

I. INTRODUCTION

A. BACKGROUND OF THE STUDY

Manila being the capital of the Philippines is one of the busiest cities in the country. One of the primary reasons is because of its tourism industry. Hotel accommodations are plenty and so are the restaurants and tourist spots. Tourists who come here are not only limited to foreigners but also caters to local tourists.

Maps are very useful and informative. It can be a source of information for a particular place and location. With this in mind, maps can be very helpful and functional for tourists who either want to explore the place or who simply want to satisfy their thirst for information about the place.

We are now in the era of the Information Age where information is “just a click away”. Through the advancements of technology, storing and retrieving data on computers is made possible. Scalar Vector Graphics is one of the tools for making the acquisition, storage and retrieval of data achievable.

Currently, web maps on the city of Manila are a few. And if they do exist, they are presented only as static pictures. Another thing to consider is that these existing web maps only display a limited view of the city since it only reveals a rough outline of the city.

B. STATEMENT OF THE PROBLEM

The city of manila contains a lot of cultural sites, hotels, landmarks, shopping and dining areas. Due to the number of places one could visit, one could encounter the difficulty of choosing the place to visit and of finding its location. Navigation is extremely important especially if one is unfamiliar with the place. At present, there is a lack of online maps of the city of Manila that provide informative details such as the name of the establishment, description, website links and pictures of the specific place in the map. A visual representation could help prospective tourists to familiarize themselves about the city.

With this vision in mind, the author proposes to make a dynamic map of the city of Manila using the Scalar Vector Graphics.

C. OBJECTIVES OF THE STUDY

To build a dynamic web-map of tourist establishments of the city of Manila implemented through Scalar Vector Graphics with the following capabilities:

- a. The web map would be able to display different map structures through the use of color schemes and layering.
- b. Display information about a map structure
- c. Ability to zoom in to street level and zoom out to district level depending on user query and view choice
- d. The System Administrator can add, edit, delete map structures (site types such as cultural site, church, hotel, restaurant etc.) as well as the corresponding map properties (structure name, site type, district, subdistrict, street, description, website links, picture).

D. SIGNIFICANCE OF THE STUDY

By making a dynamic web map of the city of Manila, this would greatly benefit the tourism industry. Information can readily be accessed through the Internet which means more people can look for the needed information. This information could help boost our city by showing what it can offer for tourists in form of cultural sites, accommodation, dining and shopping places. Information regarding specific sites such as hotels and restaurants will also be shown adding more knowledge and acquaintance on the place. This would be to their advantage since it would create interest among tourists when their place is advertised on the map.

All these information would prove helpful and at the same time informative to anybody who is interested in exploring the city.

E. SCOPE AND LIMITATIONS

The project will focus on the Manila area only. It will display two primary features – map structures and map properties. Map structures are defined as the establishment types such as landmarks, hotels, and the shopping and dining areas in the city. Map properties refer to the name and description of the place, its website links and pictures referring to the specific map property under consideration.

Adding or deleting map structures in the System Level will also be included in this project. Adding or deleting streets in the map itself are not allowed. It would also be possible to do modifications on map properties.

The system assumes that the information entered by the System Administrator as far as street information is concerned is correct. There is no way to check if the street entered corresponds to the right position in the map since street paths are not defined in the map.

II. REVIEW OF RELATED LITERATURE

'Ortigas Online: A World Wide Web Based Business Information System' is a system that was designed by Daryl Nilo Bentillo during March 1998. The system was implemented using Hypertext Markup Language and Java. The application has an interactive map that can be zoomed in and out. It has a database that stores the establishments in an area as well as its corresponding information about it such as e-mail address, phone numbers, bit images, brief descriptions of establishments and street location. The database is in the form of a rtext file. The user is allowed to query the data.[1]

Andre Winter's thematic map of Europe in the <http://www.carto.net/papers/svg/eu/oeccdatlas.html>. His work features different diagrams dynamically generated using Scalar Vector Graphics. It presented the different countries of Europe. Depending on the type of rendition of map, textures to symbolize land feature or inland rivers can be shown. Information about a specific country and calculation-time diagrams also appear by clicking on the menu. Data was embedded in a javascript array.[2]

In the carthography site in http://www.carto.net/papers/svg/animated_bustrack_e.html titled Animated Bustrack, a map using Scalar Vector Graphics simulated a bus-track routing navigation system. It used SVG animation and incorporated SVG features which simulated acceleration and deceleration effects. The path that the bus takes was depicted by a moving red line. [3]

Michael Clark et al in "GIS Application For Redistricting in the State of Texas" wrote the project in AML and C code. It featured updated school boundaries, voter tabulation districts and precinct coverages. It was designed for the user to customize the map by choosing a specific map for production and able to show specific features in the map. [4]

Chua et al in "Baguio Geographical Information System" developed a system that aims to assist tourists while visiting Baguio. It relates geographical features with data from a tourist information system. The system also provides a route from current location to the desired location. Hotels and Inns were the primary sites used. The project was done with the support and cooperation of the Department of Tourism to help promote tourism in Baguio City.[5]

The 'St. Charles City-County Library District Geographical Information System' is located at ,Middendorf-Kredell Library, 2750 Hwy. K, O'Fallon, Mo. Users have to make an appointment with the GIS/Government Documents Librarian Anna Sylvan before using the system. Available data includes : a.)Demographic Data – general population, age, education and employment, households, housing units, income by family, income by households, race; b.)Physical Data – floodplain, hydrographic, land use, municipal database, road network, satellite image, soils, topography; c.)Country Zoning – Zoning Map; d.) Country Summary – agricultural highlights, farm highlights, farm income and expenses, demographic summary, demographic trend, migration trend, economic profile, environmental profile; and e.) Business – St.Charles County 1998 Business Database. Information is displayed in the map of St. Charles County. Data displayed depends upon user query. Different types of information are displayed in different colors. The color allows the user to distinguish between different types of data.[6]

III. THEORETICAL FRAMEWORK

Information Systems

Information systems are systems that is either automated or manual, that comprises people, machine , and/or methods organized to collect, process, transmit, and disseminate data that represent user information. [7] In this kind of system, data is considered as a sampled view of the world. Functions operate on these data. The users in turn, interact with the system through the functions. [8]

Information systems were built to interact with people, to support and improve day to day operations and support problem-solving and decision-making needs of management. [9] In this era of the information age, information systems are fast becoming a necessity. Information is very important. Moreso, using, storing and retrieving correct information is also extremely important. With the advent of technology, information systems have also grown and developed. Newer systems include Geographic Information Systems which uses spatial data to retrieve and store information.

Geographical Information Systems

GIS stands for Geographical Information System. It is a very new field which combines the use of geographical features with tabular data to solve problems. According to the site, <http://www.gislounge.com/library/introgis.shtml>, the GIS field began in the 1960's when people realized that maps could be programmed using codes which could be stored in a computer. The stored data can be used for future modifications of the system created. The history of GIS can be traced back to cartography where maps where drawn meticulously to its details. The simple lines that where used to define land boundaries evolved to become the spatial features that we see in GIS maps today. GIS has long evolved from its early beginnings from cartography. It allows maps to be produced in a quicker and easier way. It follows a digital format which allows complex analysis, simulations and modeling of land features and situations in order to solve real-world problems. This new technology was not available before. GIS defines two types of data that it can

store – spatial data and attribute data. Spatial data represents data based on its spatial location like for example a park. In contrast, attribute data is the additional data about it. So for instance, additional information about the park would be the name of the park, the area it covers, no. of visitors and so on. [10]

Scalar Vector Graphics

Scalable Vector Graphics is a new language that describes two dimensional graphics in Extensible Mark-Up Language. Graphical objects such as vector graphic shapes, images and text can be used. It can be transformed, grouped, or styled into previously depicted objects. One of its features is its being dynamic. This means, SVG is also suited for animations and simulations. This can be done either by embedding SVG objects or for more complex ones, be assisted by scripting languages. This is done by accessing SVG DOM (Document Object Model) which contains access to its elements, properties and attributes. SVG is compatible to the W3C standard which makes it more appealing and powerful for web applications. [11]

SVG is in vector format and has many advantages over other image formats primarily over raster-based graphics such as JPEG and GIF which is the most common graphic formats used today in the Web. Vector formats are made of curves and lines which gives flexibility. Raster based graphics, on the other hand, are made of pixels. This means that SVG graphics can be printed or viewed in any high quality resolution. The details and the quality of the image is not destroyed compared to raster-based images which suffers from the “staircase effect” if it is zoomed in or printed at a higher resolution. SVG text can also be searchable and selectable. For instance, city names in the map can be searched. It also offers more complex interactive and dynamic graphics compared to Flash and bitmapped. Another advantage is its being an open standard as SVG is not proprietary. By being written in XML, SVG builds on this strong foundation and gains many advantages such as a sound basis for internationalization, powerful structuring capability, an object model, and so on. By building on existing, cleanly-implemented specifications, XML-based

grammars are open to implementation without a huge reverse engineering effort. SVG can be a stand-alone or xwork with an XML namespace. [12]

Graphics made on SVG is smaller in size compared to jpeg graphics which makes it easier to store as it consumes less space. Additionally, it is also easier to download. SVG can also respond to user's actions such as highlighting, animations and the like. SVG is entirely XML based providing several advantages for developers and users. And since XML is more powerful than HTML, the need to make and develop powerful web pages using SVG as a tool would be a great advantage. Likewise, SVG similar to XML is text based. It can be integrated in an HTML format, can be indexed by search engines and works well in any given platform. SVG can be run by scripts and also supports Document Object Model (DOM). [13]

Adobe has incorporated the W3C standard SVG format in one of their product lines. This would enable a new creation of dynamic, information-rich graphics to be made. Adobe will continue to promote SVG content, educational material, tools and player development. In their website, they also posted demos made through the use of their product, ADOBE SVG. [14]

Tourism in Manila

Manila is the capital of the Philippines. It is a city of 12 million person-strong that occupies 636 sq km. Most tourists see Manila nothing more as an entry point to other more interesting rural destinations that the Philippines can offer. But there is more to the city than meets the eye. [15]

According to the Department of Tourism (DoT), some 1.797 million foreign visitors visited the Philippines in 2001, down from 1.992 million in 2000 and 2.2 million in 1999. In particular, the country received 447,921 tourists from North America (US and Canada); 790,793 from East Asia (Japan, Korea, Taiwan, China); 199,345 from Europe; 80,002 from Australia and the Pacific; and 278,832 from other countries in 2001. Average occupancy rate in Metro Manila hotels was placed at 55.8 percent. As of December 2001, Metro Manila had a combined 11,784 rooms in 59 hotels

classified as deluxe, first class, standard, and economy. Average length of stay by each visitor in Metro Manila hotels was 2.73 nights. [16]

Metro Manila is one big gastronomic trip of many cuisines. In Intramuros is Illustrado Restaurant with its colonial ambiance and Spanish provincial cuisine. The old Malate district, with Remedios Circle at its core, is the favorite watering hole of artists, designers and the café society who are only too willing to try the varied international flavors offered by the many restaurants in the area. Authentic Chinese cuisine can be had at the old financial district of Binondo. [17]

Churches, museums and theatres vie for the attentions of history and culture buffs. Malls, boutiques, flea markets and antique shops offer endless surprises for shoppers and souvenir-hunters. Posh restaurants and sidewalk eateries entice gastronomic adventurers. Snazzy discos and cozy bars entertain the night owl. Golfing greens, country clubs and accessible out-of-town resorts provide recreation and relaxation for all. And everywhere, a friendly, festive people who smile readily, adore music and love to welcome visitors with their world-famous brand of hospitality. First-class hotels and restaurants attract diners with performances by local pop artists, folk dance troupes, string quartets and jazz bands. Theater and repertory acts, classical concerts and ballet performances cater to the well dressed set who frequent the Cultural Center of the Philippines, the Manila Metropolitan Theater, the Repertory Theater at Shangri-La Plaza and other theaters throughout the city. [18]

DEFINITION OF TERMS

1. SVG – stands for Scalable Vector Graphics. It allows the use of text, vectors and images for graphics.
2. GIS – stands for Geographic Information System. It combines graphical features combined with tabular data for solving real-world problems. It is raster based meaning information is stored per pixel.
3. Map structure – refers to the objects in the map represented as the tourist spots. These are the different site types.
4. Map property – refers to the information regarding the map structure. This includes the structure name, site type, district, subdistrict, street, description, website and picture.

IV. DESIGN AND IMPLEMENTATION

Existing Set Up

The Department of Tourism is responsible for promoting tourism in our country. They have launched their own website, <http://www.wowphilippines.com.ph>, which showcases the different tourist spots in our country today. [19] It also includes travel packages, trivia and travel articles. Through this, a greater number of audiences can be reached since information can readily be accessed through the Internet. Printed brochures showing the map of the city of Manila is given freely when one visit the Department of Tourism in Kalaw St. in Ermita. They also distribute the different brochures to different hotels and tourist spots to help promote the place. Commercials on tv also help in promoting the place to the people. Inquiring about a certain place is done also through the use of phone calls. The present set up can be further developed if they would be able to provide an interactive map that a user can use to search for information and location of that place. In this manner, potential tourists can also be generated.

The Web-Map System that is being proposed in this project would be able to display the location of the establishment and also provide information regarding that place. The system would be using five interacting tables indicated in the Entity-Relationship Diagram in Figure 1. The main table struct contains the map properties information. It has a link to the pictures table where the picture files are stored. The information regarding establishment type, district, subdistrict, street and barangay are stored in their own separate tables.

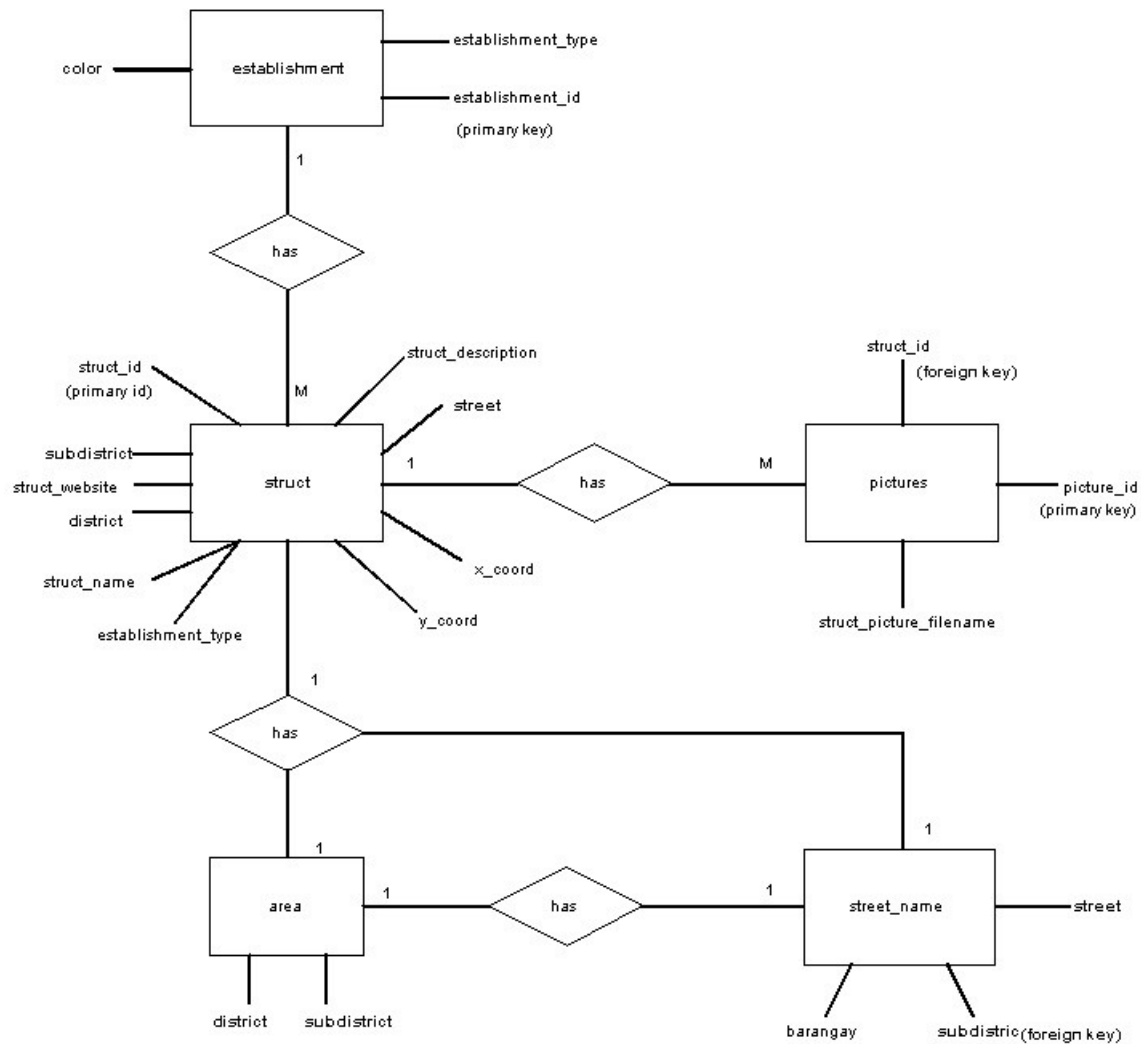


Figure 1. Entity-Relations Diagram, A Dynamic Web-Map of Tourist Establishments of the City of Manila

The two main users namely the User and the System Administrators interacts with the Web-Map System as illustrated in the Context Diagram as seen in Figure 2. The system stores and retrieves information regarding map properties from its database.

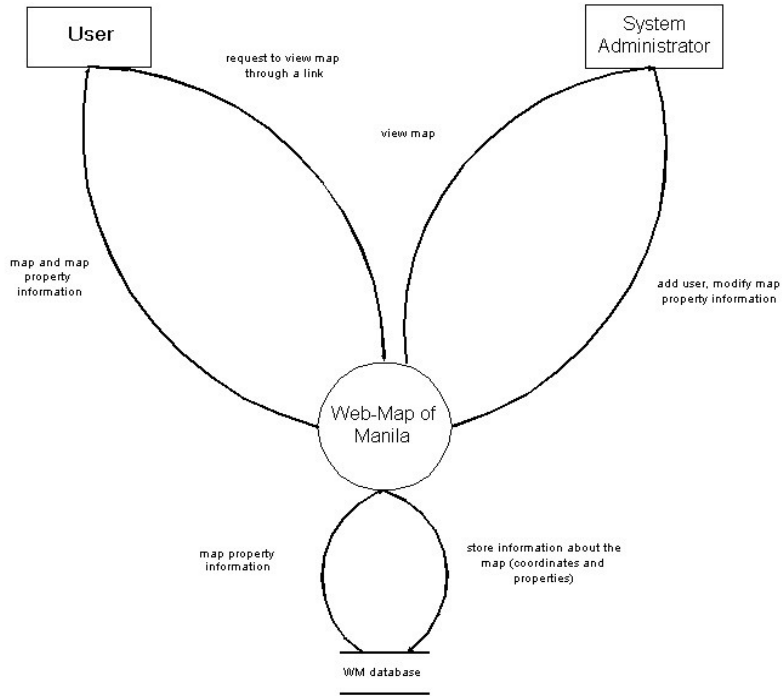


Figure 2. Context Diagram, A Dynamic Web-Map of Tourist Establishments of the City of Manila

The Conceptual Framework displays the general flow of the system as illustrated in Figure 3. The User can only view the map while the System Administrator has access to other functions such as adding, updating and viewing the map.

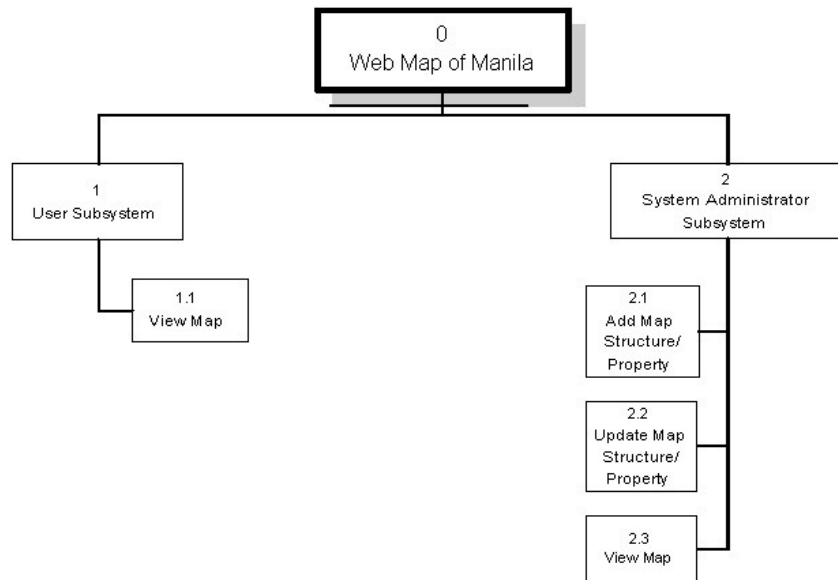


Figure 3. Conceptual Framework, A Dynamic Web-Map of Tourist Establishments of the City of Manila

Figure 4 shows what the specific users can do in the system. The User will be able to view the said map. Querying on the data can be done to display only the needed information at that time. The System Administrator, in contrast, has access to other functions as well. Because of this, security is important. A user name and password will be needed to maintain security and integrity of database data.

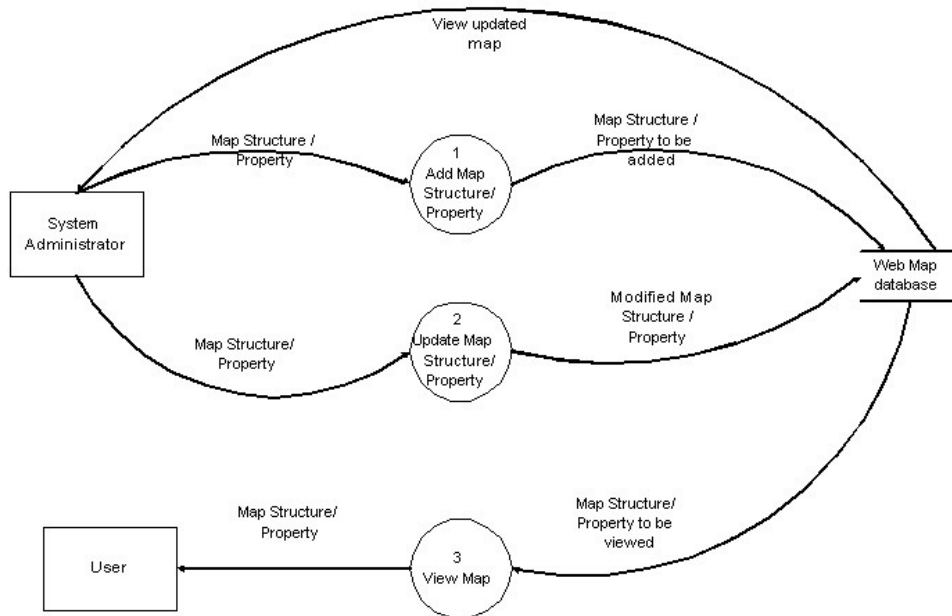


Figure 4. Top Level Data Flow Diagram, A Dynamic Web-Map of Tourist Establishments of the City of Manila

The subexplosion of the add process is seen in Figure 5. The System Administrator should first identify the location of the establishment to be added. Then, he can proceed filling the forms.

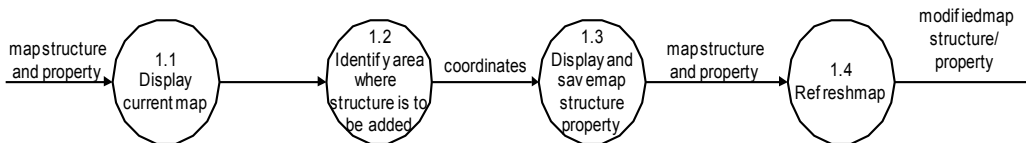


Figure 5. Subexplosion of Process Add Map Structure/Property, A Dynamic Web of Tourist Establishments of the City of Manila

Figure 6 shows the subexplosion of the update process. The System Administrator can select the way how he chooses to view the map. Upon identifying and viewing the establishment to be updated, the System Administrator can either edit or delete the map structure and property.

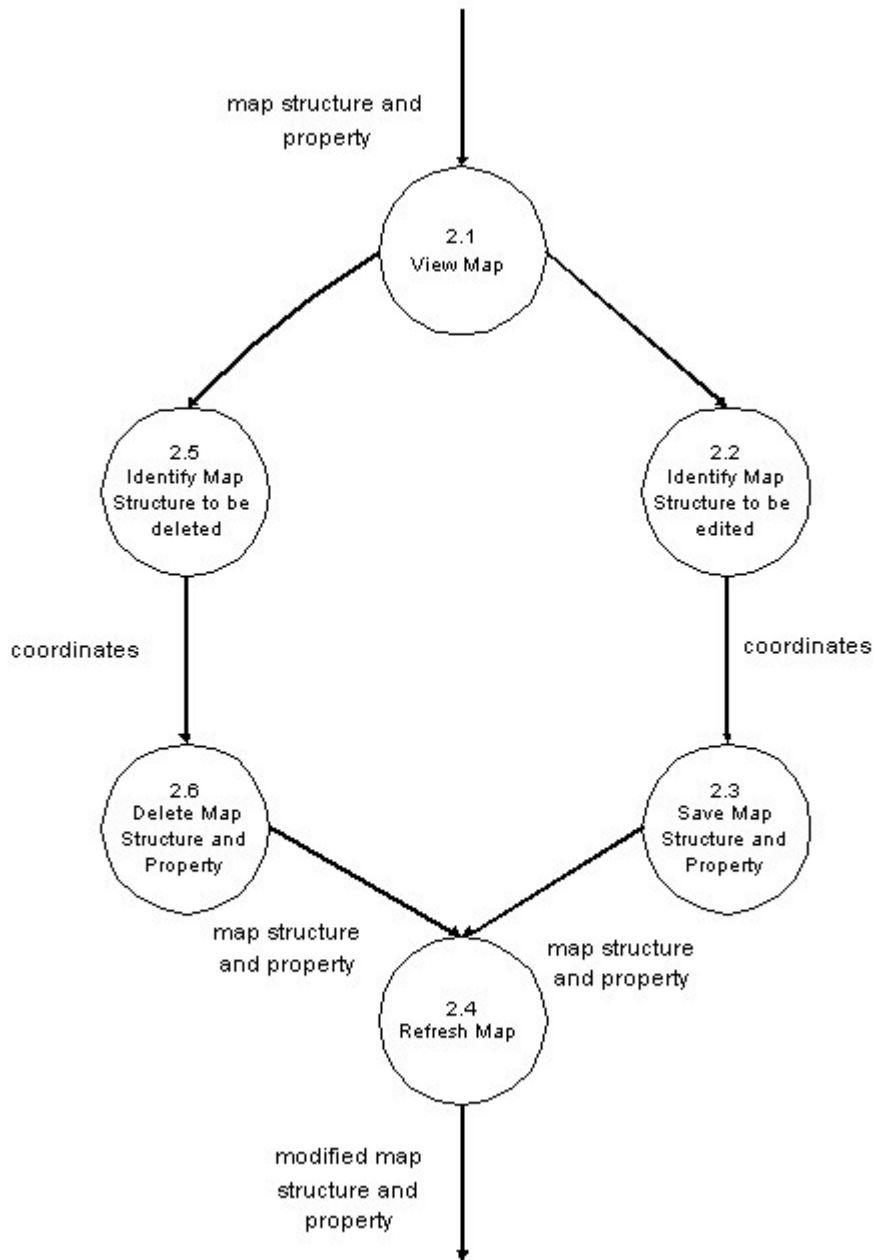


Figure 6. Subexplosion of Process Update Map Structure/Property, A Dynamic Web of Tourist Establishments of the City of Manila

The subexplosion of the view process is seen in Figure 7. The map can be viewed by establishment name, site type, by street name, by district, by subdistrict, and by barangay to finally display the filtered map which will display information depending on the user query.

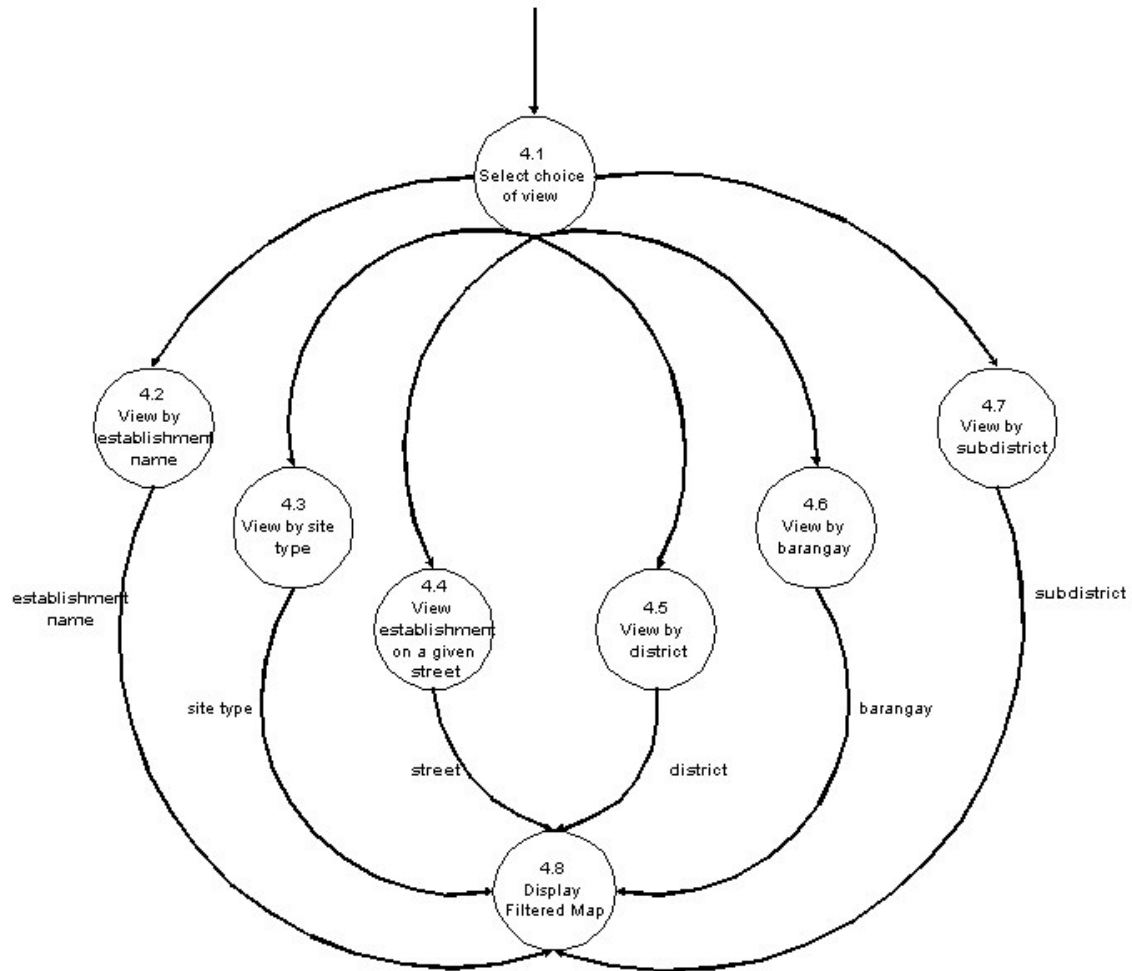


Figure 7. Subexplosion of Process View Map Property/Structure, A Dynamic Web of Tourist Establishments of the City of Manila

The Data Design table shows the names of the database tables under the Implementation Model and their corresponding implementation in the system. This information is listed in Table 1.

Table 1. Data Design, A Dynamic Web of Tourist Establishments of the City of Manila

System Model	Implementation Model
1. System Administrator	1. admin
2. Map Structures & Properties	2. struct
3. Pictures	3. pictures
4. List of Districts and Subdistricts	4. area
5. List of Establishments	5. establishment
6. List of Street Names	6. street_names

The Database Dictionary in Table 2 shows the database table names and their corresponding fields and data types. The database, TouristMap, consists of six (6) tables: admin, struct, pictures, area, establishment and street_names. The admin table consists of **username** and password which will be used to verify the validity of the System Administrator of the Administrator. The struct table is the main table in the database. It holds the map structure and map properties information. Its fields are **struct_id**, struct_name, establishment_type, x_coord, y_coord, struct_description, street, district, subdistrict and struct_website. The pictures table contains all the pictures of the establishment made. It includes **struct_id**, picture_id and **struct_picture_filename**. The area table contains the list of all the subdistricts and districts in the map. It has two fields, subdistrict and district. The establishment table holds the list of establishment types and their corresponding color. Its fields are **establishment_id**, establishment_type and color. The table street_names contains the different street names and their corresponding subdistrict and barangay. Its fields are street, subdistrict and barangay.

Table 2. Data Dictionary, A Dynamic Web of Tourist Establishments of the City of Manila

Table Name	Element	Type
admin	username password	varchar varchar
struct	struct_id struct_name establishment_type x_coord y_coord struct_description street district subdistrict struct_website	int varchar varchar float float text varchar varchar varchar varchar
pictures	struct_id picture_id struct_picture_filename	int int text
area	subdistrict district	varchar varchar
establishment	establishment_id establishment_type color	int varchar varchar
street_names	street subdistrict barangay	varchar varchar varchar

TECHNICAL ARCHITECTURE

To implement the program, the minimum configuration of the hardware of the computer on which the system will run is a Pentium III processor or its equivalent with a minimum requirement of Windows 95 as the Operating System. It is also recommended to have an excellent Video card such as NVIDIA GeForce2 MX 100/200 and a colored monitor in order to use and view the map to its full potential. It is also recommended that computer memory should be at least 128 MB. A browser preferably Internet Explorer 5 is also required for SVG compliancy.

The computer must also have a modem, a telephone line, and an internet connection. The System Administrator must have an account in the Web-Map of the City of Manila to be able to access the system.

V. RESULTS

The output is a web-based dynamic web-map of the city of Manila complete with its documentation. As the User enters the system, he is led towards the home page with a link to view the map as shown in Figure 8.

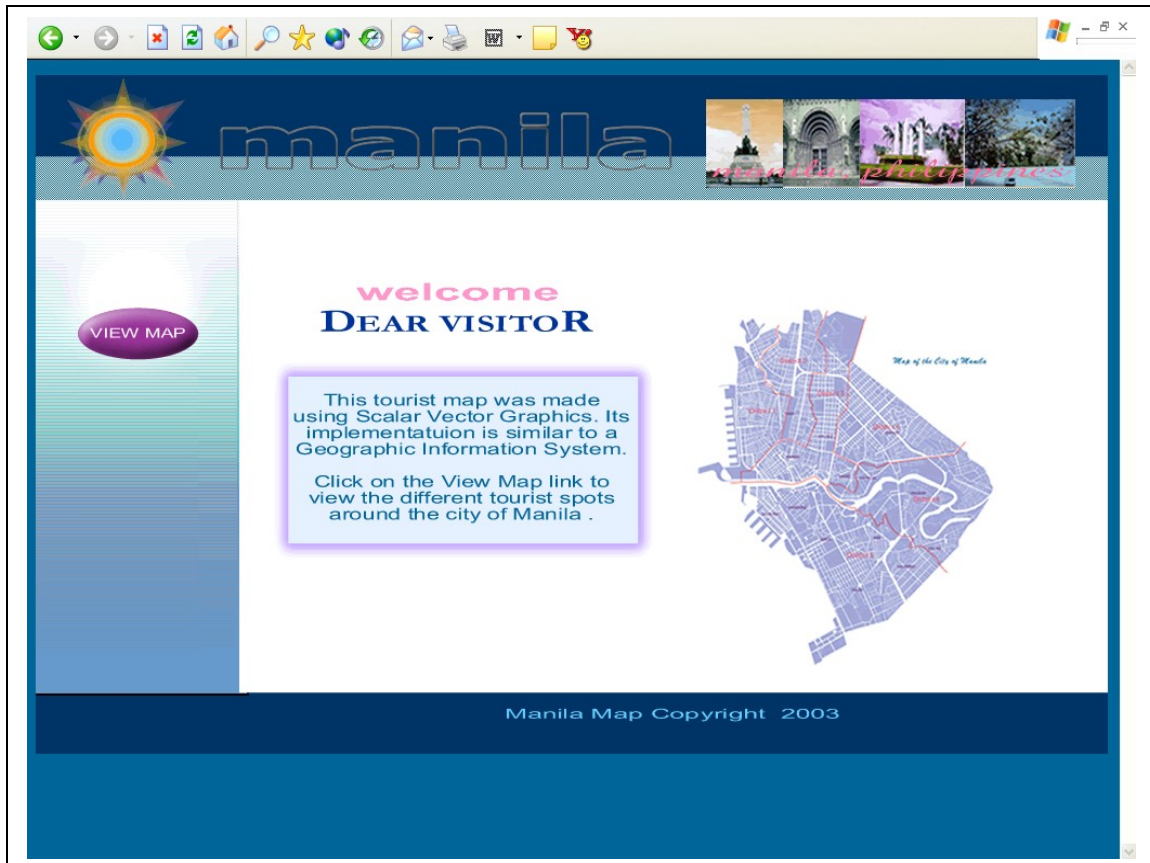


Figure 8. Homepage, A Dynamic Web-Map of Tourist Establishments of the City of Manila

The User is then asked to select how to view the map as indicated in Figure 9. The map can be viewed by district, by subdistrict, by establishment type, by establishment name, by street name and by barangay.

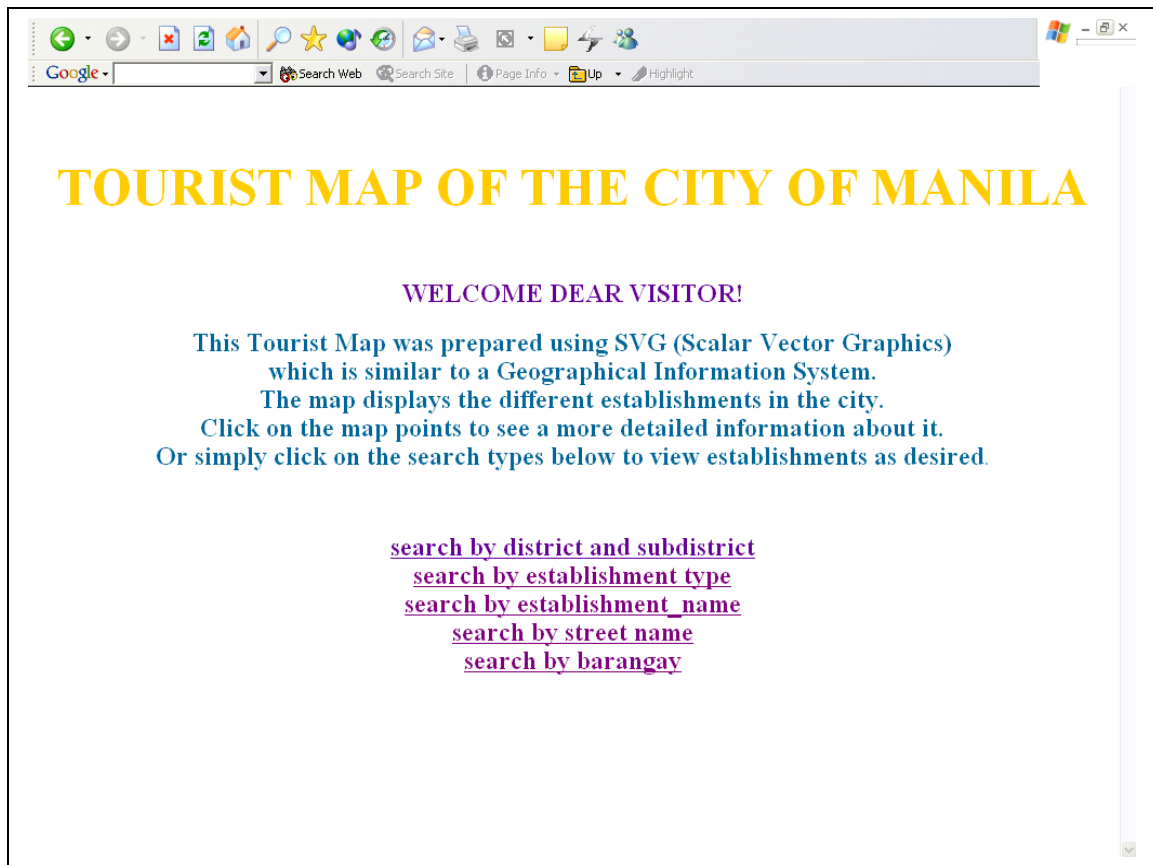


Figure 9. Select View Type Page, A Dynamic Web-Map of Tourist Establishments of the City of Manila

View by district and subdistrict displays the map structures grouped by district and subdistrict. Hovering the mouse above the map structure will display the establishment id and establishment type. The id displays the establishment name. Different colors represent different establishment types. Ticking on the checkboxes will either hide/display the map structures. (See Figure 10).



Figure 10. View by District and Subdistrict, A Dynamic Web-Map of Tourist Establishments of the City of Manila

Figure 11 displays the view by establishment type. The User has to select the establishment types by ticking on the checkboxes and pressing the submit button. View by establishment type displays the map structures grouped by establishment type. Hovering the mouse above the map structure will display the establishment id and establishment type. The establishment types displayed on the map are the ones existing in the database. Since the establishments are updatable and not fixed, it will change from time to time. Different colors represent different

establishment types. Map Controls are in view pages. To zoomed in map, press the ctrl and left click the mouse. To cover a bigger area to zoom, drag the mouse and draw a square as displayed in the figure below. To zoom out, press the ctrl-shift key and left click mouse. Another alternative is to right click mouse and choose from the SVG built in functions. The picture in Figure 11 displays a zoomed out map.



Figure 11. View by Establishment Type, A Dynamic Web-Map of Tourist Establishments of the City of Manila

Figure 12 below shows the view by establishment name. The User can either select from the selection box or type the name of the establishment to search. Additionally, Figure 13 shows the output of searching by establishment name.

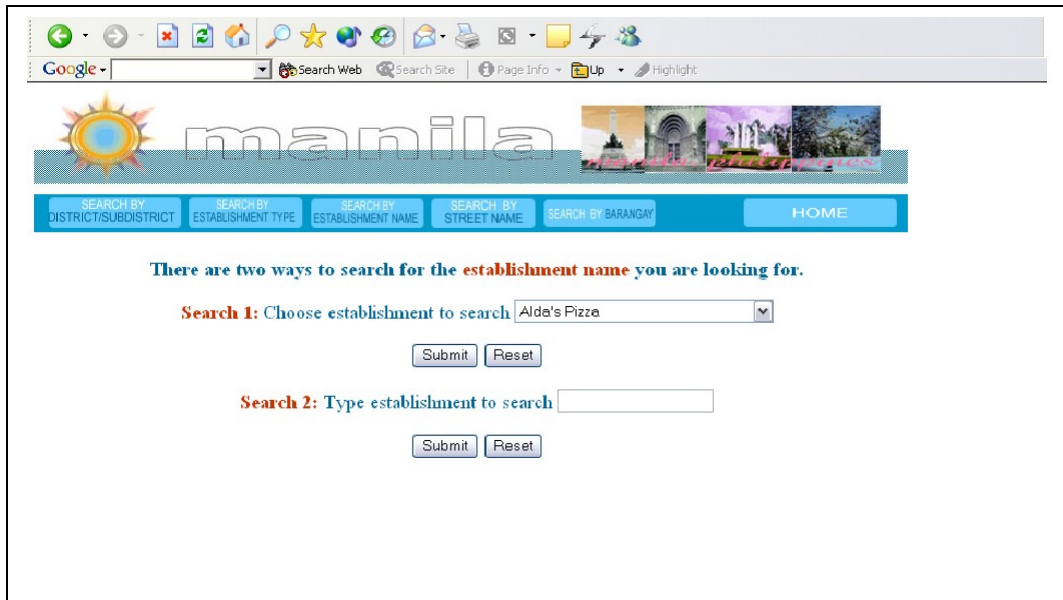


Figure 12. View by Establishment Name, A Dynamic Web-Map of Tourist Establishments of the City of Manila

The figure below is the result of the query done by searching the establishment name. Clicking the view link will display the location and additional information about the establishment.

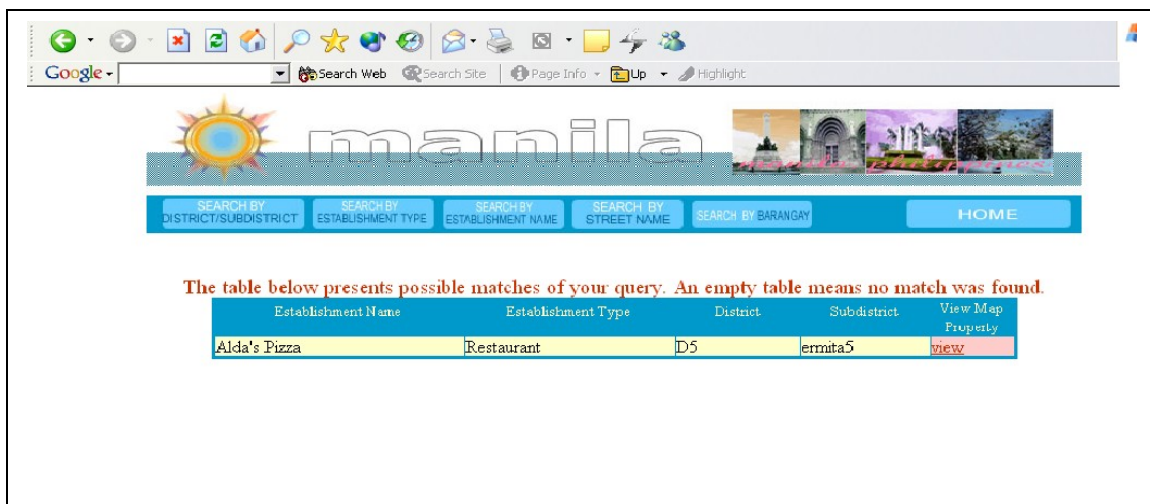


Figure 13. View Establishment List, A Dynamic Web-Map of Tourist Establishments of the City of Manila

Figure 14 displays the search by street name view. The User can either select from the box or type the street to query to know what establishments are there on that street. Figure 15 shows the result of querying by street name. Clicking the view link will display the location and additional information of the establishment.

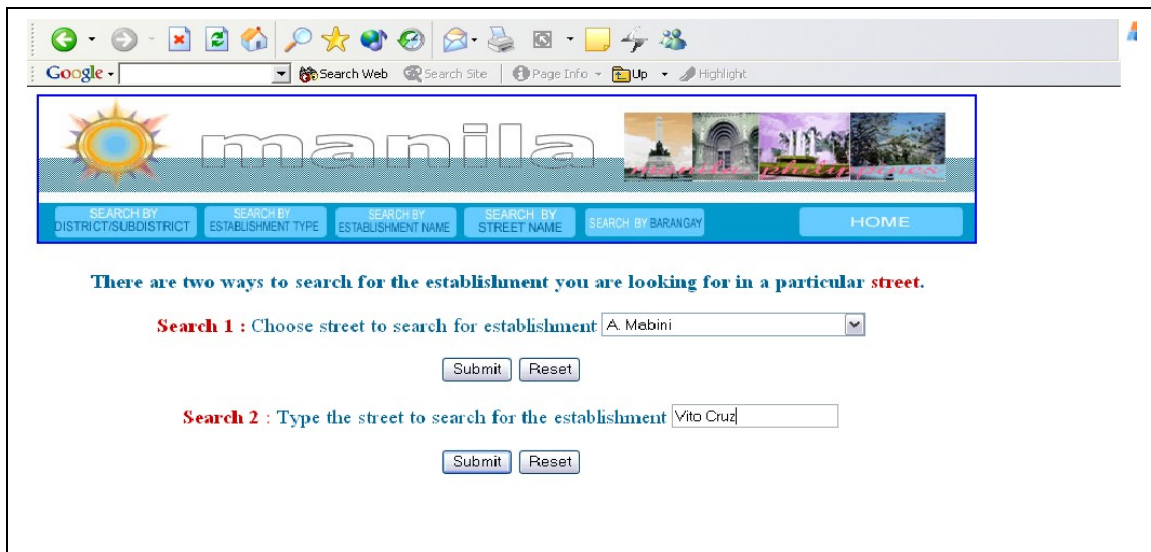


Figure 14. View by Street Name, A Dynamic Web-Map of Tourist Establishments of the City of Manila

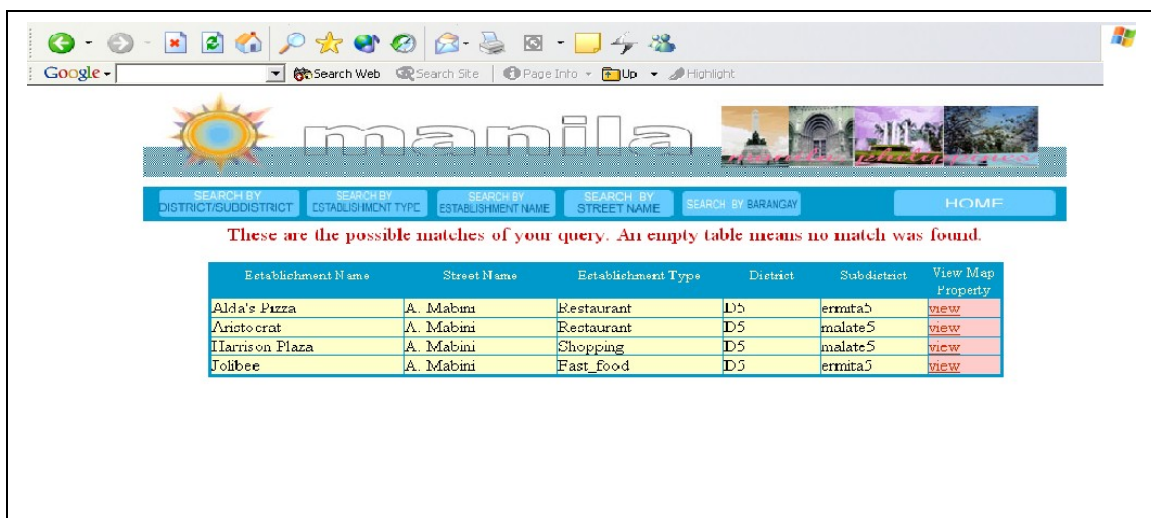


Figure 15. View by Street Name List, A Dynamic Web-Map of Tourist Establishments of the City of Manila

Figure 16 displays search by barangay. The User can either select from the select box or type the barangay to query. Additionally, Figure 17 displays the result after searching for the barangay. Clicking the view link will display the location and additional information about the establishment.

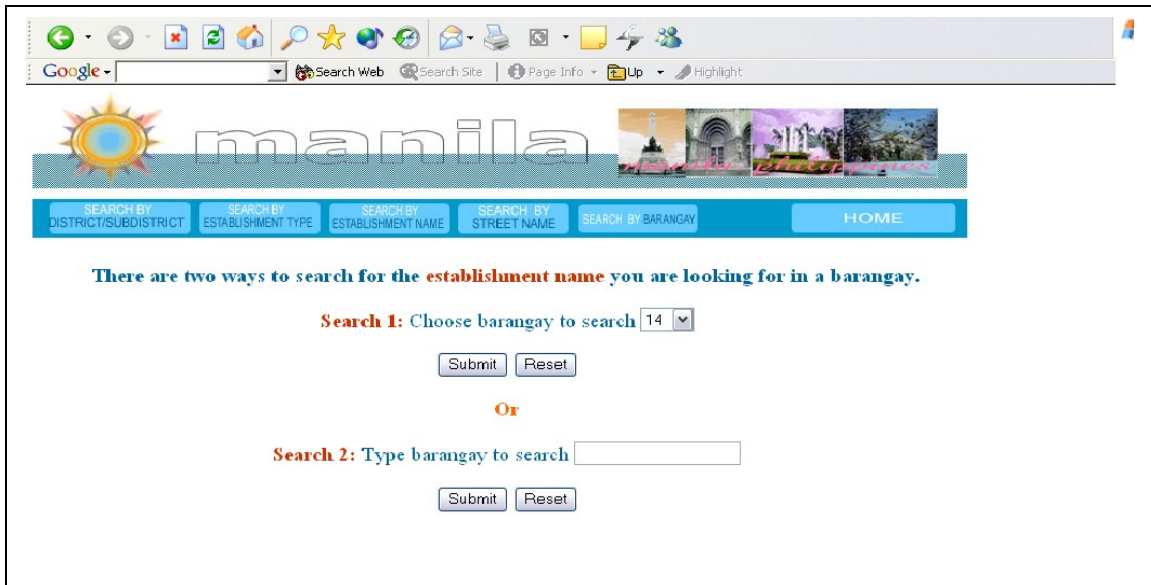


Figure 16. View by Barangay, A Dynamic Web-Map of Tourist Establishments of the City of Manila

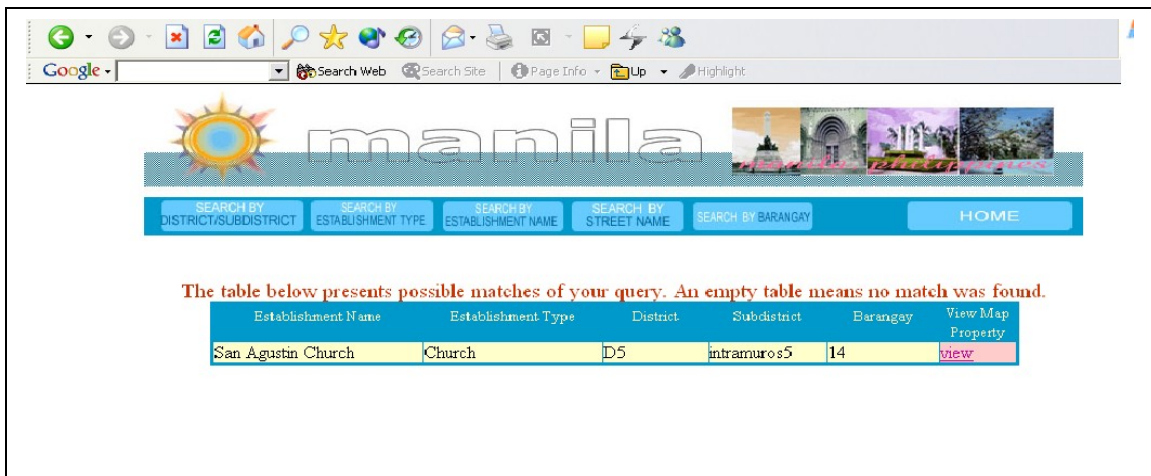


Figure 17. View List by Barangay, A Dynamic Web-Map of Tourist Establishments of the City of Manila

Figure 18 is the form that will be displayed when the User clicked on an establishment or when the User clicks on the view link. The position of the map structure and its map properties will be displayed. If there are pictures, it will be displayed and a link will appear to link to the photo gallery. The map properties refers to the map properties which include structure name, establishment type, district, subdistrict, street, description, website and picture.

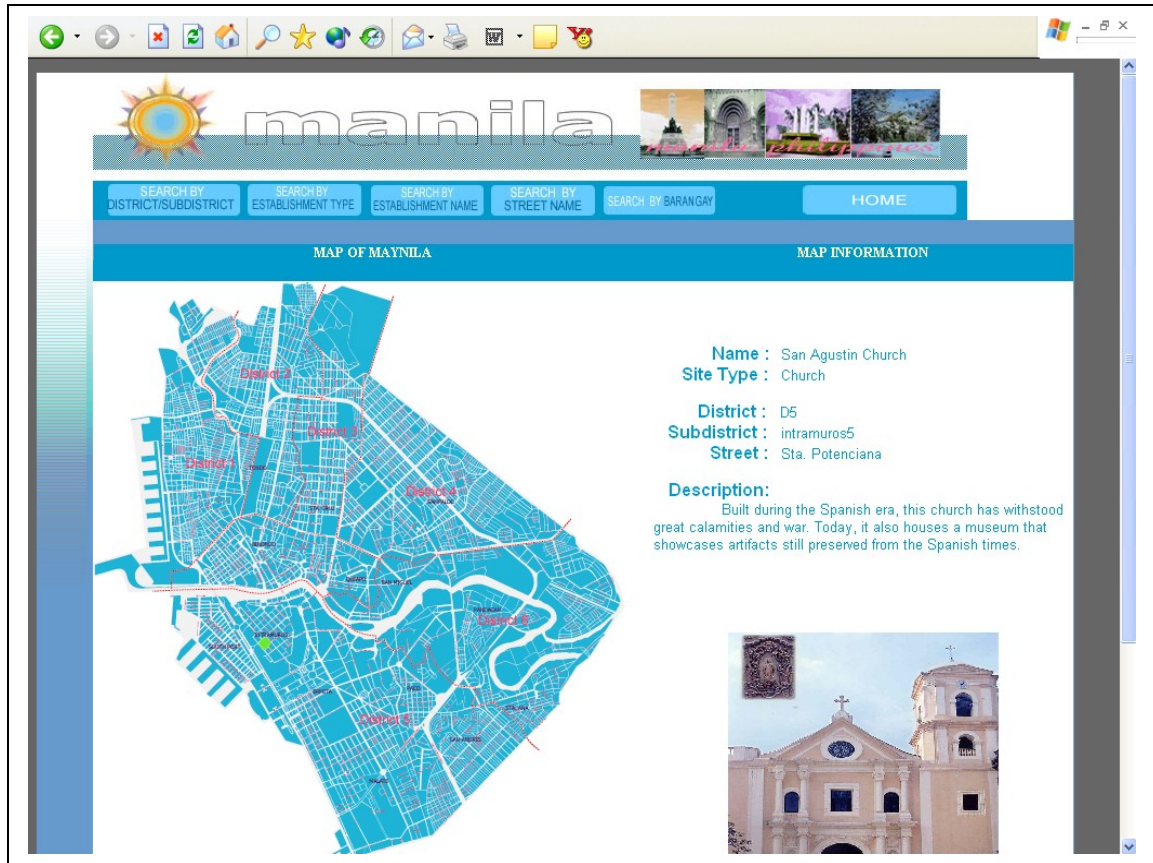


Figure 18. View Establishment Type Information, A Dynamic Web-Map of Tourist Establishments of the City of Manila

Figure 19 displays the photo gallery. Pictures of the the establishment is displayed here. This page can only be access if there is a picture to show.

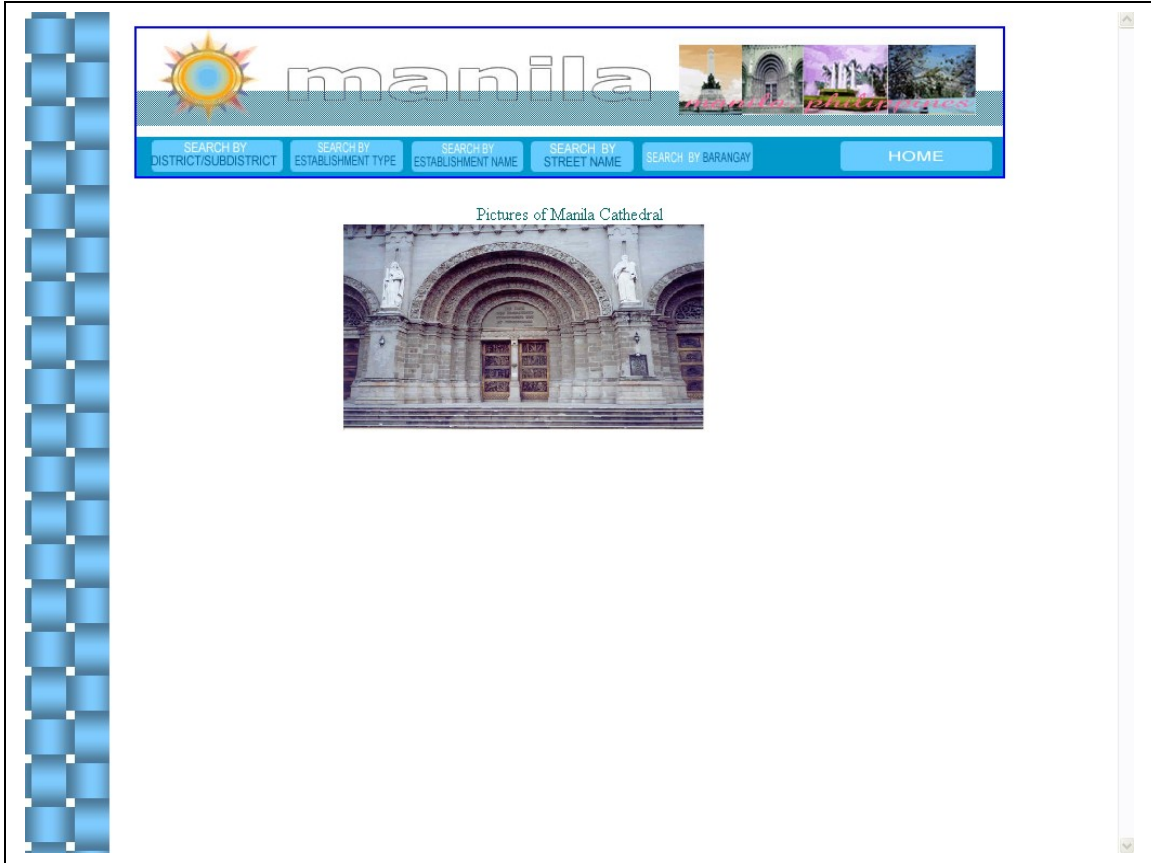


Figure 19. Photo Gallery, A Dynamic Web-Map of Tourist Establishments of the City of Manila

The map has zoom in and zoom out capabilities. The map controls are displayed on the forms.

Figure 20 displays the map in its default size.

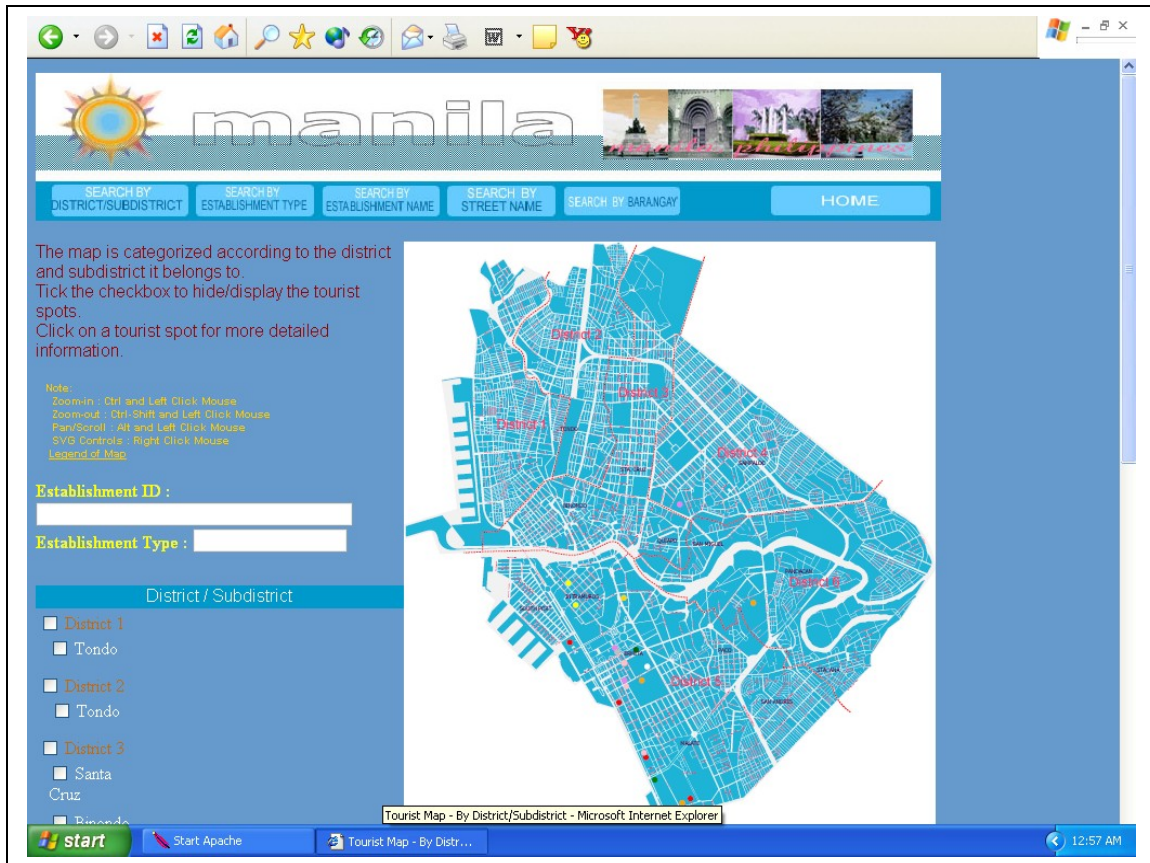


Figure 20. Default View of Map, A Dynamic Web-map of Tourist Establishments of the City of Manila

To zoom, press the ctrl and left click the mouse. To cover a bigger area to zoom, drag the mouse and draw a square as displayed in the figure below. To zoom out, press the ctrl-shift key and left click mouse. Another alternative is to right click mouse and choose from the SVG built in functions. Figure 21 displays this process.

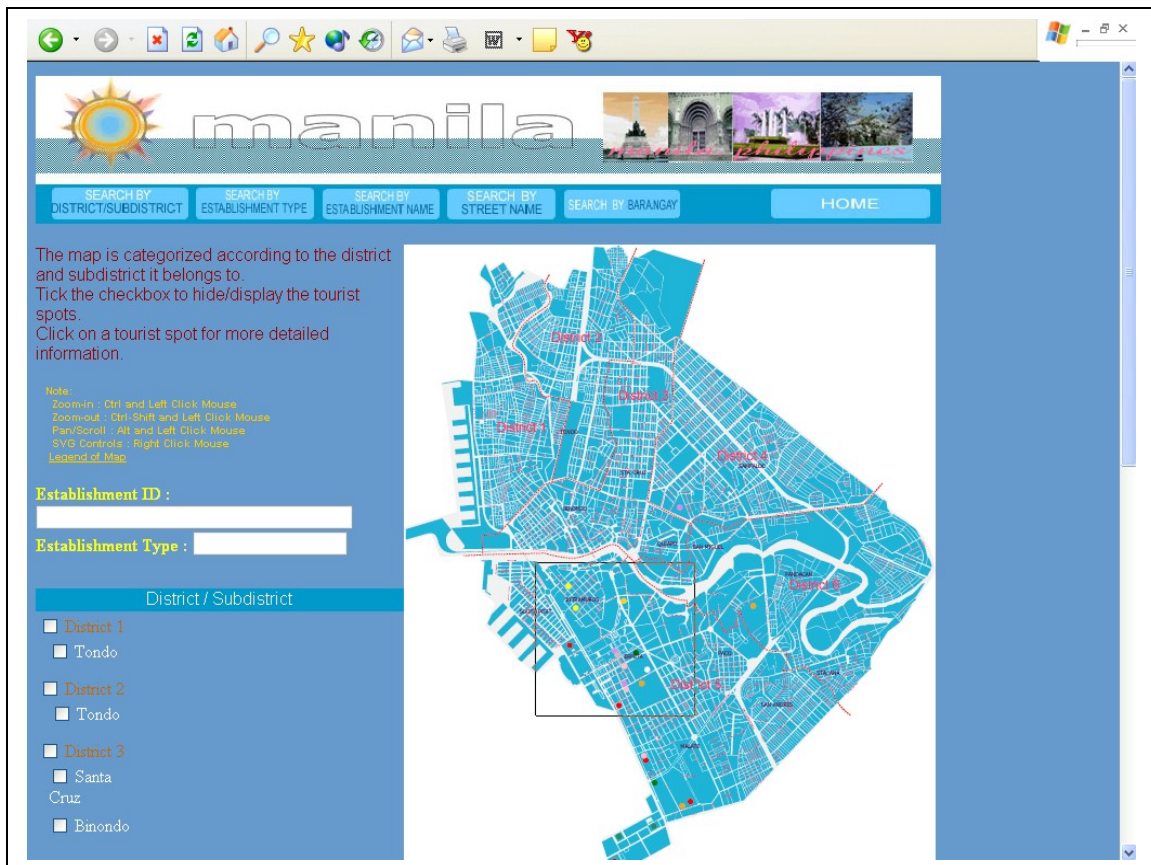


Figure 21. Process of zoom-in/zoom-out of map, A Dynamic Web-map of Tourist Establishments of the City of Manila

The map and map structures will be enlarged after zooming in on map. Figure 22 shows how the map will look like.

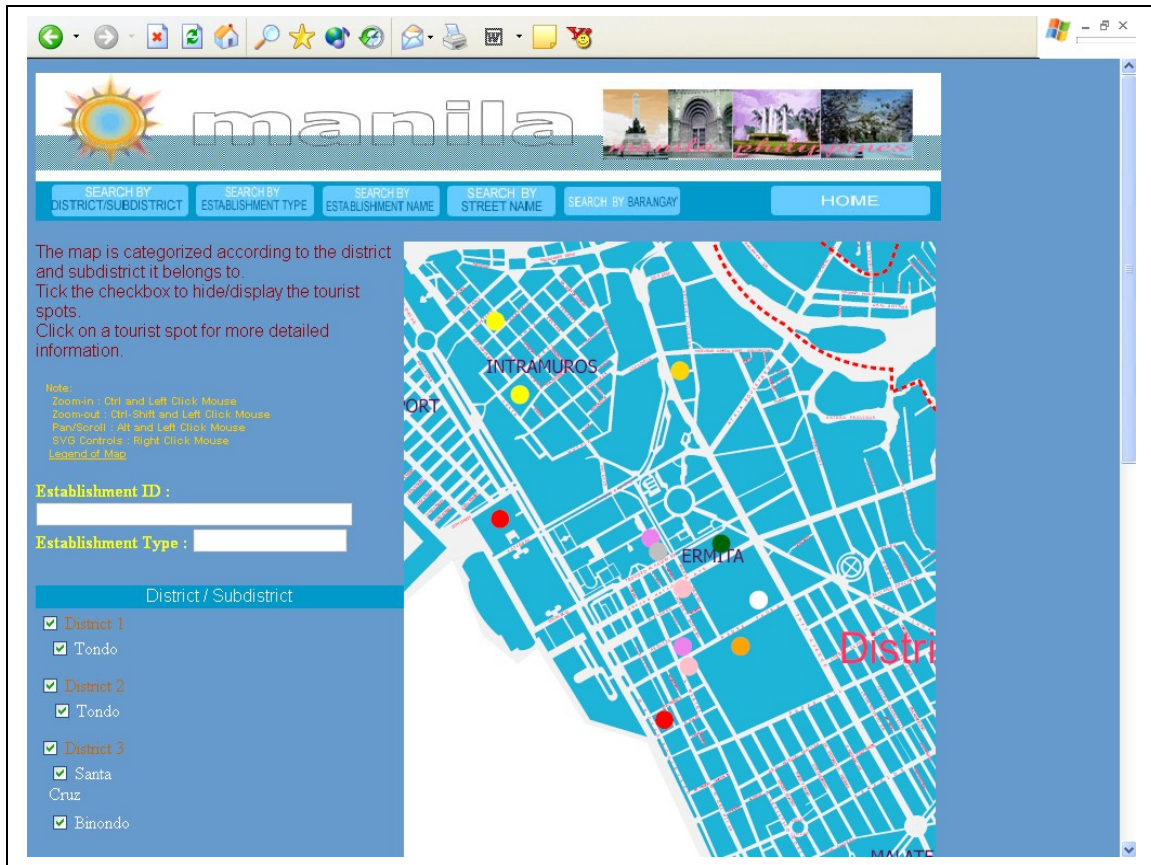


Figure 22. Zoomed in Map, A Dynamic Web-map of Tourist Establishments of the City of Manila

The figure 23 shows how a map will look like after it has been zoomed out.

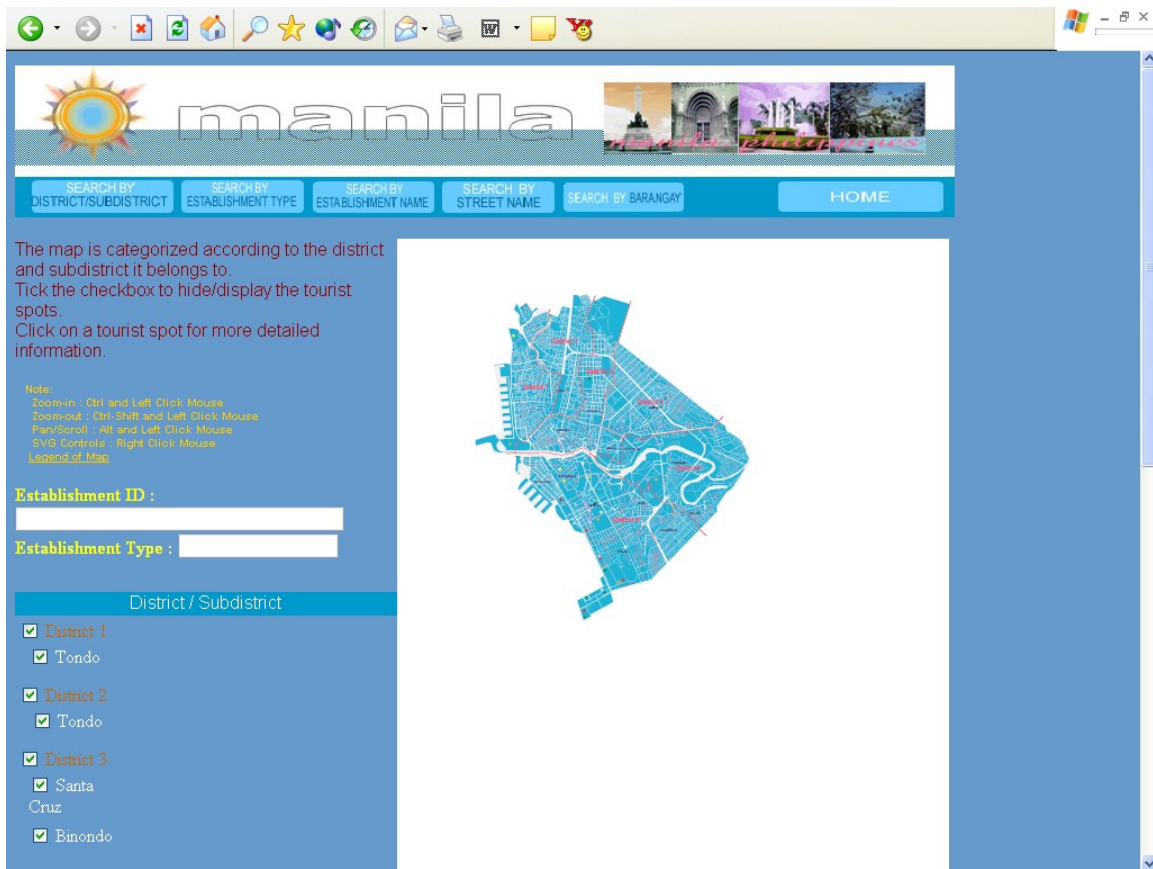


Figure 23. Zoomed out Map, A Dynamic Web-map of Tourist Establishments of the City of Manila

The System Administrator has to log in first to gain access to the Web-Map system. Figure 24 displays the log in page.

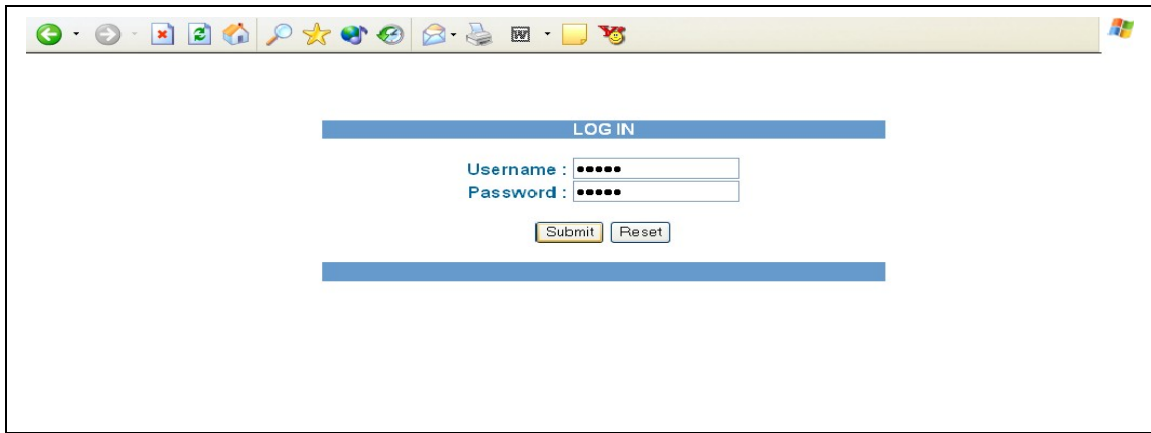


Figure 24. System Administrator's Log In Page, A Dynamic Web-Map of Tourist Establishments of the City of Manila

The next figure displays the homepage of the System Administrator. This will only be displayed after logging in. This page has links to functions such as adding, updating and viewing. It also has access to the customize page where adding and editing streets and establishment types can be

done.

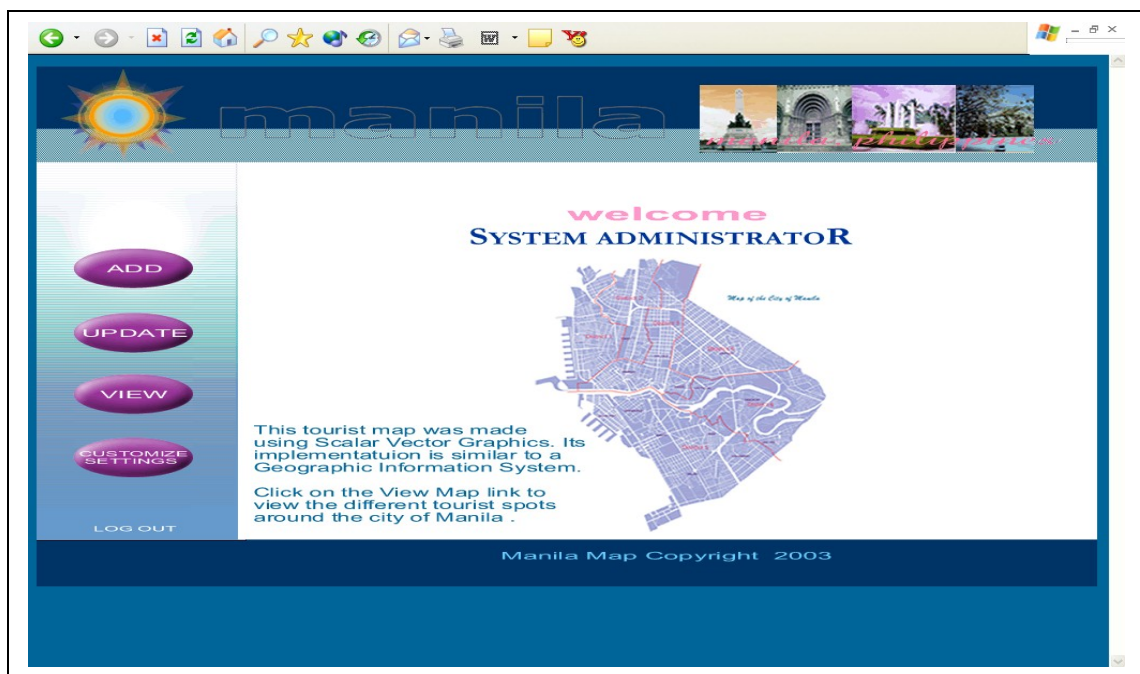


Figure 25. System Administrator's Homepage, A Dynamic Web-map of Tourist Establishments of the City of Manila

Figure 26 displays the add form. It displays an empty map. To add a map structure, the user has to click on the map. Beside it is a form where the map properties name, site type, district, subdistrict, street, description, website and picture are to be filled.

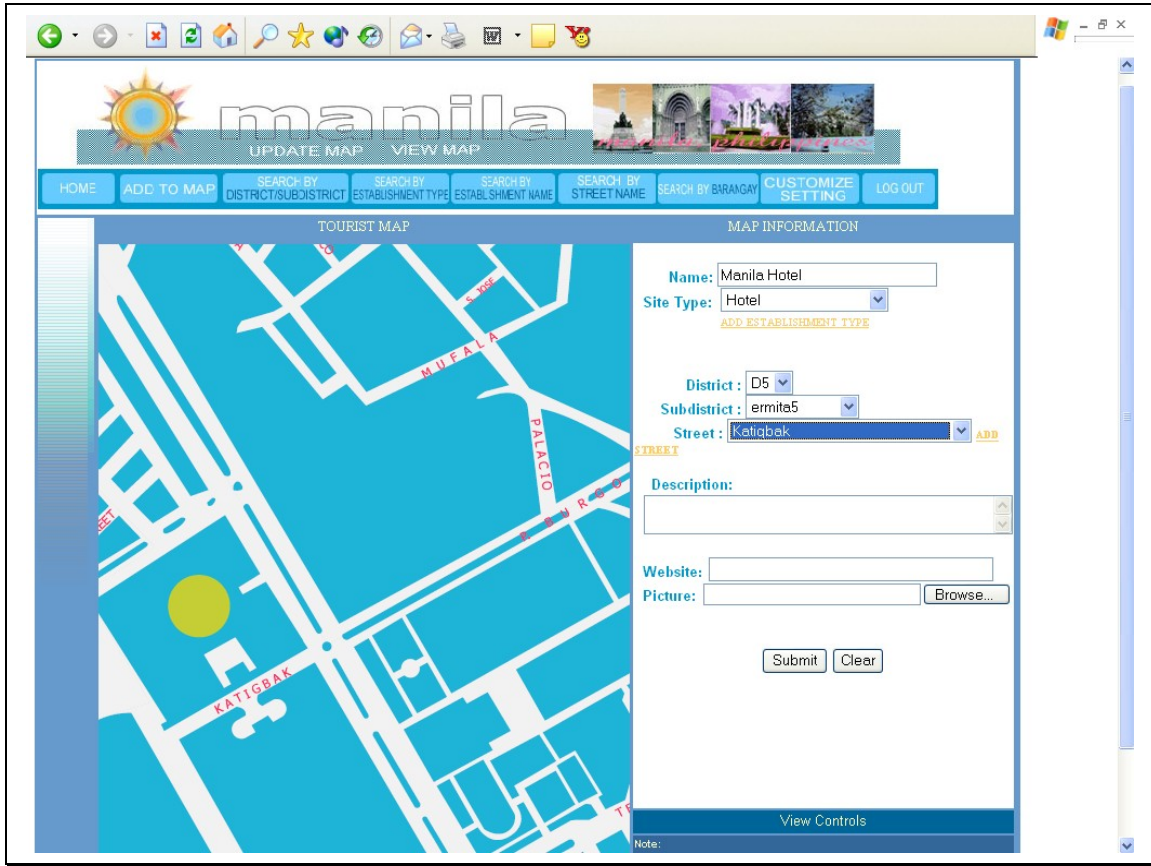


Figure 26. System Administrator's Add Form, A Dynamic Web-map of Tourist Establishments of the City of Manila

The System Administrator when updating or viewing has to select a type of view. Figure 27 displays view by district and subdistrict. The map structures are grouped according to the district and subdistrict that it belongs to. Hovering above a map structure will display the establishment id and type. The establishment id displays the establishment name. Colors symbolize the different

establishment types. Ticking the checkboxes will hide/display the map objects. Clicking on the map object will display the location and additional information of the establishment on a new form.

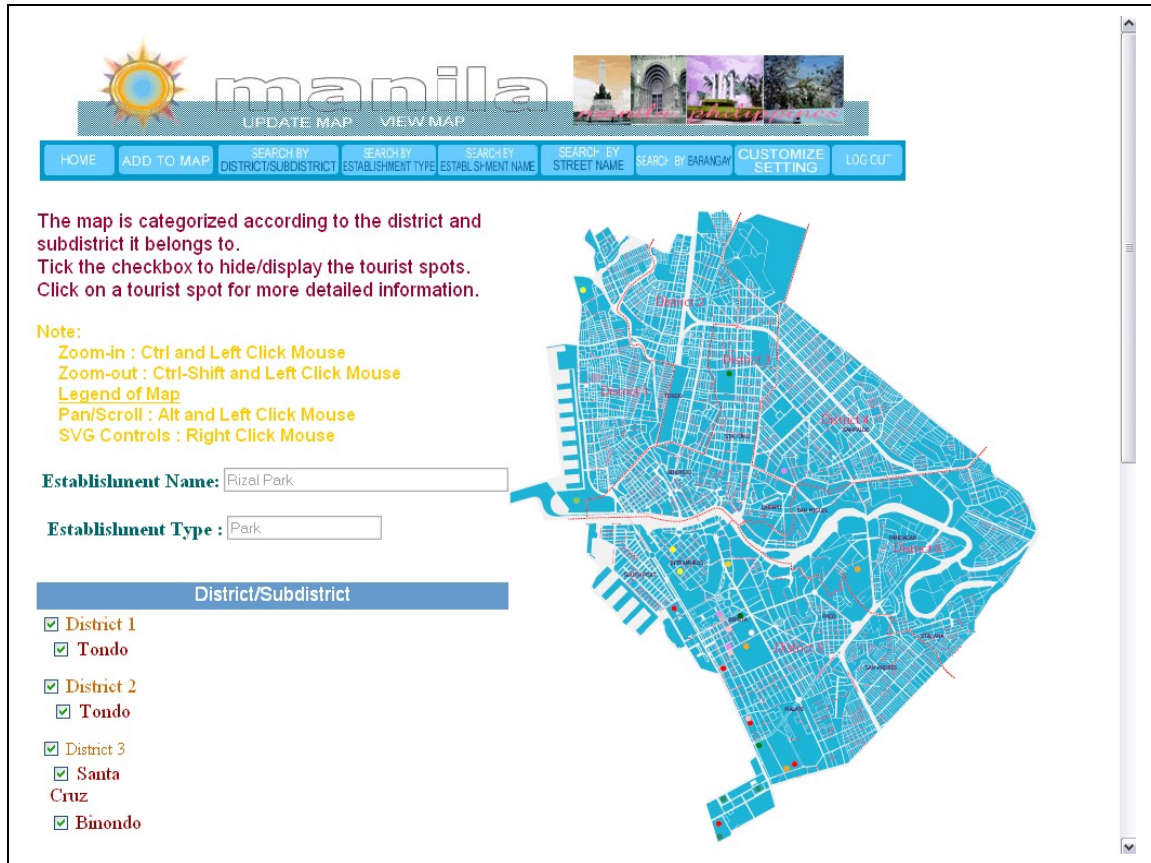


Figure 27. System Administrator's View by District and Subdistrict, A Dynamic Web-map of Tourist Establishments of the City of Manila

Figure 28 displays the view by establishment type of the System Administrator. The map structures are grouped according to the establishment types they belong too. Ticking the checkboxes will display the establishment types queried. Clicking on a map structure will display the location and additional information of the establishment in a new form.



Figure 28. System Administrator's View By Establishment Type, A Dynamic Web-map of Tourist Establishments of the City of Manila

Figure 29 displays the view by establishment name. The System Administrator can either select from the select box or type the establishment name to search. Figure 30 displays the results found after a match has been made. Clicking on the view link will display the location and additional information of the establishment searched.

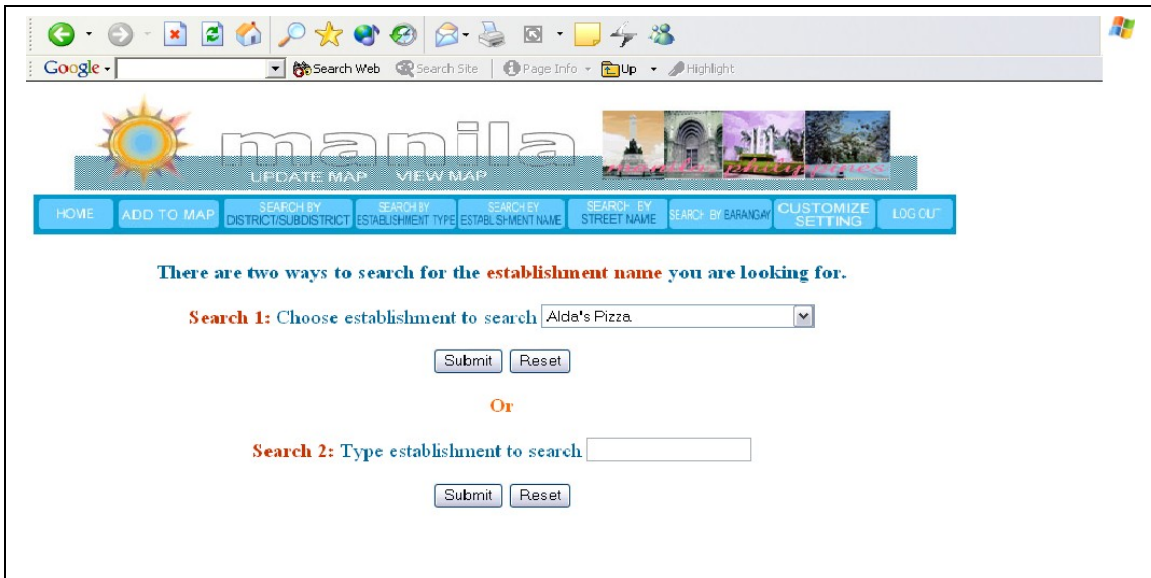


Figure 29. System Administrator's View by Establishment Name , A Dynamic Web-map of Tourist Establishments of the City of Manila

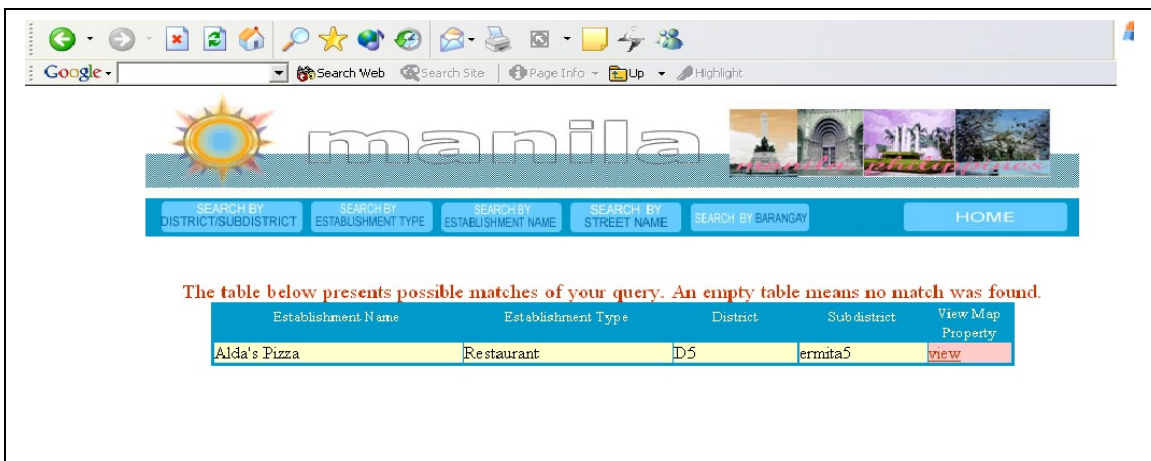


Figure 30. System Administrator's View List of Establishment Name, A Dynamic Web-map of Tourist Establishments of the City of Manila

The view by street name will look like Figure 31. The System Administrator can either select the street from the list or enter type the street name to be searched. Figure 32 displays the result after querying by street name will look like the figure below. Clicking on the view link will display the location and additional information of the establishment name searched on a new form.

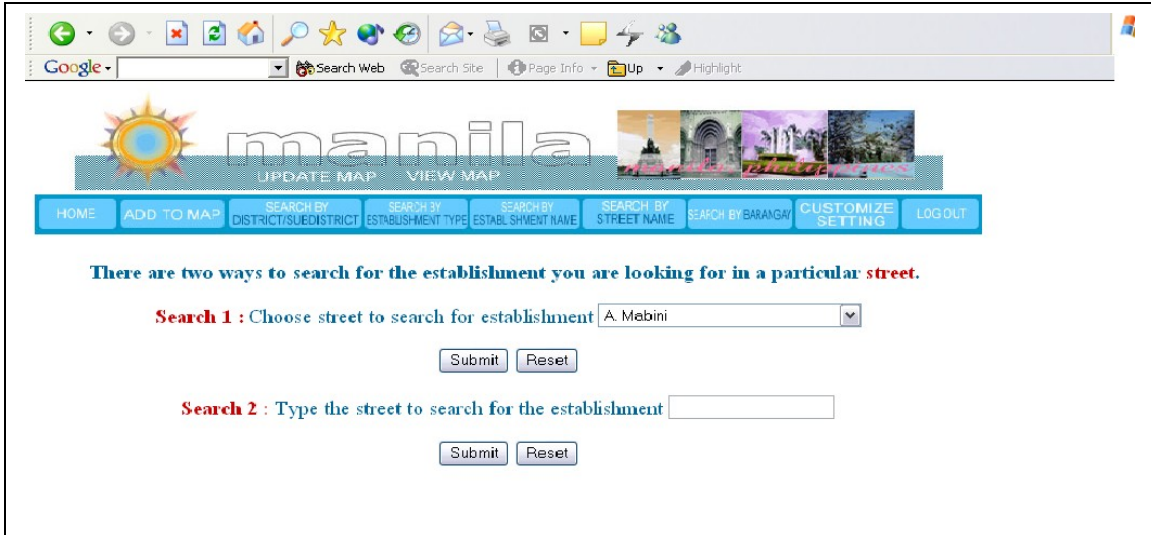


Figure 31. System Administrator's View by Street Name, A Dynamic Web-map of Tourist Establishments of the City of Manila

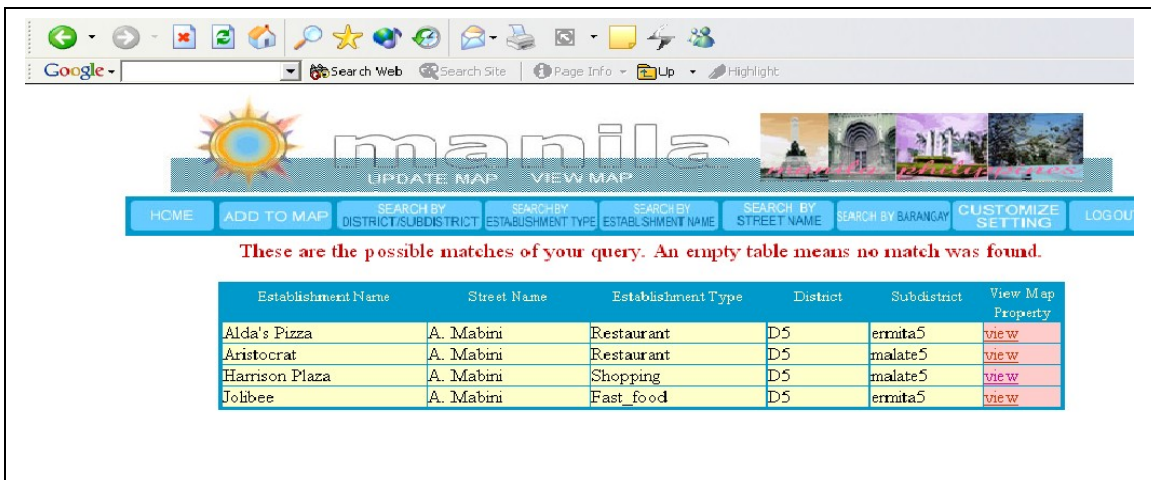


Figure 32. System Administrator's View List of Street Name, A Dynamic Web-map of Tourist Establishments of the City of Manila

Figure 33 displays the view by barangay. The System Administrator can either select the barangay from a list or type the barangay on the text box. Additionally, Figure 34 displays the result list after querying for barangay. Clicking on the view list will display the location and additional information of the establishment under this barangay on a new form.

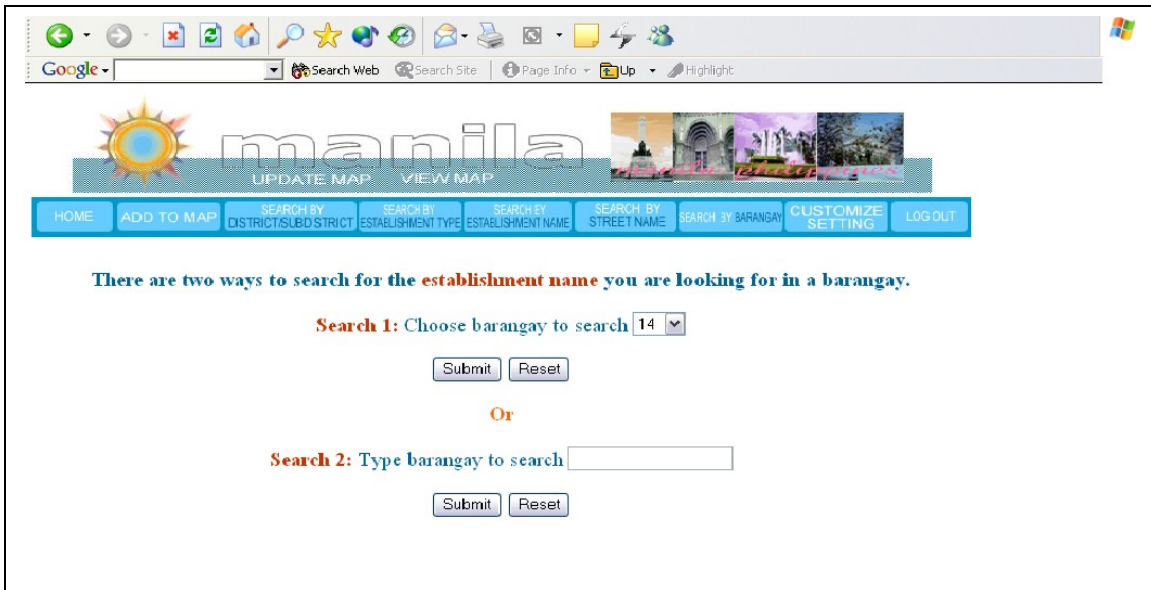


Figure 33. System Administrator's View By Barangay , A Dynamic Web-map of Tourist Establishments of the City of Manila

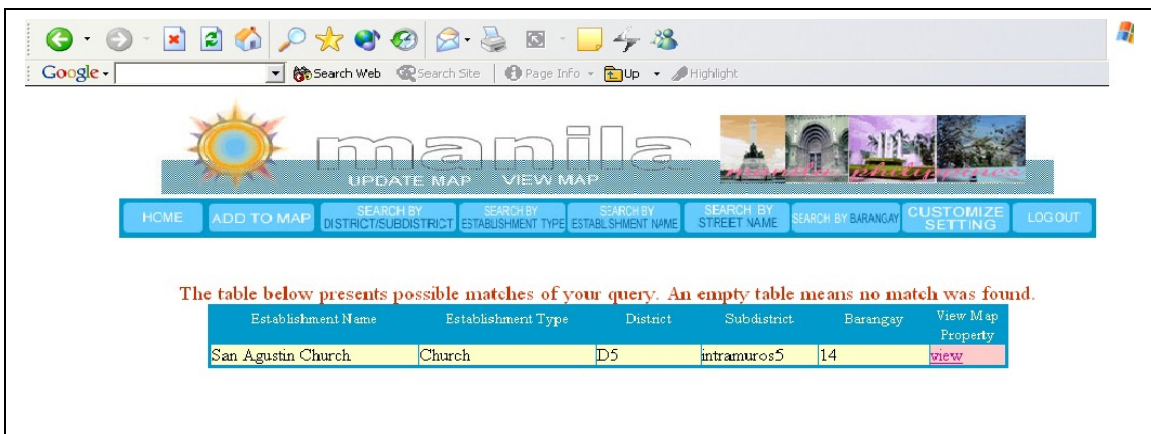


Figure 34. System Administrator's View List of Barangay , A Dynamic Web-map of Tourist Establishments of the City of Manila

Figure 35 displays the Customize Page where the System Administrator can add and update street names and establishment types.

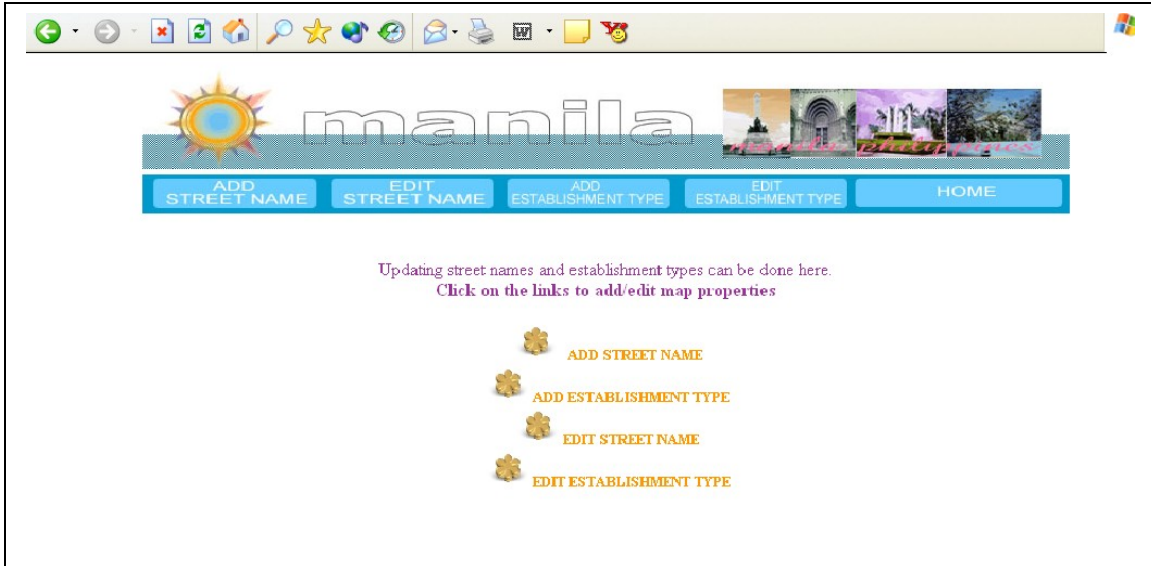


Figure 35. System Administrator's Customize Page , A Dynamic Web-map of Tourist Establishments of the City of Manila

Figure 36 displays the add street form. The fields below such as the street name, subdistrict and barangay should be filled.

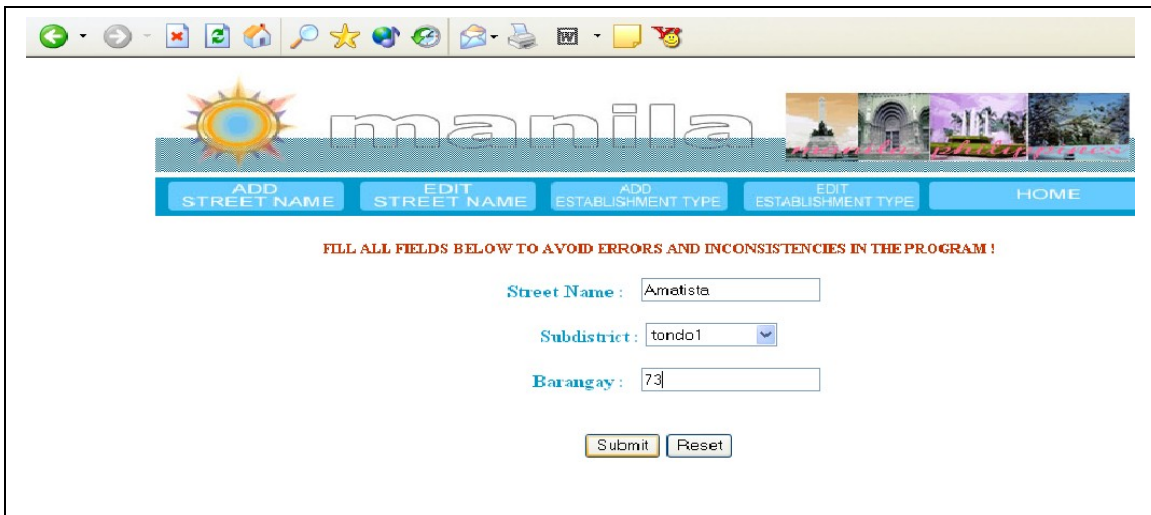


Figure 36. System Administrator's Add Street Form, A Dynamic Web-map of Tourist Establishments of the City of Manila

Street names can only be deleted. Figure 37 displays all the street names in the database. Clicking on the delete will erase the street name.

Below are the list of Street names stored in the database. An empty table means no data is stored.

Street Name	Subdistrict	Barangay	Delete
A. Mabini	ermita5	58	Delete
Aldecoa	intramuros5	43	Delete
Ameng Rodriguez	melete5	75	Delete
Arquiza	ermita5	55	Delete
Bonifacio Drive	south_port5	60	Delete
Concepcion	intramuros5	62	Delete
dfg	tondo1	fdg	Delete
dfg	tondo1	fdg	Delete
Don B. Hernandez	melete5	73	Delete
Katigbak	ermita5	30	Delete
Lourdes	melete5	72	Delete
Lucia	intramuros5	57	Delete
Magallanes Drive	intramuros5	81	Delete
Magallanes Drive	intramuros5	42	Delete
Magallanes Drive	intramuros5	40	Delete
Maria Orosa	ermita5	54	Delete
Murella	intramuros5	57	Delete
Padre Faura	ermita5	54	Delete

Figure 37. System Administrator's Edit Street Name , A Dynamic Web-map of Tourist Establishments of the City of Manila

The System Administrator can also add an establishment type as shown by Figure 38. The fields establishment type and color should be filled.

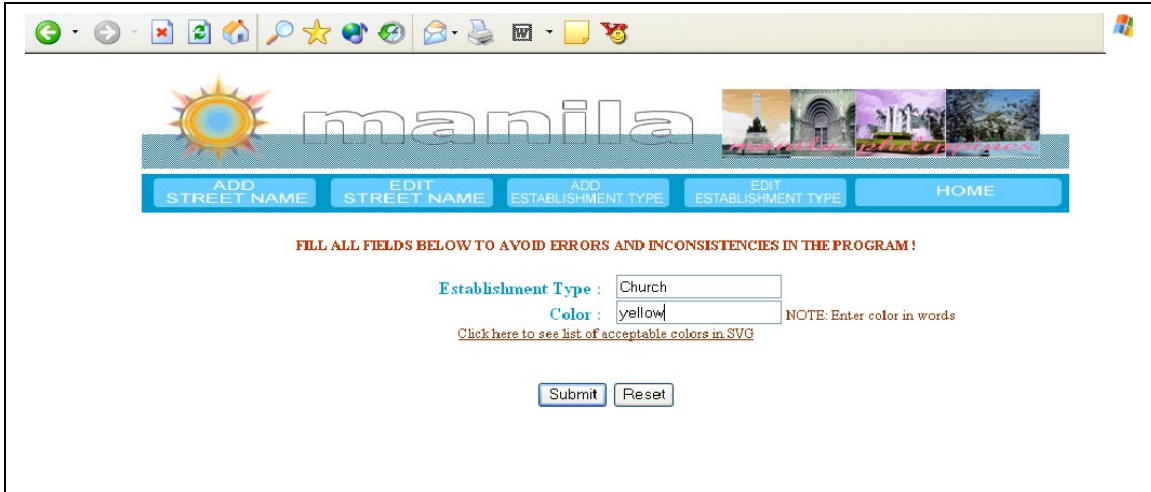


Figure 38. System Administrator’s Add Establishment Type , A Dynamic Web-map of Tourist Establishments of the City of Manila

Figure 39 shows the edit establishment type form. The establishment type can be updated by clicking on the edit link. Clicking on the delete link will erase it.

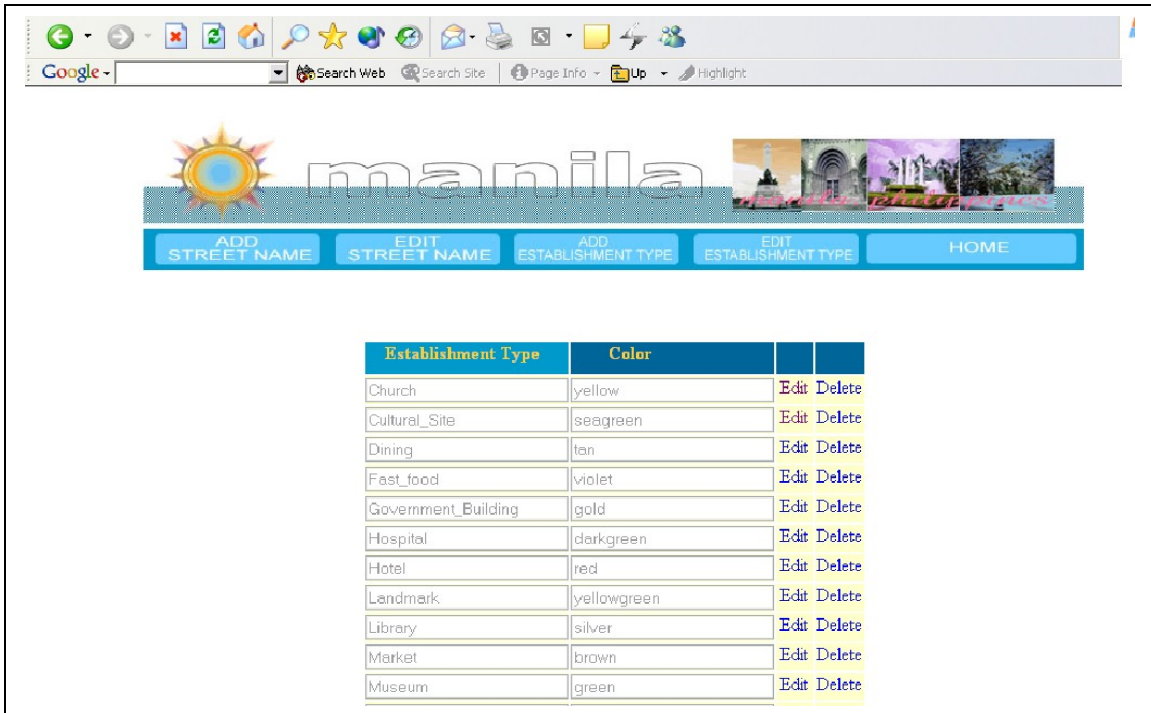


Figure 39. System Administrator Edit Establishment List , A Dynamic Web-map of Tourist Establishments of the City of Manila

The System Administrator’s view information is displayed in Figure 40. The establishment’s location and map properties are displayed. From this page, the System Administrator can access

the update and delete functions, add more pictures and view the photo gallery by clicking on the links.

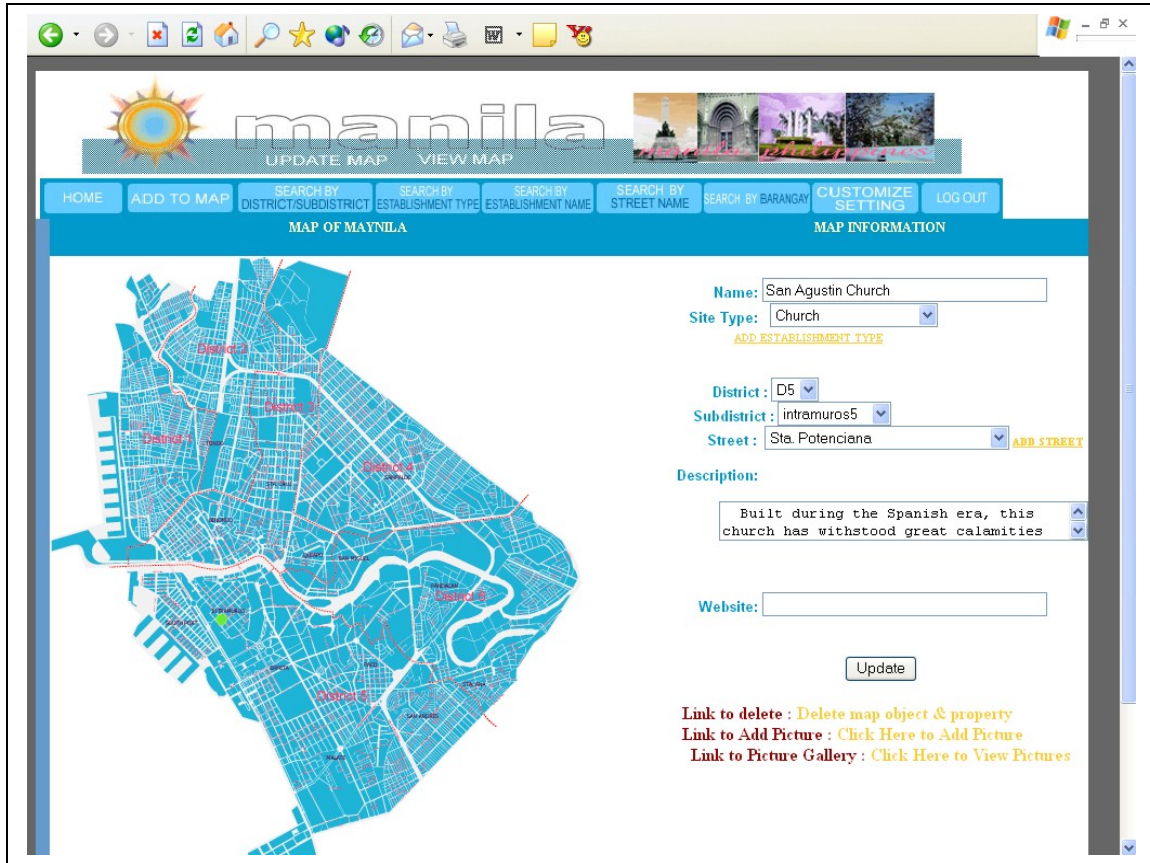


Figure 40. System Administrator's View Information Form , A Dynamic Web-map of Tourist Establishments of the City of Manila

The photo gallery is displayed in Figure 41. This can only be viewed if there is a picture to show.

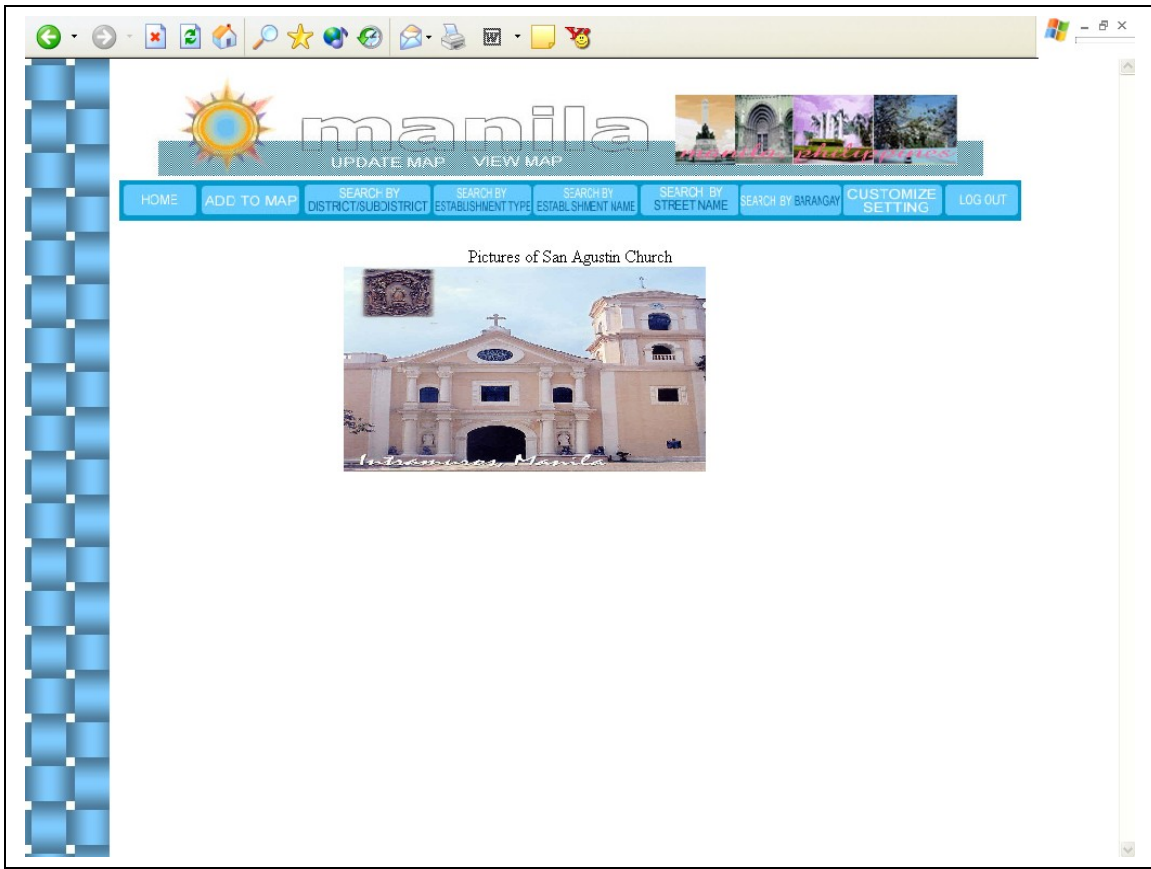


Figure 41. Photo Gallery, A Dynamic Web-map of Tourist Establishments of the City of Manila

VI. DISCUSSION

The Web-Map of Manila is a dynamic map that shows the different tourist spots in the city. The ordinary user can only view the map. The map remains dynamic since the user can interact with the map by clicking on the map objects to get information or by using search to query the needed information. The System Administrator having access to the editing functions (add, edit, delete) can also update street names, establishment types and their corresponding colors. The Administrator has access to view the map.

A visual representation of the city of Manila will be a delight to tourists. Searching for information and navigation around the city will be easier since the location of the establishment can be viewed in the map. Information about the establishment is also displayed. A picture of the establishment is also displayed. Tourists can select how they would like to view the map. It can also be zoomed in or zoomed out. This feature was designed to help them search for the data that they would like to see. Potential tourists can also have a peek of the city. And this encourage them to come visit our city.

It would have been better if the establishment searched will be zoomed in and placed on the center of the map. The system as of now can still be further improved in terms of searching.

The Web-Map System can be accessed by a lot of people since it is online. It provides a detailed map of the city of Manila including its districts, subdistricts and streets. Information regarding the different map objects on the map can be known by clicking on it. Its feature being updatable, dynamic and interactive is a plus compared to the maps I have seen which is presented, although sometimes, with great detail, in plain image format such as gif or jpeg. The map itself is made by using scalar vector graphics which does not pixelate even when it is magnified in different percentages. Also, this format is very new and looks promising in the near future.

VII. CONCLUSION

A dynamic web-map of tourist establishments of the city of Manila implemented through Scalar Vector Graphics is created with the following capabilities:

- a. Display different map structures through the use of color schemes and layering.
- b. Display information about a map structure
- c. Ability to zoom in to street level and zoom out to district level depending on user query and view choice
- d. The System Administrator that can add, edit, delete map structures (site types such as cultural site, church, hotel, restaurant etc.) as well as its corresponding map properties (structure name, site type, district, subdistrict, street, description, website links, picture).

VIII. RECOMMENDATIONS

The following suggestions can further improve the current system:

- 1.) MAP - Street paths in the map could have also been drawn to assure accuracy of street location. This would improve the view function as far as searching for street names are concerned.
- 2.) MAP STRUCTURES – Representing the different establishment types could have also been done using different shapes.
- 3.) PHOTO GALLERY – The current Photo Gallery is very simple. Due to limited time, the plan to make it animated did not push through. It would have been better if the pictures were shown in the form of a filmstrip. In that manner, the user can interact with the picture gallery page.
- 4.) VIEW FUNCTION – It would have been better if the establishment searched would be zoomed in and placed on the center of the map.

Comments/suggestions regarding the improvement of the current system are certainly most welcome.

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