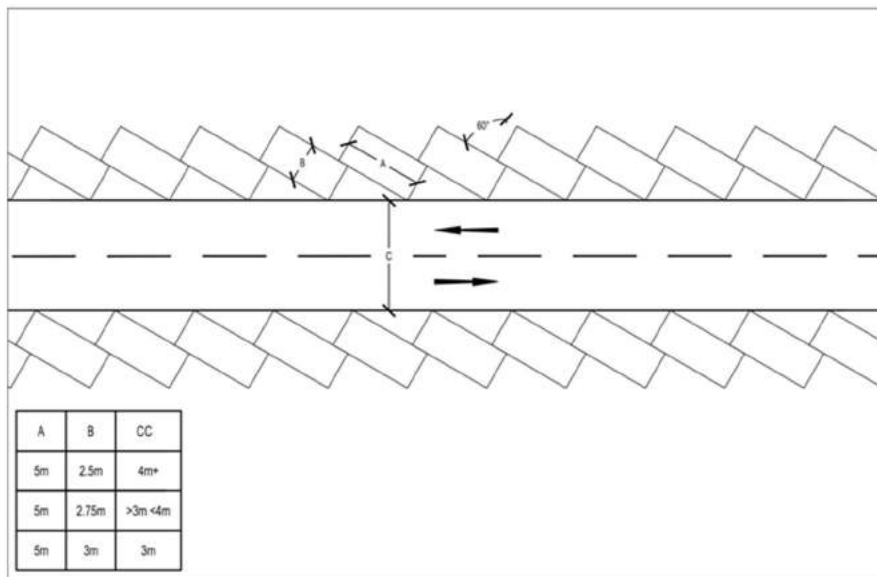


Figure 3.8 – 60' Angled parking

- On-street Areas of Parking. Figure 3.9 depicts an area of on-street parking. This is an existing arrangement found in Chisinau (see Photo 3.1 as an example) therefore careful consideration taking into account the physical space available will enable Designers to make an informed decision as to whether this arrangement would be best adopted for the location being designed.

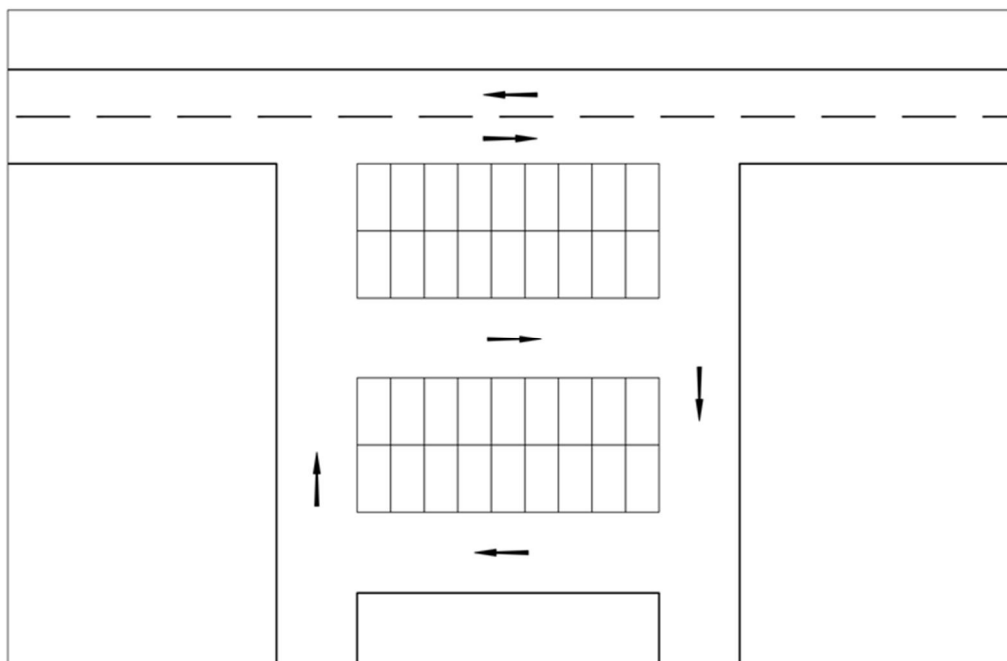


Figure 3.9 - Example arrangement of an area of on-street parking



Photo 3.1 Existing arrangement of an area of on-street parking

3.6 Disabled Parking Provision

- 3.6.1 There are currently no standards in Chisinau for disabled parking provision. Requirements vary across the world and by the land uses the spaces are associated with. In order to determine what is appropriate for Chisinau consideration has been given to the current level of registered disabled motorists.
- 3.6.2 Consultation was held with the Chisinau Traffic Police who indicated that there are very few disabled drivers within the Municipality. This is supported by information provided by the Vehicle Regstru, the vehicle licencing authority, which as of 1st July 2012, has 247 registered disabled vehicles within the Municipality out of a total of 250,843 registered vehicles in Chisinau, which equates to just 0.1%.
- 3.6.3 Based on this it is recommended that the Designer consult with the Municipality when introducing on-street car parking to confirm whether any of the bays should be marked for disabled use only. Otherwise it is recommended that 0.5% of parking bays are dedicated for use by disabled motorists, subject to regular review should demographics, etc. change; e.g. if there are 20 bays provided, one of these should be dedicated solely for use by disabled motorists.
- 3.6.4 Three layout options for disabled parking bays have been produced as follows;
- Parallel parking *Figure 3.10* depicts a disabled parallel parking layout, with a safety strip provided for manoeuvring purposes. The bay provision is 50% wider than a standard bay to accommodate for the reduced mobility of the occupant. The table within *Figure 3.10* demonstrates the relationship between the bay widths and the manoeuvring width required to manoeuvre into the bay without encroaching into the opposing carriageway. Designers should consider which arrangement is best suited for the location being designed.

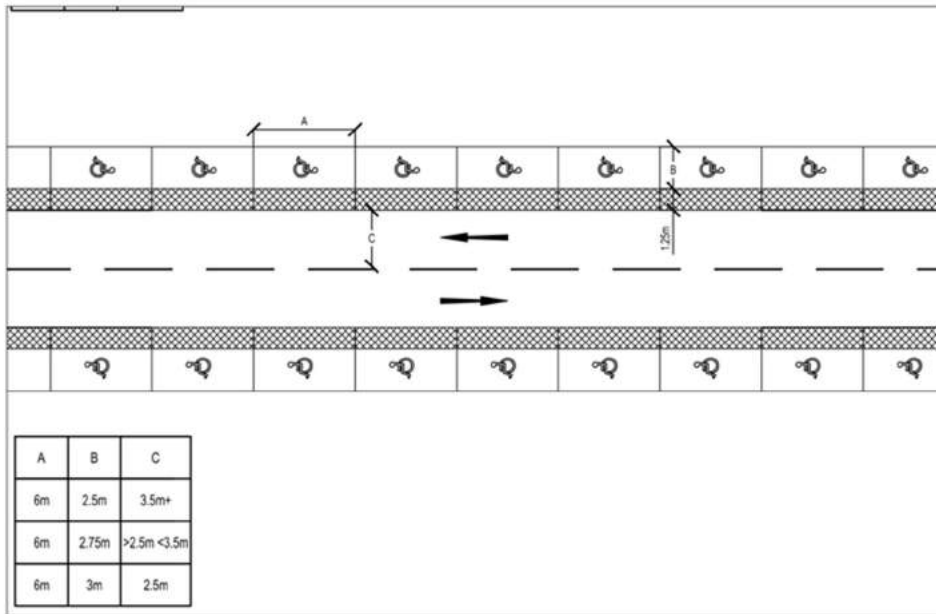


Figure 3.10 – Parallel disabled bays

- Perpendicular parking Figure 3.11 depicts a perpendicular parking layout. The bay provision is 50% wider than a standard bay to accommodate for the reduced mobility of the occupant. The table within Figure 3.11 demonstrates the relationship between the bay widths and the manoeuvring width required to manoeuvre into the bay. Designers should consider which arrangement is best suited for the location being designed.

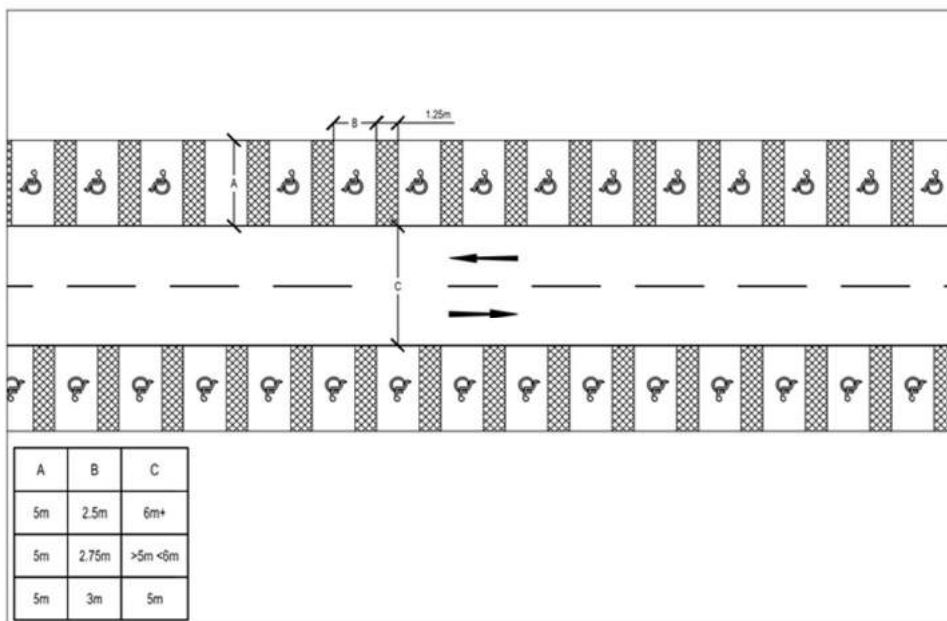


Figure 3.11 – Perpendicular disabled bays

- Angled parking *Figure 3.12* depicts an angled parking layout. A review of international best practice demonstrates that providing angled parking bays for use by disabled motorists is an unusual occurrence as often the needs are better met by a perpendicular solution. The table within *Figure 3.12* demonstrates the relationship between the bay widths and the manoeuvring width required to manoeuvre into the bay. Designers should consider which arrangement is best suited for the location being designed.

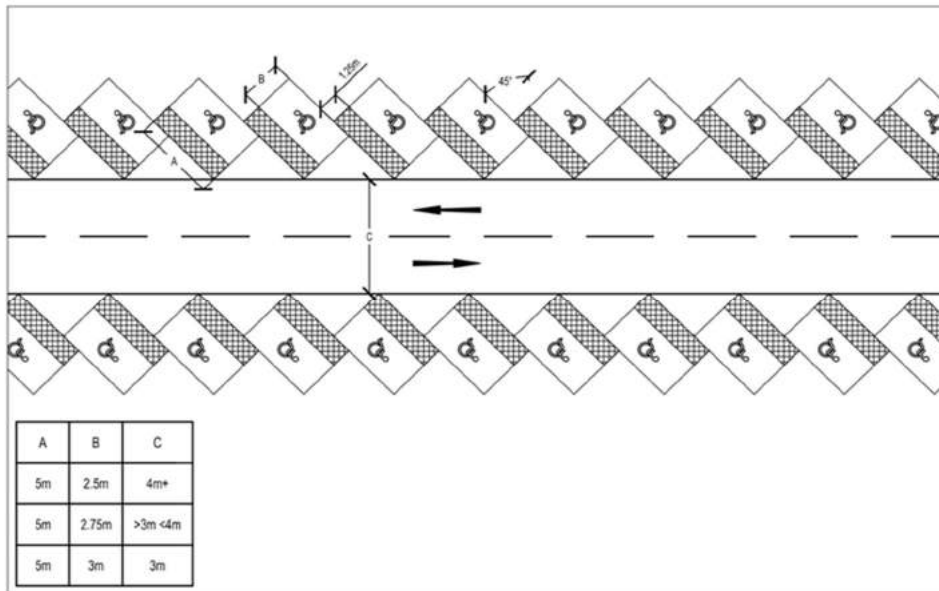


Figure 3.12 – Angled disabled bays

3.6.5 The standard detail for the demarcation of disabled spaces is shown in *Figure 3.13* below.

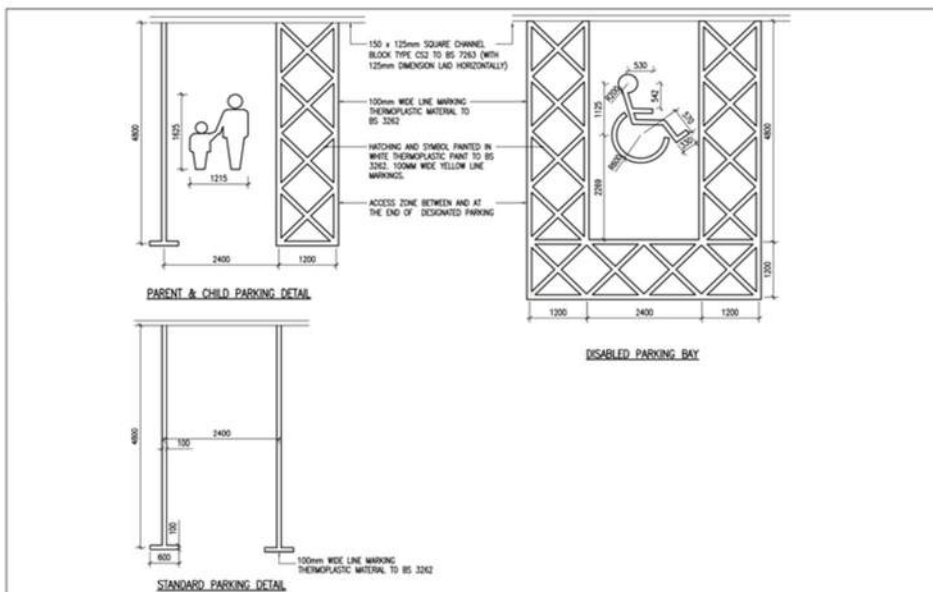


Figure 3.13 – Standard detail for disabled parking bay demarcation

3.7 Motorcycle Parking Provision

- 3.7.1 Motorcycle parking generally requires anchor points for added security. *Photos 3.2 and 3.3* show two variations of a secure anchor rail, taken from the Institute of Highway Engineers Guidelines for Motorcycles and *Photos 3.4 & 3.5* show an existing situation within the borough of Kensington, London. Both solutions use standard car parking bays with the ability to accommodate up to six motorcycles. The most suitable solution implemented will be down to the Designer's discretion, after due consideration of constraints such as pedestrian needs etc. are taken into consideration.
- 3.7.2 The number of motorcycles registered in Chisinau as of 1st July 2012, was 3,592, based on records provided by the Vehicle Regstru. This represents circa 1.5% of all vehicles on the road. However, with the benefits associated with motorcycle commuting, this ratio could well increase year on year. It is therefore recommended that where on-street parking is provided an allowance of 2% of the number of spaces is allocated as motorcycle parking; e.g. if there are 60 parking spaces on a section of street, three motorcycle bays should be provided.



Photo 3.2 – Example of a stand-alone motorcycle anchor rail



Photo 3.3 – Example of motorcycle parking with continuous rail integrated with pedestrian guard railing



Photo 3.4 – Old Brompton Road, Kensington on street motorcycle provision



Photo 3.5 – On street anchor points, allow 6 motorcycles within a standard car parking bay

3.7.3 These two layout arrangements are shown in more detail in *Figures 3.14 & 3.15*. If an anchor rail is provided it should be installed flush to the carriageway edge for tethering purposes. If surface mounted anchor points are to be used; six anchor points can be accommodated within a standard parking space. The most suitable solution will be down to the Designer's discretion.

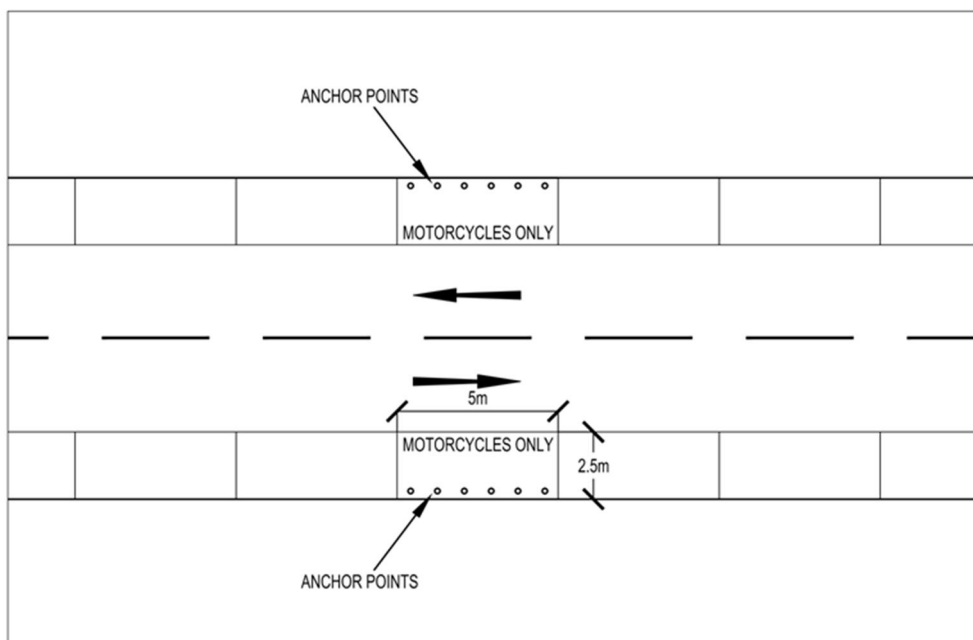


Figure 3.14 – Motorcycle parking with surface mounted anchor points

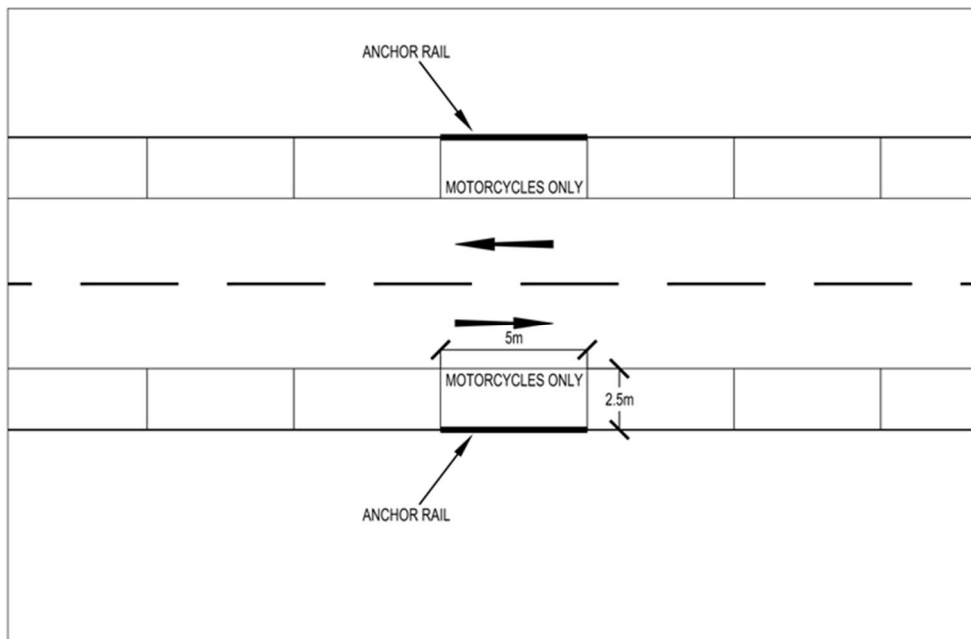


Figure 3.15 – Motorcycle parking with anchor rail provision

3.8 Loading Bay Provision

- 3.8.1 On-street loading is often governed by road markings and signage; *Figure 3.16* depicts an example of on-street loading provision, demarcated by white lining along with examples of shared use signage. As discussed previously this space can be shared with other road users, again see *Figure 3.16* for examples of this practice. *Photo 3.6* shows an example of an on-street loading bay.
- 3.8.2 The provision of on-street loading bays is subject to careful consideration of the requirements of local businesses and their delivery demand, size of vehicles which carry out deliveries, etc. It is recommended that dedicated loading /unloading bays are provided within the city to ensure that the needs of businesses are met and to avoid delivery vehicles from causing unnecessary obstruction to other road users. This should be considered on a street by street basis.
- 3.8.3 A consultation of a cross-section of local businesses, and their suppliers if practical, should be held to ascertain the needs of businesses and the current arrangements for deliveries.
- 3.8.4 A standard arrangement for on-street loading/unloading facilities is to have space which is either permanently dedicated for such use or time restricted such that it can be used for more than one purpose. Designers will need to liaise with the Municipality to determine the most suitable solution depending on where in the city such measures are being introduced.

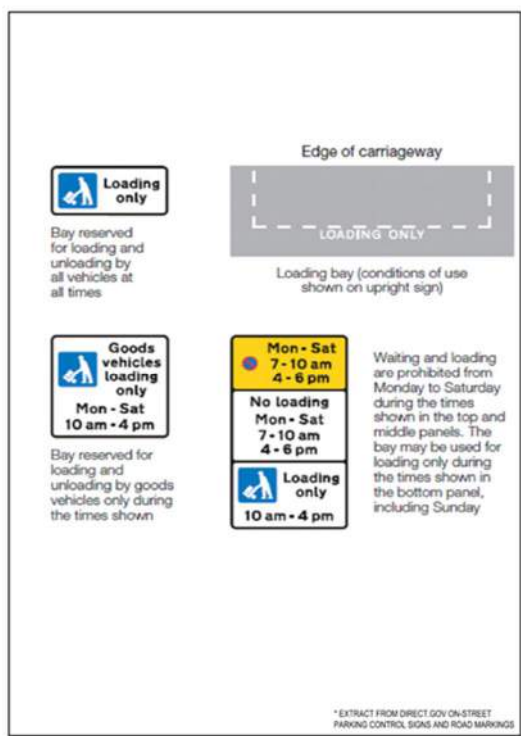


Figure 3.16 – Examples of on-street loading signage



Photo 3.6 – Wandsworth High Street, London example of an on-street loading bay

3.9 Other Key Design Criteria

Bay Demarcation

3.9.1 Parking bays must be clearly defined. Parking bays can be demarcated in a number of different ways including white lining, metallic studs or block paving. The choice of these will depend upon the materials being used to surface the bays and therefore depending on this the following demarcation methods are recommended:

- Paved bays (e.g. block paving) – demark bays by using a block of different colour. The advantage of this method is that the on-going maintenance costs associated with keeping the bays marked clearly are minimal.



Photo 3.6 – Example of block pavers used to demarcate bays

- Tarmac bays – demarcate bays using white lining, if possible using thermoplastic paint with glass beads for its hard wearing qualities. The advantage of using paint is that it is a cost effective solution in terms of capital costs albeit on-going maintenance is required to ensure the lines are visible (for thermoplastic road markings with glass beads it is recommended re-marking every five years).



Photo 3.7 – Example of thermoplastic paint used to demarcate bays on a tarmac surface

- Concrete bays– demarcate bays using metallic (normally brass) studs. If these are not available then coloured paint should be used which is of varying colour to the concrete surface. As with tarmac surfacing it is recommended that thermoplastic paint with glass beads is used with a tack coat to adhere it to the concrete surface. The advantage of the metallic studs is that the capital cost is still relatively low and on-going maintenance costs are minimal.



Photo 3.8 Example of thermoplastic paint used to demarcate bays on a concrete surface



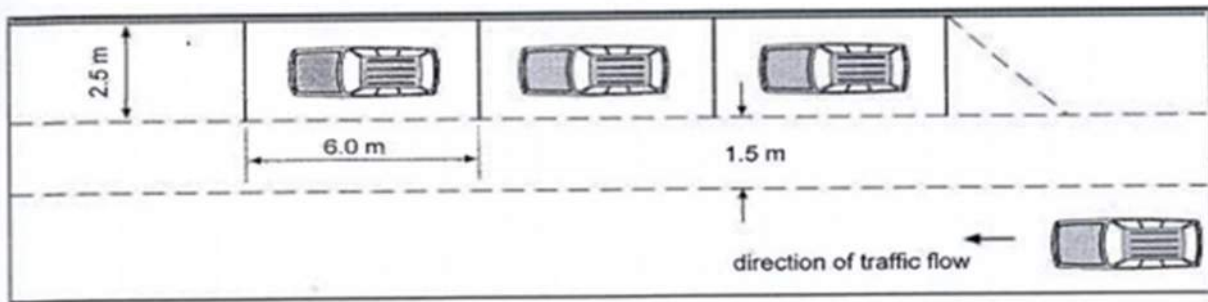
Photo 3.9 – Example of metallic studs used to demarcate bays

Gradients

- 3.9.2 It is recommended that on-street parking bays should not be provided where the gradient perpendicular to the vehicle is more than 5%. The reasoning for this is to aid motorists getting into and out of their vehicle without the door swinging back against them and to aid elderly and disabled motorists.

Speed Limit

- 3.9.3 Designers should take into consideration the speed limit of the street on which on-street parking is to be provided. On-street parking provision is not recommended on roads with a speed limit of more than 50kph, due to the safe stopping distances required and the increased likelihood of vehicular conflicts. There are methods which can be used to address this if on-street parking is used on streets with a speed limit greater than 50kph. As an example *Figure 3.17* shows how this is dealt with in Qatar and Dubai through the introduction of a safety strip. However this is not seen as a space efficient solution. In no circumstances should perpendicular or angled bays be used on streets with a speed limit greater than 50kph.



Geometry of parallel parking layout for 60 km/h

Figure 3.17 – Layout of parallel parking for streets with a speed limit greater than 50kph

Traffic Flows

- 3.9.4 The volume of traffic using a road on which on-street parking is being considered should be assessed when deciding whether it is suitable to introduce on-street parking, and if so the most appropriate parking layout applicable. As an example parking bays which are perpendicular or angled to the road; i.e. where users are required to reverse into or out of a space against moving traffic, could be seen as a potential hazard on streets with heavy traffic flows or streets with a higher speed limit. As stated earlier in this section, angled and perpendicular parking should never be introduced onto streets with a speed limit greater than 50kph.

Signage

- 3.9.5 Signage warning motorists that they are entering the Controlled Parking Zone should be positioned on each of the roads leading into the CPZ, with signs also provided to inform motorists of when they are leaving the CPZ. Signage detailing any restrictions in place on individual streets, i.e. loading restrictions, waiting times etc. should be provided at regular intervals.
- 3.9.6 There are a number of signs which will be required to accompany on-street parking bays. *Figures 3.18 and 3.19* provide details of this, taken from GOST R 52289-2004. Where signs are currently not provided for under a GOST or SNIP it is recommended that the Designer design appropriate signage and submit this for approval by the Municipality prior to their manufacture and installation.

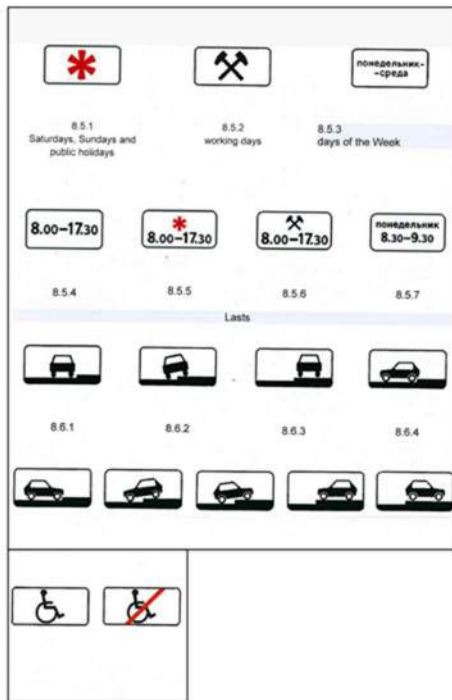


Figure 3.18 – CPZ signage



Figure 3.19 – General on-street parking signs

- 3.9.7 Once cars have passed the CPZ entry sign (Figure 3.18), consideration should be given to providing repeater signs reinforcing the message that motorists are only permitted to park in formally marked parking spaces.

Pedestrian Facilities

- 3.9.8 Long stretches of continuous on-street parking should be avoided and a maximum length of uninterrupted parking of 100 metres is recommended. Longer lengths should be broken up preferably by build outs. This will facilitate informal pedestrian crossing facilities and reduce the risk of pedestrians walking between parked cars which may be manoeuvring and restricting their visibility to on-coming traffic.
- 3.9.9 Pedestrian needs must be considered when providing on-street parking. It is recommended that a minimum footway width of 1.8 metres is provided between parking bays and adjacent buildings, etc.

Street Lighting

- 3.9.10 Street lighting should be considered by the Designer and provided at regular intervals. All parking should be well lit to ensure driver safety when entering and exiting their vehicle late at night with particular care taken where parking is provided between trees. This will help reduce the potential for conflicts and reduce the likelihood of opportunist crime and vandalism.

Tree Protection

- 3.9.11 Many of the roads within the Municipality are lined with trees, see *Photo 3.10* below. It is recommended where parking is to be provided between trees that a kerb detail is provided around the tree as shown in *Photo 3.11*, to provide a degree of protection



Photo 3.10 – Example of tree lined street



Photo 3.11 – Example of tree protection

Payment Machines

- 3.9.12 At the time of writing the precise form of payment for on-street parking facilities is to be determined by the Municipality. If, as is most likely, pay-and-display machines are implemented, consideration needs to be given to the proximity of the machine to the parking spaces. A nominal distance of approximately 60 metres between machines would reduce the maximum distance motorists have to walk from their vehicle to purchase a ticket to 30 metres, which is deemed both a reasonable walking distance and a pragmatic approach to the amount of machines provided. Longer streets would benefit from equidistant spacing of pay machines.

4 Non-Rehabilitated Roads

4.1 Introduction

- 4.1.1 As described previously there are a number of roads within the CPZ which are not currently scheduled to be rehabilitated. This chapter therefore refers to how these roads should be treated where they will still be subject to parking restrictions. Minor works will be required to ensure the enforcement is consistent throughout.
- 4.1.2 Much of the design criteria stipulated in Chapter 3 for roads which are scheduled to be rehabilitated will also apply to those roads not currently within the rehabilitation programme. However, there are exceptions to this, most notably the way in which the parking bays are demarcated. Some of the streets within Chisinau which are not due to be rehabilitated have reasonable surfacing where the car park bays are located, whilst other streets have parking bays within un-surfaced areas. *Photos 4.1 & 4.2* below show examples of these respectively.



Photo 4.1 – Example of existing surfaced parking



Photo 4.2 – Example of un-surfaced parking

- 4.1.3 Ideally, if a budget is available, then un-surfaced parking areas should as a minimum be levelled and surfaced in tarmac such that parking bays can be demarcated. Where this is not possible then it is recommended that parallel parking bays are used, if the physical dimensions of the carriageway permit, as these can be formally demarcated on the tarmac surface. Both forms of demarcation should be through white lining, ideally using thermoplastic paint with glass beads for its durability in order to limit capital costs.
- 4.1.4 The size of bays should be as set out in Chapter 3. Other commonalities are;
- Motorcycle parking provision is subject to the same criteria as rehabilitated roads; see Section 3.7 of this report.
 - Loading bay provision is subject to the same criteria as rehabilitated roads, Section 3.8 of this report
 - Other Key Design Criteria
 - Proximity of parking to junctions is in accordance with Section 3.2.1 of this report
 - Signage is required, in accordance with Sections 3.9.5, 3.9.6 and 3.9.7 of this report
 - Pedestrian facilities are required, in accordance with Section 3.9.8 and 3.9.9 of this report
 - Street lighting is recommended, in accordance with Section 3.9.10 of this report
 - Tree protection is recommended, in accordance with Section 3.9.11 of this report
 - Payment machines are required, in accordance with Section 3.9.12 of this report