

CONCEPT OF TRAFFIC SAFETY IMPROVEMENT IN LATVIA-LITHUANIA CROSS-BORDER REGION

Design guidelines for minor roadside rest area



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LLIV-299 Roadside safety rest areas



2013

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Executive summary

There are several types of roadside facilities that provide opportunities for travelers to safely stop, rest and manage their travel needs and safely access some of the state's recreational facilities.

Rest area is a roadside facility equipped with permanent restroom building(s), a parking area, picnic tables, refuse receptacles, illumination, and other ancillary services. SRAs typically include potable water and might include traveler information and telephones.

Rest areas provide universal access for rest, traveler information, and restroom facilities. Benefits include improved safety by reducing driver fatigue and the number of vehicles parked on the shoulders of state routes, refuge from adverse driving conditions, and increased tourism promotion.

This document provides guidelines for minor or basic comfort safety rest area design along Latvia-Lithuania cross-border region roads.

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1. Minor rest area definition

Rest area is a roadside area with parking spaces separated from the roadway, provided for travelers to stop and rest for short periods. Main idea of rest area is provision of convenient, brief stops and easy roadside access to public restrooms, drinking water and telephones, 24-hours, every day.

2. Demand for rest area in Latvia-Lithuania cross-border

The transit roads of both countries –Latvia and Lithuania serves different groups of travelers including vacation/recreational travelers, commercial vehicle operators, commuters, motorcyclists, bus tours, and others. Latvia and Lithuania border is an outer border of European Union and great number of cargo vehicles passes the area on their routes from EU to Russia and Belarus and back.

General road users make regular stops during their travel caused by different needs such as restroom use, short break/light exercise, vehicle check, pet relief, child relief, change drivers, and others. Commercial vehicles operators, as they are required to follow regulations on driving time limits and must stop for short breaks and for long term rest for night sleep

Some of the required services may be found at special commercial facilities like roadside restaurants, gas stations, service stations and commercial truck parks but rest areas may offer an integrated combination of different services accomplished by unique opportunity of walk/picnic space, accommodation for travelers with special needs, parking places for vehicles of different size and services of welcoming centers.

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Demand for rest areas was evaluated on the base of:

Users' expectation on level of services gained through road-users opinion survey conducted within LLIV299 project;

Average annual daily traffic data (AADT) obtained from traffic intensity measurement performed by LLIV-299 research team,

Existing level of services evaluated by inspection of existing roadside infrastructure and evaluation of alternative stopping opportunities;

Evaluation of stopping factor performed by assessing the alternative stopping opportunities on each road, distance from urban centers in combination with AADT.

3. Design criteria

3.1. Rest area key users

There are three main categories of road users:

- Cargo vehicle/truck drivers;
- Tourists;
- General road users.

Each of these categories have different motivation for stopping.

Truck drivers must stop for defined period in accordance to law. These stops are regulated by Regulation (EC) Nr. 561/2006 and comprise 15-45 minutes for short-break and 9-11 hours for long break.

Tourist travelers being a very diverse group of users have a choice when to stop. This category often utilize opportunities provided by commercial facilities (petrol stations, road side shops, restaurants) but also require an equipped place for food&drinks breaks, sanitary needs, fatigue management. This importance of rest area in remote and little populated rural areas is critical because of lack of commercial roadside facilities.

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General road users include residents of towns and villages travelling/commuting for work, shopping or personal matters. They are likely to make their journey as short as possible but therefore may need to stop to manage fatigue. This group of users values the cleanness, safety and aesthetics of the rest area as the most critical factor when they choose to stop.

3.2. Road users requirements

In accordance to targeted road users opinion survey the major criteria set by end-users are:

- Traffic and parking: a rest area has to be easy-accessed 24h, provide enough space for parking and not obstructed maneuvering
- Sanitary facility: WC and water supply are of primary importance
- Outdoor facilities: seating and tables, area for relaxation
- Personal safety: lighting at nights, video surveillance

3.3. Building codes and standards requirements

Site planning, development, design, construction, and operation should comply with federal, state, and local laws, regulations and standards

Local Land Use Compatibility and Approvals – Should be compatible with local community, business, and government land use, economic, social, and environmental objectives, and therefore approved by the local community.

4. Strategic context

4.1. Rest area as fatigue management tool

Fatigue is a significant issue for drivers. Rest area shall provide the basic fatigue management tool and supplement other rest opportunities provided by commercial service

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providers (catering facilities, petrol stations etc). Minor rest areas shall ensure the minimal level of comfort for road users in order to provide opportunity for short-term stay.

All rest areas shall contain basic facilities for fatigue management for all road users and include shelters, tables, seating and WCs.

The rest areas shall be open and accessible 24h for genuine fatigue management reasons.

4.2. Rest area as environment friendly facility

Besides legally regulated environment protection measures like waste collection, waste water management, portable water purification new technologies shall be applied for rest areas. Rest area should become a point of promotion of “green” construction concepts. The remote location of rest areas makes various environmental applications be feasible. Use of solar energy, water recycling in combination with advanced energy saving methods is encouraged to be widely applied.

4.3. Rest areas national-wide network

The development of rest area as an integrated part of the road shall be implemented on network base. Rest areas on regular base shall be established along all major state and international roads. The idea of rest areas connected with points of interest seems very attractive for further development of rest area’s network.

4.4. Rest area for all road-users

These basic rest area features/services must be open and available to the public 24 hours per day, 7 days per week, and must be accessible to individuals with disabilities. Due to medium traffic intensity on Latvian and Lithuania no separation between general rest areas and trucks parking bays is foreseen.

4.5. Rest area as local business and tourism promotion point

Rest areas provide a unique opportunity for tourism and local business to address directly the wide audience of potential service users. Rest areas shall provide opportunity to display the information on advertisement and information boards (non-electronic information and electronic information).

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5. Conceptual vision

A roadside facility where travelers may safely stop for short periods of time to relax and rest at no charge and to purchase available goods and services.

Network of safety rest area shall be established and properly maintained as an integral part of Latvian and Lithuanian roads. Minor rest shall include amenities which are of primary need and shall be provided at no charge and no obligations for users: toilets, parking lots for different types of vehicles, drinking water, picnic area and waste bins. Each of minor rest area may include additional commercial services on the base of additional agreements and regulations set by rest area operators.

Spacing between rest areas is a key safety factor. The particular distance may vary taking into account the characteristics of the particular road segment, number sizes and spacing of alternative stopping opportunities. For rest area planning purposes a spacing of an hour's driving time or less shall be reasonable unless extenuating circumstances can be established. For this concept the average distance of 75km between rest areas is considered as optimal. When alternative stopping opportunities are available on route the average distance between rest area and alternative stopping shall be 15 km. The distance is estimated on the base of world-wide experience on evaluation of "safety period" of driving between stops, average speed on Latvian and Lithuanian road and bi-directional driving patterns.

6. Roadside rest area design guide

6.1. Location

The exact rest area location shall be identified based on proper land availability, good views of surrounding area, taking into consideration geometric and environmental constraints. The following factors shall be applied for potential site evaluation:

- Rest area shall be located within close access to the road;

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- The site is available to be purchased by state agency;
- The site should have good drainage, require minimal grading;
- The site shall ensure clear visibility of all facilities;
- Site shall be located within straight section before downgrade in order to avoid upgrade exit;
- Flat terrain to ensure easy maneuvering and parking for heavy trucks;
- Rest area located close to places of interest, scenic value site are preferable;
- Close proximity to public utilities is desirable;
- Site shall be able to accommodate adequate sewage treatment facilities;
- Site shall be located considering the minimal environmental impact.


Each site shall be evaluated considering development costs, ability to generate commercial sales revenues, and whether their development might encounter environmental problems or community and therefore political resistance.

6.2. Signing of rest areas



All areas shall be signed using  to inform about fatigue management suitability for all road users. The information of sanitary facilities availability shall be signed using



sign  . The opportunity of short-term/long-term parking shall be marked



with  .

Amendments with additional information on classes of vehicles which may be provided with parking lots:

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The proper signing shall enable drivers with adequate time to decide to use the particular rest area and what amenities may be used.

It is recommended to use the informative signs providing information of 3 next rest areas available on the rout with data on name of location, facilities and distance to each. It is recommended to provide additional signs in 1 km distance and in 400 m distance.

6.3. Appearance

The location and design should encourage users to stop and utilize the offered services.

Landscaping and facilities (parking, comfort stations, picnic tables, and pedestrian walkways should be attractive, clean, and adequate to meet projected user needs.

Minor rest areas' layout and appearance of structure shall match the character of the surrounding area. Since the major number of rest areas is proposed to be located on remote rural area the application of local architectural traditions is appreciated. It is recommended to use the themes when developing the design solutions. It is reasonable to apply unified layout and structures but external architectural solutions shall make each place individual.

6.4. Parking area

Parking area shall provide enough parking lots for all three groups of users and enough space for easy maneuvering and parking.

The following are standard space requirements of some typical vehicles. These may be used as basic minimum reference values but different layouts such as parallel, herringbone and in-line, have slightly different overall space requirements and detailed layout of parking spaces will be site specific.

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In general the following requirements shall be followed

- Car and light vans 2.5 metres x 6 metres
- Trucks 3.5metres x 18.5 metres
- Coaches (40 seats) 3.5 metres x 14.0 metres

In accordance with national guidance, consideration should always be given to the needs of disabled people. The location of parking provision is particularly important in this context. In particular, allocated spaces should be:

- Located be as close as possible to the destination- WC and picnic area;
- Connected to the destination without steps;
- Sufficiently large to allow unobstructed wheelchair access.

The location of disabled parking spaces should be considered as mandatory requirement. The width of a parking space provided for use by disabled people should be at least 3.3 meters.

Bicycle racks shall be provided where this type of active transportation mode is accessible to an SRA.

Areas for snow storage needs and drainage arrangements shall be foreseen.

6.5. Access/egress point

Access and egress points shall be designed to provide a proper level of safety for vehicles entering and leaving rest area. For regular sections of e-roads E262, E67 and E77 the roadside rest areas shall be accessed for traffic travelling in both directions. Both left in and right in access shall be provided. For E85 the rest areas shall be developed to serve the traffic travelling in one direction only.

Access to the rest area shall be designed following required turning radius standards for cars and heavy trucks.

Grade shall be evaluated to provide comfortable exit for heavy trucks. Considering that the most road sections within cross-border region are single carriageway rest areas shall be

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designed on one side of the road. In this case the location on flat section shall be considered the best solution.

Sight distance to entrance and exit of rest area shall be considered for each individual site.

Acceleration and deceleration lanes shall be provided at the exit and entrance of rest areas, taking into consideration lanes and grades requirements for trucks.

6.1. Layout solutions

The recommended land plot size for all rest area facilities is 0.6 ha. The exact size depends on terrain quality and demand for parking lots on particular route.

Site plans shall be developed to achieve safe and efficient traffic and pedestrian flows, initially applying the following criteria:

- One-way traffic flow for trucks shall be followed as mandatory
- Truck parking areas shall be separated from parking zone for light vehicles to prevent traffic collisions during maneuvering of trucks and ensure safety for passengers of cars. For safety reasons parking lots for trucks shall be located such way that to avoid backward movement of vehicles.
- The site shall be enough to include the desired public and private commercial facilities.

6.2. Greenery

Vegetation enhances the physical environment by providing shade, shelter from wind, visual screening, wildlife habitat, and other benefits. Special landscaping solutions shall be undertaken that emphasize low-maintenance practices and obstacle-free lawns, and minimize water usage for irrigation and impacts to existing native vegetation where practicable.

6.3. Site Security

The facility shall be designed to maximize line of sight for rest area users. Design vegetation for visibility to avoid hiding places on-site.

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6.4. Area lighting

Lighting shall be provided at all rest areas to enhance personal safety of rest area users. The lighting at night provide comfort and security for visitors and make a beacon to improve the visibility of the rest area from the road what encourage travelers to use the facilities. Two types of lighting shall be provided:

Upper lighting to light area near toilets, picnic tables, maneuvering ways;

Lower lighting is recommended in truck parking areas to allow truck drivers to take long sleep breaks.

LED is a rapidly evolving technology that produces light in a new way with the following main characteristics: (1) small sources of light that are illuminated due to the movement of electrons in a semiconductor material similar to an electronic chip than a light bulb; (2) LEDs produce heat that is conducted through the back of the fixture rather than radiation in all direction as in other sources of light; and (3) LED is a directional light which increases its efficiency in applications that need directed light. In directional applications, LEDs can produce energy savings more than 50% compared to fluorescent and High Intensity Discharge (HID) lighting, and more than 75% savings compared to incandescent lighting.



6.5. Public rest rooms

Rest area buildings shall be designed to provide a safe, comfortable experience for the traveling public. Building designs with potential hiding places shall be avoided, and adequate building lighting shall be provided around the perimeter.

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Toilets are considered essential facilities, and it is suggested that they be included at all rest area sites. Where sewers are located in close proximity to the rest area, toilets should be connected to the sewerage system. In the majority of cases where a sewer is not available, the selection of toilet type and toilet designs requires knowledge of estimated rest area usage, especially during holiday seasons.

Good toilet designs should include facilities that are durable and vandal resistant. Simplicity and durability of design enables easy maintenance. The selection of toilets for rest areas should aim to minimize the whole of life cost.

Where high usage rest areas are not located in close proximity to sewers, septic tank systems and aerated wastewater treatment system shall be installed to treat wastewater to the required level of effluent quality for discharge.

The selection and design of rest area toilets should take into consideration the ongoing maintenance of the facility required. In general, the recommended number of cubicles for rest area toilets is 2 to 4. Unisex toilet cubicles should be used to maximize the toilets' availability. Ventilated toilet designs should be used to minimize odor problems. The roof of a toilet structure can be designed such that it maximizes natural lighting for energy savings and good ventilation. Where it is feasible to have water supply it is recommended to have permanent built-structures to locate all sanitary cabins with septic style flushing. The option is to provide module sanitary cabins- Bio-toilets.

Motion Activated Lighting (MAL) is a green technology that increases energy efficiency by activating light only when it is needed. MAL systems use motion sensors in order to detect the movement of a heat source in a specific area where the light is being activated. Once the heat source is out of reach, the MAL system remains in detection for a certain time and then it turns off the light automatically. Motion Activated Lighting system shall be applied where it is possible for lighting toilets.

6.6. Rubbish bins

Rubbish bins are essential facilities at rest areas. The bins shall be located in specially allocated area isolated from other facilities by fence, planted greenery. Bins shall be provided with enclosed with lids to prevent intervention of wild animals and birds.

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6.7. Outdoor relaxation area

All rest areas shall provide a suitable area for people to sit comfortably out of their vehicles and have meals breaks.

Each rest area shall be equipped with several sets of table and seats. Preferably to have ½ of them sheltered. The equipment shall be design to be vandal resistant and minimize life-cycle costs. Location of tables and seats shall be isolated from the road noise.



6.1. Information boards

Each of rest areas shall provide opportunity to locate an information board for travelers. It may contain information on area, local attractions. The information on next rest area, maps, distances to cities shall be provided in order to make the journey better managed. The information boards may be on unique style developed for all rest areas in the country or may reflect the peculiarities of the region and be individually designed.



Besides information on distances and points of interest it is advisable to present relevant road safety and route specific information to road users within a rest area.

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6.2. Open market space

Each rest area shall be planned considering that paved area may be allocated for arrangement of local green market or crafts market.

6.3. Facilities for travel related services

On some site where it is considered to be economically feasible it is recommended to foreseen facilities for provision of commercial services: locating vending machines, fast food or retail of beverages, food or various travel related goods.

6.4. Utilities

Power supply

A new or upgraded (in case of existing) electrical service provided on-site shall meet the projected needs of the facility over the next 20 years where practicable. Provide three-phase service where available. Consider building capacity increases, site lighting improvements, electric vehicle charging stations, truck parking electrification, and other potential needs.

Water and waste water

Individual design solutions shall be developed for each selected site on water and sewage disposal systems, including reservoirs, long-distance pressure sewers, septic tanks, drain fields etc. Local water intake and purification facilities shall be designed considering further maintenance.

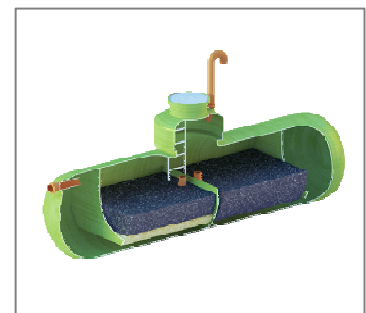
Heat supply

Taking into consideration the remote location of rest areas from centralized heating system it is recommended to design electrical heaters for rest rooms.

6.5. Environment management solutions

Rest areas with intensive use by heavy trucks create a significant amount of pollutants like oil and grease on parking areas and wastes. Stormwater collection and treatment and drainage design shall be developed for each rest area.

Storm water from parking lots and pavements shall be



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collected and treated applying oil separation and sand removal technologies.

6.1. Site and buildings sustainability

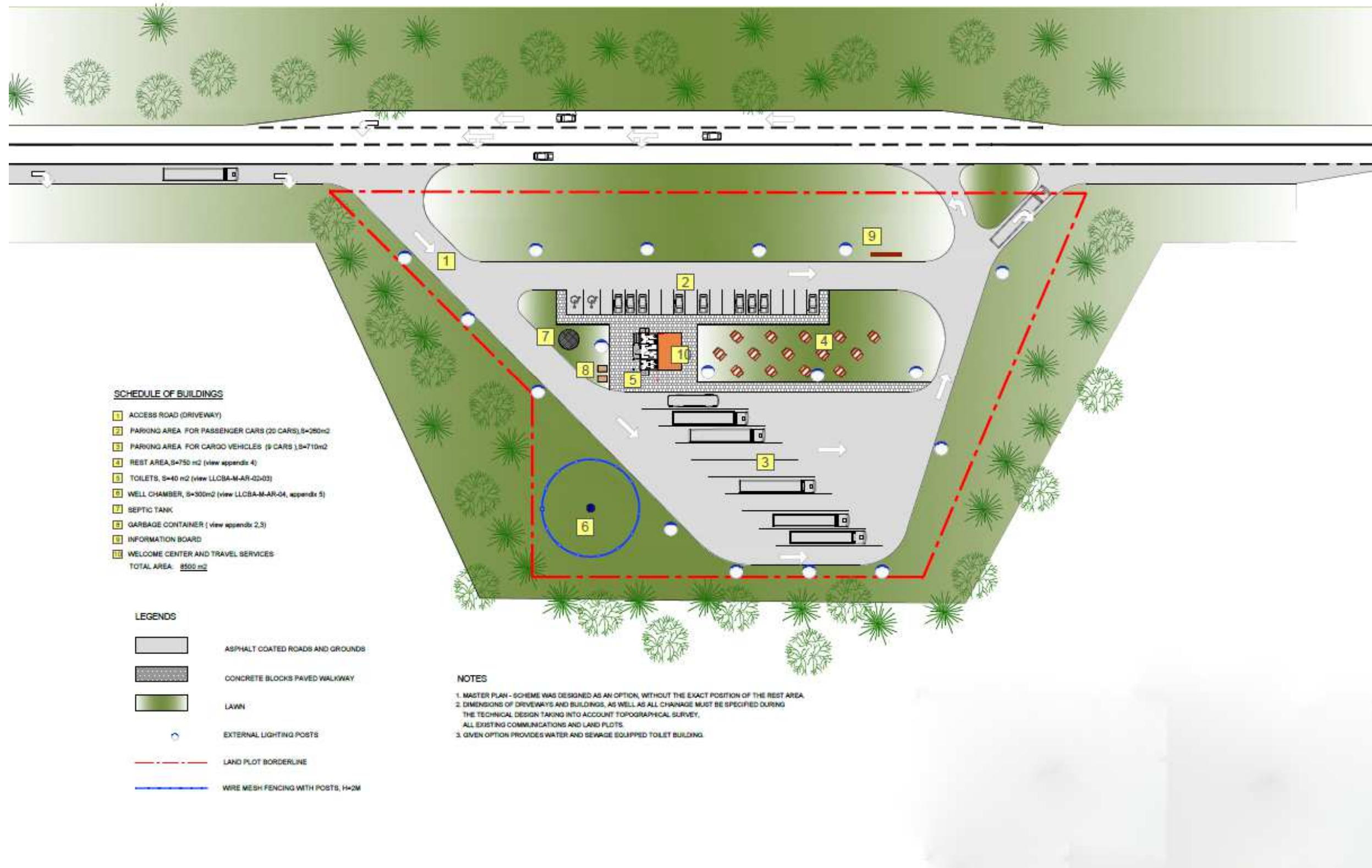
The design shall be developed applying Energy efficiency and Environmental Design standards where practicable. Design target is to achieve maximal energy efficiency, water conservation, and low operational costs. Landscaping features shall be durable and easy to maintain. Consider vandal-resistant materials as a preferred option for building components such as fixtures, fasteners, and surface coatings.

Annexes

Master plan of minor roadside rest area

MASTER PLAN-SCHEME (OPTION 2)

SCALE 1:1000



Zoning plan of minor roadside rest area

AREA ZONING SCHEME ((OPTION 2))
SCALE 1:1000

