LANDSCAPE DESIGN ON THE SIDES OF THE BAGHDAD-BABEL ROAD "AN APPLIED MODEL FOR A REST AREA

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ABSTRACT

The study was aimed to design the landscape on the sides of Baghdad-Babel road and landscaping the aspects of this section of the road length of 1 km, which represents the main entrance of the province of Babel, which is the municipality of Alexandria to achieve the strategy of beautiful roads through the appropriate selection of types of vegetation and emphasis on local species and adapted to environment and soil, which is one of the main factors in the conservation of vegetation on the sides of the roads, as well as the preparation of a design proposal for a rest area on the right side of the section of the road under study to an area of 270,14.108 m^2 is not intended for any future use, its currently used by drivers of heavy and medium vehicles and the regular vehicles and passengers while waiting at the entrance to the province of Babylon and provide an opportunity to reduce stress and fatigue on the driver and management of travel requirements and improve traffic safety by reducing traffic accident rates as a result of traffic density in this way.

Keywords: roadside iandscaping, planting roadside, rest area.
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تصميم المشهد الطبيعي على جوانب طريق بغداد – بابل " نموذج تطبيقي لمنطقة استراحة "

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المستخلص

هدفت الدراسة الى تصميم المشهد الطبيعي على جوانب طريق بغداد – بابل وتشجير جوانب هذا المقطع من الطريق البالغ طوله 1 كم والذي يمثل مدخل رئيس لمحافظة بابل والمتمثل ببلدية مدينة الاسكندرية من اجل تحقيق ستراتيجية الطرق الجميلة من خلال الاختيار المناسب لأنواع الغطاء النباتي والتأكيد على الانواع المحلية والمتكيفة مع البيئة والتربة والتي تعد من العوامل الرئيسة في الحفاظ على الغطاء النباتي على جوانب الطرق ، وكذلك اعداد مقترح تصميمي لمنطقة استراحة على الجانب الايمن من مقطع الطريق قيد الدراسة تصل مساحتها الى 270,14.108 م ^{2} غير مخصصة لاي استخدام مستقبلي لتستخدم من قبل سائقي المركبات الثقيلة والمتوسطة الحمل والمركبات العادية والمسافرين اثناء انتظارهم عند مدخل محافظة بابل وتهيئة فرصة لتقليل الاجهاد والتعب على السائق وادارة متطلبات السفر وتحسين السلامة المرورية من خلال تقليل معدلات الحوادث المرورية نتيجة لكثافة الزخم المروري الحاصل في هذا المقطع من الطريق.

الكلمات المفتاحية: تصميم المشهد الطبيعي لجوانب الطرق، تشجير جوانب الطرق، منطقة الاستراحة
البحث مستل من رسالة ماجستير الباحث الاول

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INTRODUCTION

Landscape design on the side of the roads is very important for achieving the beautification of roads strategy, which is intended to work jointly with architects, road engineers, landscaping designers and road workers, this strategy requires insight into the aspects of work on road projects and their components and preparation plans for the general and detailed design of road engineers, landscape engineers, and understanding the interrelationships between aesthetic, environmental aspects and traffic safety (14,18). The conservation of vegetation on the sides of the road requires an integrated effort of continuous planning and management to maintain plant communities without creating traffic problems and enhancing the recreational values of plants for road users, previous studies have shown that careful selection of vegetation types and emphasis on native species adapted to the local environment is a key factor that needs to be reviewed to improve the conservation status of vegetation on the sides of the road and the conservation of vegetation diversity is a very important issue in the management of the natural resources, which have received considerable attention and support from specialists, roads aspects are an appropriate environment for maintaining this diversity, reflecting increased interest of the local community and academics in roadside vegetation (2, 4,5,7, 6).The provision of rest areas for truck drivers and heavy vehicles is an integral part of the road regulation manual to reduce the fatigue and stress of the driver and reduce the rate of accidents ,as a result the demand for recreation areas increased significantly (22).Rest area on the Roadside are one of the most important elements of the highway design system, which provides convenience for travelers, drivers and travel requirements management to safely access various facilities and activities in the region(15). Interurban and urban entrances provide road users the opportunity to relax and plan to complete their journey (10 and 19). Many studies refer to the concept of rest areas, which is defined as a designated area on the highway which can be accessed; it gives the driver the opportunity to park his vehicle safely without obstructing traffic (12 ,17). the most important objectives of the roadside rest areas is to ensure the safety of the heavy vehicles driver and reduce the proportion of traffic accidents by reducing the fatigue and stress of the driver, and if the rest area on the sides of roads with attractive natural scenery, it will enhance the local area, however, if the roadside rest area inside city centers with a good local climate and recreational spaces, it will be a good opportunity to stop for shopping and buying goods (9). As for the importance of rest area on the sides of roads, it is basically a gateway to enter the region, state, city, a specific tourist area and may be the first point of contact between the driver of the vehicle and the passenger of the new area and it must be the first impression of the road has a positive, in addition the rest area provide information to the drivers of vehicles in relation to the attractions, residence, natural resources, cultural, historical, entertainment and other information about the region, as well it may contribute to reduce the rate of waste in road sides due to random stops of vehicles (13 , 24). Rest areas are classified according to the location of the recreation area, type of vehicles, type of use and the traffic volume, it is important to know the needs of drivers of heavy vehicles and other types of vehicles when classifying the types of rest area, it has been classified into recreation areas provided by the local government in city centers, tourist sites, commercial centers, historical sites. (9 , 28). One of the most important bases for the selection of rest area sites is the easy access to the site from the main road and the distance from the road so as not to disturb the passengers due to the noise of the vehicles and the glow of their lamps and be under supervision and control, in addition to the distinctive aesthetic features contribute to the attraction of the site such as elements of natural shading such as trees, shrubs and water sources such as rivers and streams (14 , 23).Planning a rest areas should take into account the ownership of the area before planning so that the responsibility is clear from the beginning in addition to obtaining official approvals and licenses, if the rest area is new land use, there may be a need for approval of the relevant government authority under local

planning as well as environmental licensing from the ministry of environment and it is necessary to prepare a formal work plan to study the financial and operational costs of financing the rest area and determine the equity capital for the purchase of land and engineering work and building utility facilities and maintenance costs and know the rate of traffic over the next 20 years and that the planning standards conform to the road engineering standards and have low maintenance costs, and allow easy reaching in a flexibly (29 , 17). The layout of the rest area structure was often influenced by the local conditions and the nature of the road in which it is located, therefore, there is no specific structure for the rest area, but there are certain foundations to be achieved in the rest area structure, including ensuring the safety of movement within the site and minimizing the collision potential between pedestrians and vehicles and ensuring the single flow of vehicles entering and stopping in the rest area, so that there is no reverse rotation of the heavy vehicles and the isolation of the rest area at a distance of not less than 7 - 8 m for the surrounding scenes may not be acceptable in the rest area limited in size and vegetation such as trees can help in separation, isolation and noise reduction (15, 22). The design of the rest area requires the efforts of a multidisciplinary team and expertise such as a professional civil engineer to design engineering components, ensure the application of engineering standards and laws, and architect to design structural elements and ensure their application of building codes and landscape designer to monitor the attractions of the site to the maximum extent (9). The design of the rest area is intended to promote the optimal use of leisure, entertainment and activities in the region, it does not mean providing detailed design to specific sites (12, 24). The study aims to design the natural landscape on the sides of Baghdad – Babel road and landscaping the aspects of this section of the road length of 1 km, which represents the main entrance of the province of Babel, the municipality of Alexandria to achieve the strategy of beautiful roads through the appropriate selection of types of vegetation and emphasis on local species and adapted with the environment and soil, which is one of the main factors in the conservation of vegetation on the sides of the roads, as well as the preparation of a design proposal for rest area on the right side of the road under study to an estimated area of 270,14.108 m^2, is not dedicated to any future use served by drivers of heavy, medium vehicles and passengers vehicles while waiting at the entrance to the province of Babel and provide an opportunity to reduce stress and fatigue on the driver and management of travel requirements and improve traffic safety by reducing traffic accidents due to the traffic density in this road.

METRIALS AND METHODS

Study site

The road Baghdad - Babel center towards Karbala is of great importance because it connects the capital with the governorates of the center and south, in addition to its importance in terms of religious tourism to Karbala and Najaf, as well as the commercial importance of the road for its intensive use by heavy and medium-load vehicles for transporting goods between governorates. The presence of industrial companies neighboring the road such as the automobile industry in Alexandria and the mechanical company for agricultural products and thermal and gas power plants, which increased the importance of the road and increase the traffic volume and it is intensively use.

Landscape Design of Roadside

Despite the urgent need to create roads characterized by attractive aesthetic scene, but there is no specific formula or method, because the design of roads depends on the nature of the site and the expertise and skill available to the specialists of the planning and design and implementation of the road project, methodology used in the landscape design of the road means a set of stages of during which decisions can be made on the road project. (14).

Information gathering stage

At this stage, the master plan of the Municipality of Alexandria, the "Study Area" and the GIS map (Figure 1) were obtained from the design division of the Municipality. The cross sections of roads, main streets and roadsides were obtained inside and outside the Alexandria city. The dimensions of the cross

section of the paved streets within the city 40 m including the medians and sidewalks and roadside dedicated to afforestation, the dimensions of the cross-section of the paved streets outside the city 150 m, including the median and the sidewalks and roadside for landscaping.

RESULTS AND DISCUSSION

Analysis of the studied road sections

Analysis of the road sections often based on different functions and features of its adjacent that may affect the structure of the road and use it as a basis in the other design steps. The details of the road sections are signed after a field survey, (Figure 2). A realistic plan for the road under study.

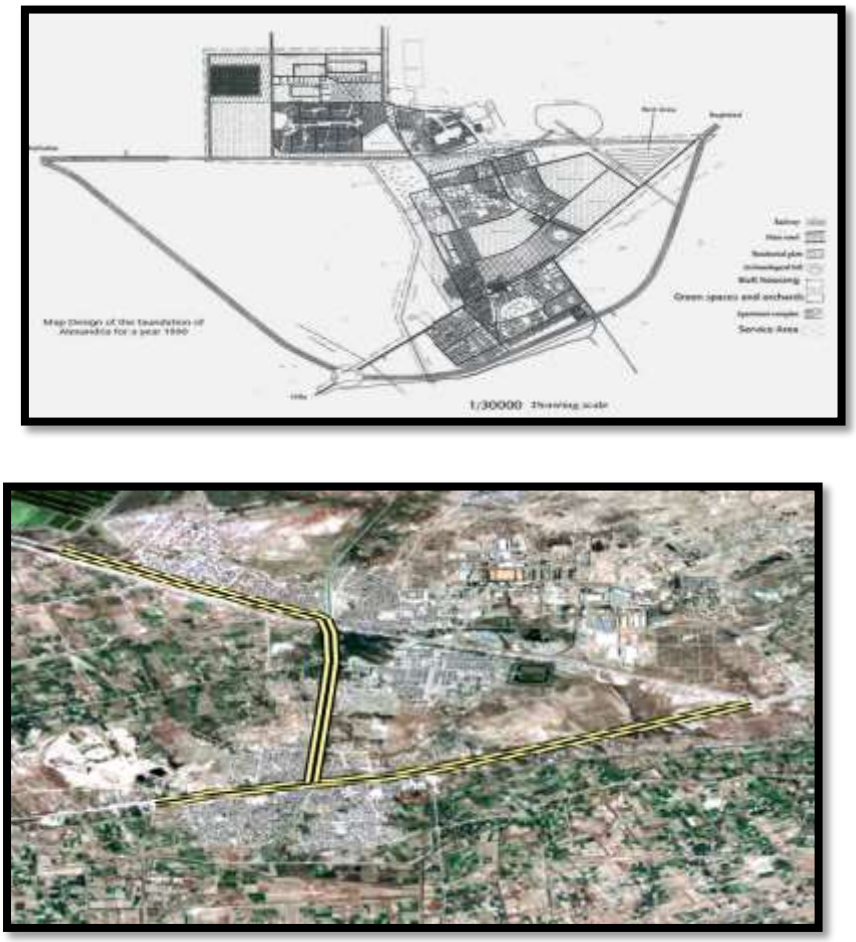

Figure 1. Master plan and GIS map for the city of Alexandria Study area: Source - Division of Urban Planning - Municipality of Alexandria

Description of road section

The length of the road section is 1 km, it is the main arterial road. It represents the main entrance to Babel Governorate. It starts with "Al-Salam" bridge that connects municipality of Latifia which is return of the province of Baghdad and the municipality of Alexandria which is return of the province of Babel. One of the most important features of this road is the railway leading to the southern provinces and down to Basra province, as well as the high-pressure line of electricity and distributed residential units and motor vehicles establishment. This section of the road was characterized by traffic congestion of heavy and medium load vehicles carrying goods between the province of Baghdad and central region governorate. (Figure 2) showing a section of the road map under study.

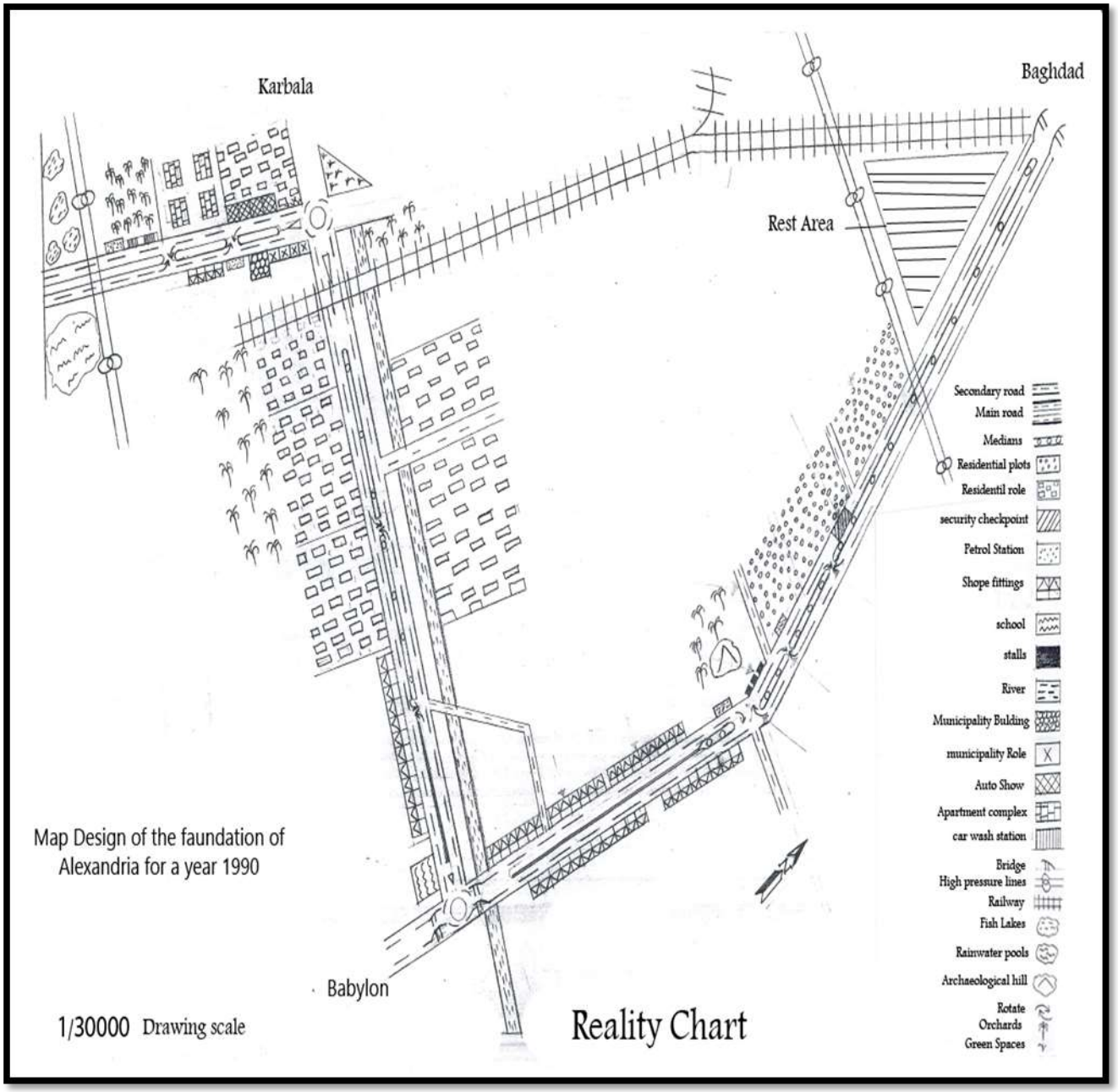

Figure 2. Plan of the reality - prepared by the researcher based on the master plan for the city of Alexandria

The design proposal for road section

This phase aims to the interaction between the results of the analysis of the reality of the road section under study and its adjacent features with the surrounding environment to reach a preliminary design proposal, which would develop the design of the landscape on both sides of the section and commensurate with its importance and function. The field survey showed that the section of the road needs to be paved with a curbstone to determine the edge of the paved area of the road. This will improve the safety level by guiding the drivers to the driving area which reduces the possibility of the vehicle coming out of the road as well as the separation between the road and pedestrian sidewalk, which also provides better traffic (29). In terms of road landscape design aspects, it is better to choose suitable plants to the local environment and climate as well as resistance to diseases and pests in the region and suitability for functional and aesthetic purposes in terms of the typical shape and height of at least 2 m and its ability to shading when they reach the final stage of coverage and few maintenance requirements a, especially the medians (23, 26, 28).Before selecting the forestation plan, it is necessary to emphasize the places and depths of the utility lines - furnishing the road. If the facilities are

located at a shallow depth of 30 cm - 1 m, it is recommended to plant shrubs and cover plants in these areas. Planting trees was allowed if the facilities are located at depth more than 1 meter depends on the type of tree (11). Table 1 shows the suitable plants for the planting of the sides of the road. The bushes of *Cassia glauca* were chosen to planting the sides of this section, which is an evergreen shrub with bright golden clusters of flowers from early spring to late autumn. The final plant height reaches 4 m and its final spread is approximately 5 m. Cultivation ranges between 5 - 7 m as well as the cultivation of perennial herbaceous plants in beds 1.5 x 1.5 cm and 15 cm deep around the a Cacia tree trunks. As for the coordination of the natural landscape of the 8 meter median along the 1 km road section, it is preferred to be planted with trees with high trunk and high branch, which does not impede the movement of pedestrians and the visibility of motorists, and that the length of the stem is not less than 3 - 4 m and the size of the final size of tree (height and spread with median widths such as date palm trees, *Phoenix dactylifera* and *Washingtonia filfera* (6 , 25) spaces of planting 8 - 10 m and cultivation of ground of median with turf grass plants.

Table 1. Suitable plants for planting roadside

N	The scientific name	Nature of growth	Height(m)	Spread(m)
		Shrubs and Trees		
1	*A lbizia lebbeck*	D	12-25	12-18
2	*Acacia cyanophylla*	E	5.5	2-3
3	*Alstonia macrophylla*	D	30	5
4	*Azadirachta indica*	E	15-20	20
5	*Bauhinia purprea*	D	5	5.3
6	*Bauhinia acuminate*	D	3	
7	*Bombax ceiba*	D	30	12
8	*Bougainvillea spectabilis*	D	4-12	
9	*Caesalpinia pulcherrima*	D	3	
10	*Callistemon lanceolatus*	E	2-5	4-6
11	*Cassia artemisoides*	E	3	1.5
12	*Cassia glauca*	E	4	3
13	*Cordia myxa*	d	3	1-1.5
14	*Ceratonia siliqua*	E	4-10	5-8
15	*Conocarpus erectus*	E	4-20	21
16	*Cupressus arizonica*	E	15	2-4
17	*Duranta plumeri*	E	6	3-3.5
18	*Ficus nitida*	E	23	15
19	*Ficus relegiosa*	D	30	8-12
20	*Hibiscus rosa – sinensis*	E	2-4	CM80 30-
21	*Thevetia nereifolia*	E	2-6	3.5
22	*Lantana camara*	E	2	
23	*Melia azedarach*	D	16	4-6.5
24	*Neruim oleander*	E	2-6	2.5-5
25	*Phoenix canariensis*	E	10-20	4-6
26	*Phoenix dactylifera*	E	21-23	3-7
27	*Olea europea*	E	8-15	7-15
28	*Salix babylonica*	D	20-25	
29	*Schinus molle*	E	15	21.5
30	*Tectona grandis*	E	30	4-6
31	*Washingtonia filifera*	E	20-30	7-15

	Herbaceous Flowers		
32	***Catharanthus roseus***		**CM1 50-**
33	***Chrysanthemum morifolium***	**---**	**25-30**
34	***Dianthus caryophyllus***	**---**	**30-35**
35	***Gazania splendens***	**---**	**20-50cm**
36	***Gerbera jamesonii***	**---**	**30cm**
37	***Pelarigonium grandifloum***	**---**	**0.75 cm**
38	***Pelarigonium odoratisum***	**---**	**60cm**
39	***Salvia splendens***	**---**	**20cm**
40	***Verbena bonariensis***	**---**	**90cm**
41	***Viola odorata***	**--**	**90cm**
42	***Viola odorata***	**----**	**5-15 CM**
43	***Amaranthus tricolor***		**90**
44	***Callistephus chinensis***	**---**	**20-100**
45	***Celosia plumosa***	**---**	**60**
46	***Dahlia rosea***	**---**	**30**
47	***Euphorbia heterophylla***	**---**	**30-60**
48	***Gomphrena globoa***	**----**	**30cm**
49	***Mirabilis jalapa***	**----**	**2m**
50	***Tagetes erecta***	**---**	**30-110CM**
51	***Tagetes Patula***	**----**	**50cm**
52	***Zinnia elegans***	**----**	**30-76cm**
53	***Adonis autumnalis***		**10-25cm**
54	***Althaea rosea***	**---**	**240cm**
55	***Antirrhinum majus***	**---**	**50-100cm**
56	***Calendula offinalis***	**---**	**80cm**
57	***Centaurea cyanus***	**---**	**40-90cm**
58	***Cheiranthus allionii***	**----**	**10-18cm**
59	***Linaria marocana***	**---**	**50cm**
60	***Tropaeolum majus***	**---**	**170cm**
61	***Verbena hybrida***	**---**	**75-150cm**

(AL-Chalabi and AL-kyhiat, 2013, AL-Fatlawi and Jasim, 2019, Jasim and Kamel, 2017, AL-Bawi and Jasim, 2016, Sabri and Abdel-Latife, 2017, Jawad and Majeed, 2017) where H means height, S means spread

As for the area allocated for road furniture, the elements of the road furniture should be simple designs, attractive and made of durable materials that withstand different weather conditions and are consistent with the general nature of the area and the appeal of the landscape; furniture elements include lighting and signs. As a result of the field survey of the study site, area of land located on the right side of the section of the road reaching an area of about 270,14.108 m^2 (figure 2).Through inquiry from the concerned authorities indicate not be earmarked for any future use and its ownership of the state and due to the proximity of this area of the checkpoint for the entrance of northern Babylon and the main traffic for the province to transport various goods to the provinces of the center and south in addition to proximity to industrial companies and increase traffic volume as a result of ongoing visits to religious shrines, has become this section is suffering from obstruction of vehicle stopped for a long period , so the study suggested to take advantage of this specialization proposed an a rest area be used for drivers of heavy and medium vehicles and passengers while waiting, as one of the most important elements of the infrastructure of the highway systems, which provide an opportunity for passengers and drivers to stop and rest and management of travel requirements and access to various facilities in the region. In view of the previous paragraph on rest area, one of the most important design requirements is the accessibility of the main road, since the rest area under study is double- use for drivers of heavy and medium-load vehicles and passenger vehicles for various purposes. It is necessary to meet all the needs of the vehicles used for the area in terms of parking spaces for the various vehicles and provide shading for parking spaces as natural shading elements such as trees, shrubs and attractions as a source of water, such as fountains, and emphasis on identifying the areas of picnic for the convenience of the users and signed near the shady places, these areas should preferably be complemented the scheme of rest. As for the fencing of the recreation area, it is better to protect the area from the effects of vehicles, noise and protection of the wind and sunlight and provide natural shade and demarcation of

its borders, making it safer. For the plants used in the rest area should emphasize the local identity of the road environment. Figure (3) illustrate the proposal landscape design of the section under study.

Figure 3. illustrates the proposal landscape design of the section under study

Figure 4. 3D- Proposal Landscape Design of the Rest Area

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