THE ARCHITECTURE OF THE NIGERIAN ROAD SERVICE AND SUPPORT CENTERS: A CASE OF 9TH MILE ENUGU-NGWO, ENUGU STATE

Kikanme, E. I. & Obiadi, Bons N.
*Department of Architecture, Nnamdi Azikiwe University, Awka.

Abstract
Bad roads and poor implementation of the laws in Nigeria resulted in increase in roadside services including, but not limited to vehicle repair services and hawking. Vehicle roadside repair services and hawking have been attributed to traffic impediments and accidents on the Nigerian roads and highways because, the roads and highways lack road service centers. Major intersections on the Nigerian highways are constantly clustered and congested as a result of transporters and their passengers stopping to get their needs met. This is a common occurrence on the Nigerian highway, specifically, at 9th Mile, Enugu Ngwo, Enugu State with major connecting points tying Northern and Southern Nigeria. The area has a major brewery with different bottling plants at different locations, heavy industrial layouts with industrial activities that attracted haulage vehicles. All these have resulted in haulage vehicle, commercial vehicles, private cars and tricycles parking on both sides of the roads and impeding free flow of traffic. This paper aims at creating awareness and points to the fact that there is an architectural solution to the problem of traffic impedance occasioned by increasing road side parking along major highways, which is yet to be implemented at 9th mile. It adopted qualitative research methods that reviewed the planning patterns adopted in other support centers across the world, the grades existing and narrows down to the problem facing the 9th mile area of Ngwo Enugu State, hence it made recommendations that would discourage parking along major highway and hence lead to a safer highway

Keywords: Parking, Highway, Support Centers, Enugu State, Roads,

Introduction
Moving goods, services and people from one place to another is critical to maintaining a strong economic and political tie between regions, communities and tied through good road networks, which are maintained by local, regional, state and the federal road maintenance agencies. The vehicles and people using the roads are serviced through road side service and support centers as is the case in most major roads. Every region, state or country has different types of transportation systems, including, but not limited to air, sea, rail and road transportation systems. The patronage or use of the systems depend on affordability, preference and or status symbol. Of all the transport systems, the land (road) transport system seem to be the most favoured because of affordability, wider connectivity and good road

networks. According to Kayode (2015), road transportation in Nigeria has remained the most popular form of transportation, due to the disadvantages associated with the other two, which are air and water. Transportation by road could be facilitated by trucks, buses, trailers and other automobiles, even by foot or by the use of animals such as horses, camel, donkeys and so on. The need for truck, buses, trailer and other automobiles as mediums for propagating road transportation could be said to grow out of the necessity to carry a large amount of goods, persons and services, especially on long distance journeys (Ogunbodede, 2008).The growth and development of road transportation, according to De chiara and Callender (1983), has closely followed advances in automotive technology and the improvement and expansion of the national highway networks. Fabuyi (2002) reaffirmed that, the mode of transportation has metamorphosed over time and with advent of technology, it became a supportive instrument to the existence of mankind. The road transportation systems and their support services (local mechanic shops, restaurants and taverns), develop in developing countries by the road sides on major roads and highway because of the need for transporters and their passengers to get help along the roads and highways during their travels.

A road service and support center, which is also known as a roadside rest stops, travel plaza or vehicle transit parks in some countries, is a designated public facility or area adjacent to highways and roads, where drivers and passengers can take breaks to reduce drivers' fatigue, as well as obtain basic services while on the road. Fatigue in drivers result in road accidents and this could be seen in The World Report on road traffic injury prevention worldwide, which reports that an estimated 1.2 million people are killed in road crashes and as many as 50 million are injured each year (Peden, Scurfield, Sleet, Mohan, Hyder, Jarawan, Mathers, 2004). An emerging safety issue facing the road transport industry today is fatigue (both for the drivers and the passengers alike) as it is not easily recognised and diagnosed (Munala and Maina, 2012). As a result, this led to the introduction of road service and support centers along the high ways in most developed countries. The concept of introducing road service and support centers according to Munala and Maina (2012),was based upon the premise that fatigue, boredom and monotony associated with travelling can be reduced if road users break their journey regularly. Therefore, as the highway networks expand in addition to more suitable transportation equipment becoming available, and routes becoming longer, covering greater distances, the need for places where passengers and drivers could stop to rest and recover from the fatigue, as well as obtain services for their vehicles became imperative.

Road service and support centers are rather a new development in Nigeria. It could be said to find its origin in response to the increasing dependence on the road system to meet virtually all the inland transportation needs. Munala and Maina, (2012), indicate that the causes of fatigue included, but not limited to poor road conditions and long driving periods. To relieve themselves, travelers used unplanned locations that were not intended for this purpose and offer low services including petrol stations and

bushes. Most times, vehicles are packed along the roads for the drivers, passengers and their vehicle to be serviced. As a result, vehicles are packed on both sides of the roads (plates 1 to 4).



Plate1. Benin By-pass Expressway lorry traffic and street side parking and servicing situations. Source: Obiadi (October 20, 2019).



Plate 2. Agbor, Delta State Expressway lorry traffic and street side parking and servicing situations. Source: Obiadi (October 20, 2019).



Plate 3. Amansea, Anambra State Expressway lorry traffic and street side parking and servicing situations. Source: Kikanme (October 25, 2019).



Plate 4. NNPC Enugu-Emene Airport Expressway, Enugu State lorry traffic and street side parking and servicing situations. Source: Kikanme (October 26, 2019).

Queensland Department of Main Road (2014), describes a road service and support center as a roadside development providing essential services for the safety, comfort and convenience of all users of a limited access road. Moore (1985), indicated that, road service and support centers are facilities adjacent to or in close proximity to, and with direct or indirect access to the limited access road. Lina (2014), stated that road service and support centers constitute vast complexes including cafes, restaurants, motels or small hotels with spaces allocated for open air leisure entertainments. In addition to that, road service or motor way rest and service areas are off-road spaces with provisions for both emergency, planned stopping and resting by motorists for short periods. They have freeway type entrances and exit connections, parking areas, benches and tables, toilets and abundance of water supply for their customers. According to Latvia – Lithuania Cross-Border Region (2013), a well-designed road support and service center providing favourable conditions for travelers and

improved safety parking conditions are absolutely necessary for the following reasons, reduced freight thefts due to a vehicle parked in a safe place, improved driver and passenger security and comfort, safeguarded economic growth of the region due to the proposed supply of added value services, stimulation of travelers to use services of the local businesses, support and promotion of tourism and assistance to local communities in providing them with marketing and advertising opportunities, safe road service and support areas hence, help to ensure a free movement of goods and individuals. In order to be effective therefore an ideal road service and support center should segregate its parking, between the trailer and trucks and smaller vehicles, this will allow specific considerations to be made for each category of vehicles; zoning of shared areas between the already segregated vehicles categories; proper landscaping of the site; use of landscape to create a buffer zone from the highway in order to reduce noise effect on the buildings within this center; reduction of glare through proper landscaping; use of aesthetically appealing facades in order to attract patronage from potential road users, especially through the expression of movement; provision of both indoor and outdoor relaxation area (figure 1),use of large headroom, as well as cross and corner ventilation to achieve comfort, use of the mixed orientation planning method of site planning.

Safety Rest Areas (SRAs) as is called in other parts of the world were constructed as part of the Interstate Highway Systems, modelled after roadside parks, they were to provide minimal comfort amenities for the travelling public; generally consisting of toilet facilities, drinking water, picnic grounds and information dispersal (American Association of State Highway Officials, 1998).The inception of road rest area in America came from a provision of the America Federal Highway Act of 1983 which stated that “the state with the aid of the federal government may include such sanitary and other facilities as may be deemed necessary to provide for suitable accommodation of the public”. While the Act marked the birth of road side rest areas in the United States of America, in Africa and particularly, Nigeria, road service and support center are underdeveloped and hence little is known about them (Ortise, 2017). The model of place that led to the establishment of waysides and roadside parks was initiated by the travelling public, as well as private individuals who sort business opportunities along highways (Draft National Transport Policy, 2010). Rest stops by drivers are carried out at service station or gas refill stations as well as restaurants and terminals along the routes of transportation (Ortise, 2017). This in turn presents a dangerous situation for both the road, passengers, drivers, and vehicles.

Statement of Problem

The absence of adequate parking and support service centers around the 9th Mile, Enugu Ngwo thoroughfares have resulted in overcrowding of the area roads, abandonment of road unworthy vehicles, traffic impediments and in most cases, arm robbery. These problems have resulted on the need for a

well-structured rest area (service center) for the travelers at 9th Mile, Ngwo Enugu state.

Aim

The aim of this paper is to create awareness and point to the fact that, there is an architectural solution to the problem of traffic impedance occasioned by increasing road side parking at 9th mile Ngwo Enugu, which needs to be provided.

Methodology

This paper adopted qualitative research methods that embraced archival, interviews, observational methods and content base analysis (secondary data sources), where the authors studied and interpreted the works of other authors and used them in directing the focus of this paper, The Architecture of the Nigerian Road Service and Support Centers: a case of 9TH Mile Enugu-Ngwo, Enugu State.

Classifications and Categories of Road Service and Support Centers

Most rest areas in advanced world are categorized and designed according to needs, volume of traffic on the roads and the classification of the road (national highways, state and regional roads). Most national highways are classified as grade 1 roads, state highways are grade 2 and regional roads are grade 3 roads (Tint, Maung, and Wyityi, 2013).

• **Grade I:** Rest areas intended for servicing of the national freight and passenger transport are located at the main motorways of the state (60–80 km distance between the rest areas).

• **Grade II:** Rest areas intended for those travelling by cars are located at the main and country motorways and may also be positioned near observation/sightseeing places (arrangement at 20 – 40 km intervals).

• **Grade III:** Rest areas intended for short stops of those travelling by cars are located at the main and country motorways (arrangement at 20 – 40 km intervals) with regional roads.

Planning Types Associated with Road and Support Centers

Equally, rest areas on the road ways are planned according to needs and capacity to handle the area's traffic volume. According to Tint, Maung, and Wyityi (2013), the planning types associated with road service and support center are classified into three categories: outwards, inwards and mixed orientation (figures 2 to 4).

Outward Orientation

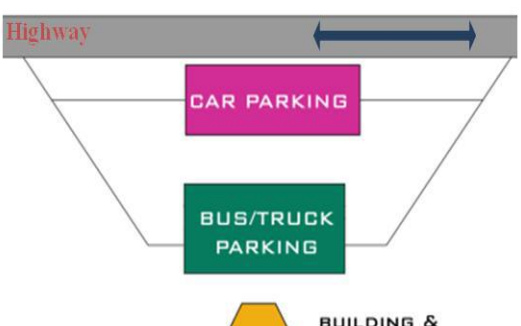


Figure 1. Illustration showing the outward orientation of road service and support center
Source: Tint, Maung, and Wyityi, (2013).

In outward orientation (figure 1), the parking stalls for all vehicle types are provided between the highway and the building and major use area. This requires smaller site to be used, minimized road crossings, and flexible development opportunities. This type of site orientation is utilised where there is a smaller site (Tint, Maung, and Wyityi, 2013).

Inward Orientation

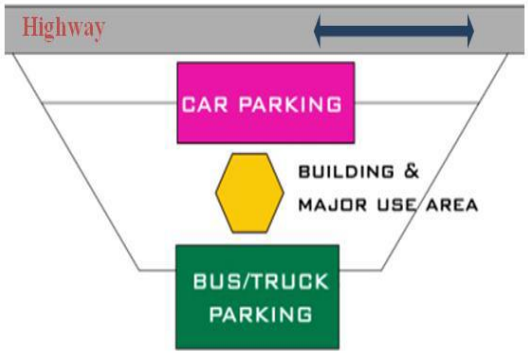


Figure 2. Illustration showing the inward orientation of road service and support center. Source: Tint, Maung, and Within, (2013).

In the inward orientation (figure 2), the parking locations for different vehicle types are separated and located within a short distance of the building and other facilities. This requires a larger site area to be used. Each of the buildings in the major use area is in closer proximity to the car parks (Tint, Maung, and Wyityi, 2013).

Mixed Orientation

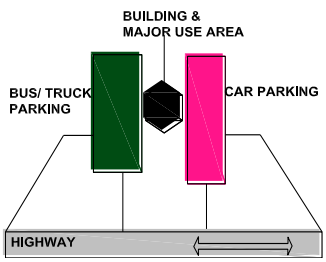


Figure 3. Illustration showing the mixed orientation of road service and support center. Source: (Authors' field work, 2019).

In the mixed orientation planning(figure 2), the advantage of these other two forms of planning are gained from, hence a relatively lesser area of the site can be used, minimized road crossing, proper zoning of functions can be effected as well as separation of parking for various vehicle types. The disadvantage of this form of planning is that there are longer distances between some of the facilities, but proper zoning can help minimize this effect (Tint, Maung, and Wyityi, 2013).

Review of Motor Parks around the World

Most motor parks around the world are designed taking advantage of the Planning Orientation models.

In Ayer Keroh Rest Area, Malaysia

The mixed oriented planning type was used for the design of this rest stop. It provided cosy places for travelers to rest and manage their needs. Covered walkways are also provided for the user comfort and direct access to public facilities, which were placed in between the parking spaces (figure 4).



Figure 4. Picture showing site plan of Ayer Keroh rest area Malaysia
Source: Google earth retrieved, (2017).

GR 230 Rest Stop Hokkiado, Japan. The outward oriented planning type was used in the design of this highway rest area. Service area was designed

with a linear form. Its form was made to express the undulating nature of landscape of the environment where it is located (plate5 and figure 5).



Plate 5.Picture showing the facade of gr230 rest stop
Source: archdaily.com retrieved, (2017).

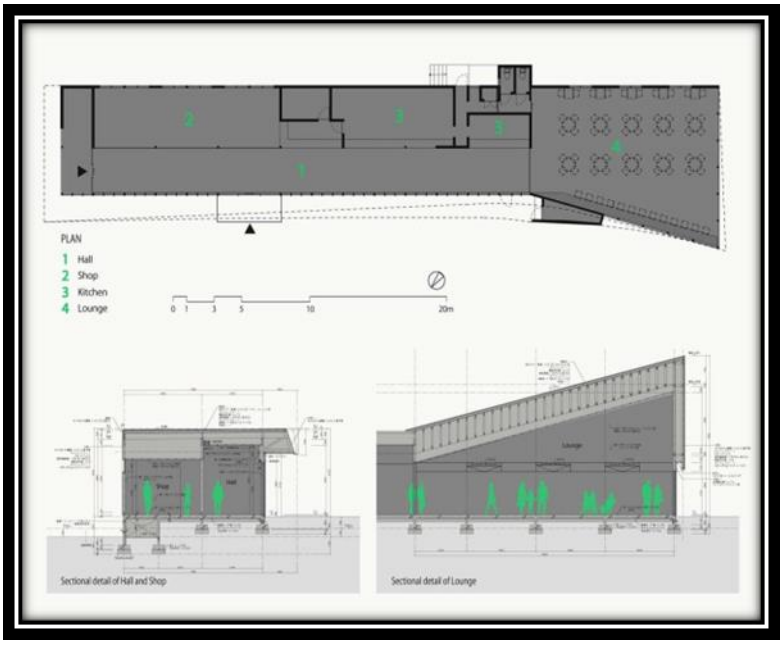


Figure 5. Illustration showing floor plan and sections of gr230 Rests top
Source: archdaily.com retrieved, (2017).

Aire De La Chaconne, Highway Rest area, Burgundy. The inward oriented planning type was used for the design of this center. This building was designed to continue the notion of creating a subtle structure set within

a rural context. At the center of the overall landscape lies the service station. This area is intended for refueling, loading and unloading; it also facilitates a shop, a restaurant and a hotel. The petrol station is separated by a pedestrian path which runs parallel to the traffic flow (plate 6 and figure 6).



Figure 6. Illustration showing Ariel view of *Aire de la chaconne*, highway rest area, burgundy, Source: designboom.com, retrieved (2017).



Plate6. Pictures showing Ariel view of *Aire de la chaconne*, highway rest area, burgundy, Source: designboom.com, retrieved (2017).

ABC Motor Park, Lokoja, Kogi State, Nigeria(figure 7).In Nigeria, they adopted the Outward Oriented planning, where the parking stalls for all vehicle types are provided between the highway and the building and major use area. This requires smaller site to be used, minimized road crossings, and flexible development opportunities. This type of site orientation is utilised where there is a smaller site (Tint, Maung, and Wyityi, 2013). This planning

pattern comes with a major dis advantage of over spill, at peak periods, causing obstruction on the road around the area where such rest centers are located.



Figure 7. Illustration showing the site plan of ABC motors rest park Lokoja rest stop. Source: Google earth retrieved, (2017).

Generally, in Nigeria, the developments of the Service Centers along the major roads are new and still in exploratory stage. In general, both vehicle operators and their passengers still take advantage of the bushes and road side support services for their comfort. The bad conditions of the roads along with bad road maintenance services have caused severe hardship for the road users and especially, at 9th Mile, Enugu Ngwo. The problems attracted the attention of Enugu State governments and their entire palliative measures failed.

As indicated by Amoke (2015), the ugly experience road users encountered on the roads in the past was caused by the existence of dangerous potholes, inadequate availability of by-pass roads and the illegal parking of heavy-duty trucks along the roads (plate 7).



Plate 7. 9th Mile, Enugu Ngwo, Enugu State Expressway lorry traffic and street side parking and servicing situations. Source: Obiadi (October 26, 2019).

According to Amoke (2015), in a bid to actualize the comfort of the road users, especially those returning home to celebrate the festive season with their loved ones and are bound to pass through the 9th mile corner roads to get to their destinations, the government of Enugu State, directed the relocation of all the heavy duty trucks parked along the 9th Mile Corner-Nsukka-Onitsha expressway, and equally mandated the State Ministry of Works and Infrastructure to as a matter of urgency come up with the budget implication for the maintenance work on the affected roads to enable government take necessary action. Apart from the fact the Ministry of Works and Infrastructure has concluded the repairing of some potholes, vegetation control work and earthworks on the two by-pass roads for alternative use during the peak period of festivities, the Ministry of Commerce and Industry also decongested the obstruction along the roads caused by parked heavy duty trucks, in line with the directives of the governor.

"Accordingly, the government has directed that all heavy-duty trucks including haulage vehicles for the breweries and other Industrial establishments parked along the Nsukka-Enugu-Onitsha Expressway, Efficient Filling Station to the New By-pass, 9th Mile-Coca-Cola-Udi Road and by-pass connecting Onitsha road from Udi, etc, must be moved immediately.

"Consequently, government has provided temporary parking spaces for the Christmas period only at these locations: old Toll-Gate along Enugu Onitsha Expressway, or the Ajali-Owa Water Works site. "All haulage and other vehicles parked by the road side or obstructing traffic must be evacuated immediately or vehicle will be towed at the owner's cost. Additionally, traders must not hawk their wares by the road side. Heavy duty vehicles or trucks coming into Enugu or traveling to Onitsha from the Nsukka must pass through the Ibute New 9th Mile By-Pass.

"These measures are put in place by the government of Enugu State, to alleviate the sufferings of road users within and around the 9th Mile Industrial zone (Amoke, 2015).

Findings

9thMile Enugu-Ngwo, the area of focus, is located along latitude 6.4274° N, and longitude 7.4070° E in Enugu State, South Eastern Nigeria. it shares borders to the north with Abor, to the south with Nsude, to the west with Eké, and to the east with Niké. 9thMile Enugu-Ngwo is a major commercial nerve for Udi and Enugu North Local Government Area in Enugu State. Ngwo has a population of over 50,000 and the majority of its inhabitants are Igbos. It is a connecting point, between the northern and southern parts of the country. According to Ugwuanyi, Okafor, and Ezeokonkwo (2017), 9th Mile, Enugu-Ngwo has its highways, filled up both day and night, with buses and large trucks parking along the shoulders of the ramps and road intersections. Trucks are also parked along the ramps and in some cases, by the road sides to obtain road side services. This is potentially hazardous for the road users. They equally, impede free flow of traffic in the area hence, the need for a road service and support center within this location (plate 8).



Plate 8. 9th Mile, Enugu Ngwo, Enugu State Expressway lorry traffic and street side parking and servicing situations. Source: Obiadi (October 26, 2019).

The 9THMile, Enugu-Ngwo has two off ramps connecting the northern Nigeria through, Nsukka-Awka thoroughfare via the old Enugu-Onitsha Expressway and another connecting Awka-Enugu thoroughfare through the old Enugu-Onitsha Expressway. Both ramps connected 9th Mile, Enugu-Ngwo to the Expressway vis a major bridge. Formerly the area was used as a toll gate, with an average daily traffic volume of 4594 per day, according to Ugwuanyi, Okafor, and Ezeokonkwo (2017). 9th Mile, Enugu-Ngwo plays host to the Seven-up Bottling Company and the Nigerian Breweries Limited (NBL) plant. The Nigeria Bottling Company has a depot in the area, serving

as a major material handling and distribution plant for Southeast region of Nigeria as a result, attracts a lot of haulage vehicles. In addition to that, the area has more than four motor parks and over the years, has become increasingly popular among road users for the travelling road services that included, but not limited to food services, mechanical services and other commercial activities for the native communities around the area. The area's informal places for travelers to break their journey and get some rest gained attention with the erection of Toll-gate in the 1980s. This led to the roads been filled with buses, haulage trailers and Lorries of different kinds (Fig.9).



Figure 8. Illustration showing the Google earth image of 9th mile Ngwo former toll gate area. Source: Google earth retrieved, (2019).

The 9th Mile, Ngwo has over the years, grown into a major unstructured rest area for travellers returning from the northern parts of Nigeria or travellers heading to North. The area has become the hub, stopover center for both drivers and passengers alike. According to Mr. Nweke, a bread seller in the area, "the place is alive. It opens twenty-four hours a day and people come from Onitsha by 9pm to catch buses going to Abuja, Jos and anywhere, name it. Drivers come here to service their vehicles before embarking on their trips."

From interaction with most road users plying this axis indicates the frequent traffic snarls, gridlock and insecurity experienced within the area, which forces most journey to be prolonged or even aborted. This situation is even worse during festive period This is simply because of poor erection of shops and heavy traffic congestion in the axis, considering that most vehicles coming from the North, especially North-Central states heading to the South-East and South-South states usually ply the road. For decades, the traffic menace defied all solutions, including the knowledge and expertise in traffic management that the Federal Road Safety Corps (FRSC), personnel brought to bear in the area. At times, the situation would be hopeless and frustrating.



Plate 9. 9th Mile, Enugu Ngwo, Enugu State Expressway lorry traffic and street side parking and servicing situations. Source: Obiadi (October 26, 2019).

Part of the problem came from bad roads, commercialization of the roads by the communities, vehicle servicing stations by the road sides and the poor management of the roads by the road management agencies charged with the responsibility. According to Atuma (2018), with our poor road networks in Nigeria, travellers experience a lot of frustrations which included, broken down vehicles; traffic snarls and accidents, which sometimes abort their journeys. Atuma (2018), further indicated that, comfort is one of the basic requirements which is needed in a road service and support center, in other to ensure that vehicles, the drivers as well as the passengers have a soothing place to relieve themselves from the stress, frustration and boredom associated with long distance road travels and therefore is a means of solving the problem.

Conclusion

The world is changing and so should the socio-economic activities of all communities. In the interest of surviving, communities go to any length to survive especially, creating their economic base. People spatially create marketing and selling facilities anywhere they see space and when they keep selling, patronage grows. The increased patronage of road transportation for Long and short distance travels is heightening the occasion of roadside parking, in order to obtain services, and in most cases, travelers tend to patronise hawkers found around. Both the activities of hawkers and the presence of potholes causes traffic impediments and accidents on the highways. This has created a dangerous situation for the travelling public and vehicle operators, at 9th Mile Ngwo Enugu State, forcing them to drive beyond the mandatory hour of service, or the use of unsuitable and uncomfortable places in order to relieve themselves of the boredom, stress and fatigue accumulated from long distance travel. This

research therefore proffers an architectural solution towards providing a comfortable atmosphere, which seeks to cater for the passengers, vehicles and drivers alike, thereby discouraging road side parking and making the highway much safer.

Recommendations

The growth of road network systems in addition to the introduction of more suitable vehicles have created dangerous situations on the road for the travelling public and vehicle operators, forcing them to drive beyond the mandatory hour of service, or the use of unsuitable and uncomfortable places in order to relieve themselves of the boredom, stress and fatigue associated with long distance travels, as a result,

- This paper recommends for both the Enugu state and federal government to develop policies that would promote the development of road services and support centers, in all major highways in Nigeria as is the case in advanced world.
- In addition, the federal governments should develop policies that would regulate the driving hours for all public vehicle operators.
- Maintenance manual for all vehicles that ply the roads should be required and most importantly, the government should strictly institute mandatory training and sensitization programme for all road users. They should understand and know the consequences of lack of rest and problems associated with fatigue on the road and especially, on long distant travels.
- Road service centers should be developed and strategically located like earlier initiated and abandoned *toll gates* across the nation, this will encourage stopping and resting while travelling on the highways.

Authors' Recommended Models

This paper recommended the use of grade 1 category of rest area at 9th Mile, Enugu Ngwo because, it is located along a federal road. This model adopted the mixed oriented parking system of planning, where the major use area, is designed to be between the trailer park and smaller bus park. In this model, proper separation of parking was affected and the various requirements in terms of turning radius of the different vehicle size and type were taken into consideration and major use areas allowed for more pedestrian interaction between the building and outdoor spaces, limiting vehicular interference (figure 9 and plates 10 to 13).

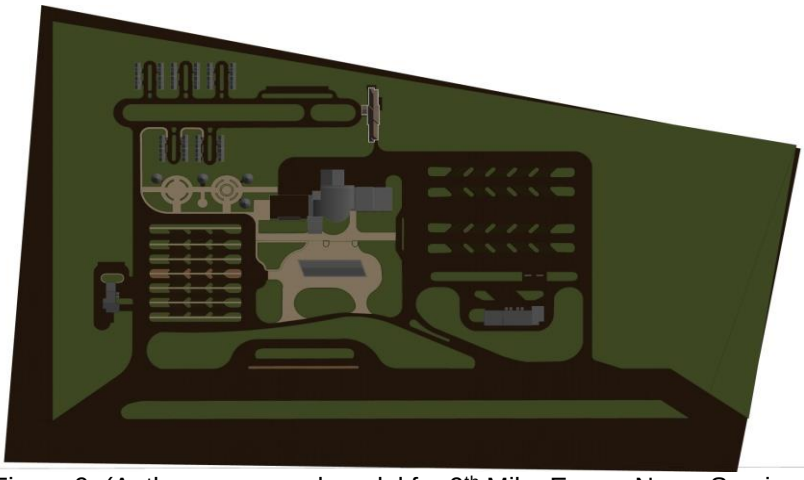


Figure 9. (Authors proposed model for 9th Mile, Enugu Ngwo Service Center, 2019)



Plate 10. (Authors proposed model for 9th Mile, Enugu Ngwo Service Center, 2019)



Plate 11. (Authors proposed model for 9th Mile, Enugu Ngwo Service Center, 2019).



Plate 12. (Authors proposed model for 9th Mile, Enugu Ngwo Service Center, 2019).



Plate 13. (Authors proposed model for 9th Mile, Enugu Ngwo Service Center, 2019).

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