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وزارة الشؤون البلدية والقروية
أمانة منطقة المدينة المنورة



A comprehensive technical report document for recommendations for infrastructure pr

For SDI information

Consulting engineering services project to study the

development of geographical information in the municipality of Medi

2013-07-29m

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Contents

Document controls	2
Version of the document	2
Change Log	2
Reviews	2
Contents	3
Figures index	4
Project information	5
Introduction	6
Purpose of the report	6
Structure of the report	8
Geographical maturity of the municipality of Medina	9
Recommendations for Information Infrastructure Projects (SDI)	11
a program 1: Organizational reinforcement	12
a program 2: Infrastructure strengthening	12
a program 3: Data warehouse development and sharing	12
a program 4: Enhancing business procedures	12
Methodology for defining projects	33
Description of projects	31
The project 1: Development of a repository for geographical data (.....) GIS Data Warehouse	14
The project 2: Preparing work standards, standards and procedures for information exchange	11
The project 3: Linking and synchronizing geographical databases	11
The project 4: Geographical data updates	11
The project 5: Security and user rights control	11
The project 6: Madinah Explorer app development	22

The project 7: Expanding and developing the geographical data repository	21
The project 1: Updating the base map	23
The project 9: Development of the Geographic Information Systems Portal (.....) ArcGIS Portal	24
The project 10: Developing the base map for the governorates - the first stage	21
The project 11: Developing the base map for the governorates - the second phase	26
The project 12: Developing the base map for the governorates - the third stage	21
The project 13: Evaluation and planning to strengthen the infrastructure for the project account	21
The project 14: Implementing the infrastructure development plan for projects account	21
The project 15 : Training and Capacity Building	32
The project 16: Awareness and publicity	31
Optional projects	32
The project 17: Development of land registry plans and data (.....) Cadastral Map	32
The project 18: Development of the naming and numbering system	33

Index of Shapes

the shape 1: The level of geographical maturity of Medina Municipality	12
the shape 2: Project classification	11

Project information

Project information			
project name:		Project "Consulting engineering services to study the development of geographical information in the Municipality of Madinah Region"	
Project code:		34008	
The executing agency :		Saudi Engineering Union Company is preacher and scholar	
Project start date:		2013-03-13 PM	
Project end date:		2013-08-13 PM	
internal <input type="checkbox"/>		external <input checked="" type="checkbox"/>	
the beneficiary		The project is sponsored by the Secretariat	M. Walid Barakat
The representative of the beneficiary		Project manager from the Secretariat	M. Akram Alsarani
Project manager from the implementing agency		Project Manager from the Implementing Entity:	M. Hassan Jabaei

The goal of the report

After the strategic plan for geographic information systems was developed in the Municipality of Medina, which in turn referred to the programs and initiatives that help in developing and improving the work and tasks of the Municipality, and increase the appreciation of the residents and visitors of Medina for the services of the Municipality, and where the programs and initiatives were designed in line with the challenges and opportunities that were made Referred to by the trust departments or those identified through the analysis carried out on the current situation in the secretariat. This report will refer to the programs and initiatives required to be implemented to create an electronic infrastructure for geographical data (Infrastructure - SDI Spatial Data) as the main and one source of data. Geography and the metadata related to it, as it will be used by all departments in the municipality and between the municipality and the various service agencies, governorates and municipalities of the Medina region, in addition to the relevant public institutions operating within the scope of the Medina region. In addition, this infrastructure (SDI) will provide easy means to access and use geographical data, and it will also provide a framework with unified standards, policies and procedures, in which the latest technology is used to manage geographical data and support their participation and effective coordination among the departments of the Secretariat with each other, And even between the Municipality and the various service agencies and relevant public institutions operating within the scope of the Medina region.

The main purpose of this structure (SDI) is to enhance and support better decision-making through the use of shared data, information exchange, and reduce the waste of investments resulting from duplication of data in departments.

The content of the initiatives and projects required to be implemented to create an electronic infrastructure for geographical data (Data Infrastructure - SDI Spatial) revolves around the following matters:

- Study and evaluate the current status of the geographical data available at the Secretariat and other external parties
- Review and develop the geographic data model for the central database
- Design and construction of the SDI architecture

- Transfer and entry of geographical data and index data into the central database and linking with data of other third parties
- Establishing the rules and mechanisms for working on the SDI (data ownership, mechanisms and policies for updating data, mechanisms for data protection and access control to the database, technical specifications and standard standards for spatial data, which is not a GIS)
- Designing and developing applications for browsing, updating and protecting data and controlling access to the central database.
- Introducing the SDI and activating its use by the Secretariat departments and other external parties. Maintenance of the SDI and
- providing technical support to its users and managers.

These initiatives will be developed through a series of projects that must be developed in phases, so that each phase represents a specific project with a specific scope, duration, calculated budget and depending on the circumstances, opportunities, and constraints of each project. With the advancement of geographic information systems during the various stages, the geographic information system will increase integration with activities and workflow within the various departments and between the Municipality and the various service agencies, governorates and municipalities of the Madinah region, in addition to the relevant public institutions operating within the scope of the Medina region.

Structure of the report

This report is organized according to the following sections:

3. **an introduction:** This section explains the purpose of this report, the method used, and the contents of the report.
2. **Geographical maturity of Medina Municipality:** It aims to help define the Municipality's position in the field of infrastructure
For spatial data and to determine its path towards geographic maturity
3. **Recommendations for electronic infrastructure projects for geographical data (- Spatial Data Infrastructure**
SDI Explains a comprehensive list of all the projects that have been identified to be promoted to the level of SDI

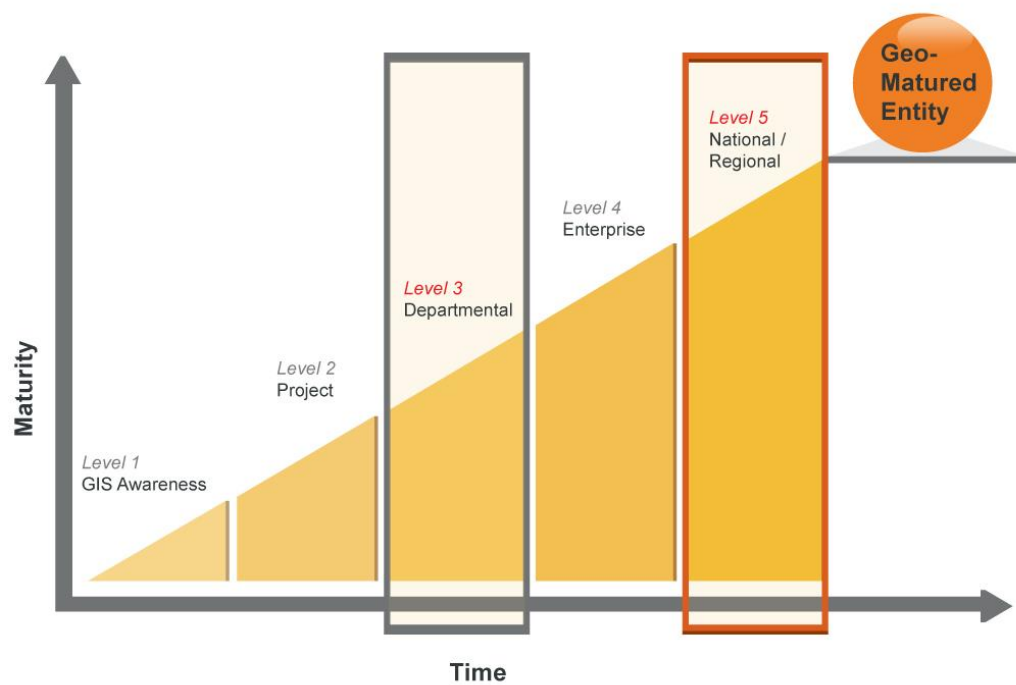
Geographical maturity of the Municipality of Medina

The geographic maturity of the Medina Municipality aims to help determine its position in the spatial data infrastructure field, to determine its path towards the growth of geographical maturity and to monitor progress.

According to the results of the strategic plan for geographic information systems in the municipality that was prepared by the consultant, it was found that the Municipality of Madinah falls within the level of No. 3, i.e. the administrative level, as most departments have applications that depend on their use on GIS.

In order to achieve maturity and upgrade to the level of an electronic infrastructure for geographic data (SDI Spatial Data Infrastructure -), the Secretariat must implement a series of projects that must be developed in phases where each phase will take towards its intended goal. It is expected that these projects will be implemented within three years, as the maturity level is expected to reach No. 5, i.e. the national or regional level (SDI).

The figure below indicates the geographical maturity of the Municipality of Madinah according to the results of the strategic plan for GIS in the Municipality that was prepared by the consultant, where the gray rectangle shows the current level of geographical maturity of the Municipality of Madinah, while the orange rectangle shows the level of geographical maturity expected to be reached after implementing the projects in full within The next three years.



the shape 1: The level of geographical maturity of the Municipality of Medina

Recommendations for Information Infrastructure Projects (SDI)

The projects are classified into five main programs:



the shape 2: Classification of projects

The tables below show a comprehensive list of all projects that have been identified to upgrade to the level of an electronic geographic data infrastructure (SDI).

Program 1: Organizational Strengthening

Project code	project name
O03	Training and capacity building
O04	Awareness and publicity

Program 2: Infrastructure strengthening

Project code	project name
I01	Assessment and planning to strengthen the infrastructure for the
I02	projects account. Implement the infrastructure development plan for the projects

Program 3: Developing and Sharing a Data Warehouse

Project code	project name
D01	Developing a geographical data
D02	warehouse, developing data standards
D03	and procedures, updating the base map
D04	Development of plans and land records data (Map <u>Cadastral</u>
D05	Development of naming and numbering
D06	system Expansion and development of the data warehouse

Program 4: Business Process Enhancement

Project code	project name
A01	Medina explorer
A03	Security and user privileges control Linking and
A04	synchronizing geographical databases
8 A0	Development of the GIS portal

Project code	project name
A10	Developing the data update process

Methodology for defining projects

The following elements will be defined for each of the projects identified:

- project name
- Project number: the number that was assigned to the
- project. Description of the project: a general explanation of the project
- Project objectives: The objectives provided by the project or program.
- Duration of implementation: The time period required to implement the project
- Timelines and factors that the project depends on: Any constraints or dependencies that affect the success of the project or program implementation are listed in this section.
- The human cadres required to implement the project: Determine the total cadres and the months of work required to carry out the
- project. Estimated cost: which was calculated based on the number of human cadres and specializations required to implement each project, in addition to the hardware and software costs.

Description of projects

This section deals with all the projects that must be implemented to upgrade to the level of an electronic infrastructure for geographical data (Spatial Data Infrastructure - SDI), as the description of the projects was approved according to the specifications that were explained in the previous paragraph:

Project 1: Developing a GIS Data Warehouse

Program name	Development and sharing of a data warehouse
project name	Development of a Geographical Data Warehouse (GIS Data Warehouse) D01
project number	
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none">• Reviewing, improving, designing and documenting the database• design Developing a periodically updated unified central data warehouse• Migrate existing geographic data to the central data warehouse
Project goals	<ul style="list-style-type: none">• Ensure reliable information• Provide systems required for use by users• Improving departmental productivity• Ensuring municipal services on a world class level
Duration of implementation	6 Gregorian months
Time data and factors On which the project relies the	-
required human resources To implement the project	56
Estimated Cost	1,380,000 SAR

Project 2: Preparing work standards, standards and procedures for information exchange

Program name	Development and sharing of a data warehouse
project name	Preparing standards, standards and procedures for working on information exchange (Standards and Procedures DATA)
project number	D02
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Set drawing standards on AutoCAD program • Disseminating drawing standards internally in the secretariat and circulating them to all contractors and consultants who deal with the secretariat • Develop ownership of geographical data and determine responsibilities for updating it • Review, document and publish data updating procedures , To include Procedures for verifying field surveys when needed • Preparing standards and criteria for exchanging geographical information between the Geographic Information Systems Department and each of the other departments of the Secretariat and external parties. Establishing procedures for collecting and monitoring geographical locations through the use of the GPS system, and determining the mechanism for extracting and uploading data • Collecting AutoCAD files, evaluating them, and developing a plan to migrate them to the geographical data repository • Collecting and evaluating paper maps and developing a special transfer plan for them.
Project goals	<ul style="list-style-type: none"> • Quick and easy access to information and an organized way to share it that increase customer satisfaction • Provide effective data protection and property rights • preservation, improve departmental productivity • Ensure reliable information
Duration of implementation	8 calendar months
Time data and factors It is based on a project to develop a geographic data repository (GIS Data)	
On which the project depends (D01) Warehouse	

The required human cadres To implement the project	24 people
Estimated Cost	1,200,000 SAR

Project 3: Linking and synchronizing geographical databases

Program name	Enhancing business procedures
project name	Linking and synchronizing geographical databases
project number	A04
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> Development of tools for synchronizing geographic data between ESRI-based data warehouse and Database built on Oracle Spatial technology This will be needed Synchronization Until all displacement is completed <p style="text-align: center;">Applications Built-up On Technique Spatial Oracle</p>
Project goals	<ul style="list-style-type: none"> Ensure fresh geographic data in ESRI format Improves departmental productivity Ensure reliable information Ensuring municipal services on a world class level
Duration of implementation	4 Gregorian months
Time data and factors On which the project depends	Based on the Warehouse GIS Data Development Project (D01)
The required human cadres To implement the project	10 people
Estimated Cost	427,500 SAR

Project 4: Geographical Data Updates

Program name	Enhancing business procedures
project name	Geographical data updates
project number	A10
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> Identify and analyze geographic information systems' needs Edit data And updated. Automate data and Review Amendment approval processes . Developing web tools for editing geographical data Development Tools to Upload geographic data to the central database
Project goals	<ul style="list-style-type: none"> Ensure fresh geographic data in ESRI format Improves departmental productivity Ensure reliable information Quick and easy access to information and an organized way to share it that increase customer satisfaction
Duration of implementation	6 calendar months
Time data and factors On which the project depends	<ul style="list-style-type: none"> It is based on a project to develop a geographic data repository (GIS Data (D01) Warehouse It is based on a project to prepare work standards, standards and procedures on information exchange (DATA Standards and Procedures) (D02
The required human cadres To implement the project	23 people
Estimated Cost	1,057,500 SAR

Project 5: Security and User Powers Control

Program name	Enhancing business procedures
project name	Security and user rights control
project number	A03
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none">• User management• Define roles• Define permissions and privileges to geographic data (layers, fields, regions) and jobs• Security and monitoring of users' access to the geographic data repository
Project goals	<ul style="list-style-type: none">• Raising the level of safety for preserving geographical data.• Ensuring municipal services on a global level
Duration of implementation	2 months
Time data and factors On which the project relies the	It depends on all applications and systems in the secretariat
required human resources To implement the project	7 people
Estimated Cost	255,000 SAR

Project 6: Madinah Explorer application development

Program name	Enhancing business procedures
project name	Madinah Explorer application development
project number	A01
Description of the project	<ul style="list-style-type: none"> • The project will include the following tasks: • Geolocation • Explorer applications for smart devices • Review the most important layers for GIS users, Advanced Map • Production Application • Providing maps and basic tools to control the map through the website, which can be operated on tablets, mobile phones and computers • Provides a navigational map with driving directions • Providing tools for citizens that enable them to report complaints by identifying the location on the mobile phone (problems with facilities and services) with the ability to take a picture and upload it.
Project goals	<ul style="list-style-type: none"> • Helping Medina residents and visitors to find sites and move from one location to another • Improving departmental productivity • Ensuring municipal services on a world class level
Duration of implementation	6 calendar months
Time data and factors On which the project depends	<ul style="list-style-type: none"> • Based on the Warehouse GIS Data Development Project (D01) • Based on geographic data repository expansion project (D06)
The required human cadres To implement the project	9 people
Estimated Cost	697,500 SAR

Project 7: Expanding and developing the geographical data repository

Program name	Development and sharing of a data warehouse
project name	Expanding and developing the geographical data repository
project number	D06
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Developing any geographical layers that are not currently available in the existing data warehouse and that departments and applications need. • Evaluate the available AutoCAD files on paper to take advantage of them. Additional layers development includes: <ul style="list-style-type: none"> ○ The navigational road network of Madinah ○ Street furniture and urban elements ○ Environmental foci ○ historical location ○ Automated teller machines, communication towers ○ The investment sites include the area, type of investment, owner of the investment ... etc. ○ Markets and shops sites neighborhood ○ libraries ○ Social and sports centers such as swimming pools, children's playgrounds, nurseries, game cities and recreational tourism projects such as zoos, parks and playgrounds as ○ classification, surveying, etc. ○ Layer indicative panels ○ Slaughterhouses ○ Survey levers - enter survey data, zoning ○ lines
Project goals	<ul style="list-style-type: none"> • Providing a central database that includes all geographical data that the departments need • Improving departmental productivity

	<ul style="list-style-type: none"> Ensuring municipal services on a world class level
Duration of implementation	32 AD
Time data and factors	<ul style="list-style-type: none"> It depends on the project to update the basemap (D03)
On which the project relies the	<ul style="list-style-type: none"> Depends on application requirements by departments
required human resources	138 people
To implement the project	
Estimated Cost	2,520,000 SAR

Project 8: Update the base map

Program name	Development and sharing of a data warehouse
project name	Update the base map
project number	D03
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Review your basemap • Collect AutoCAD files , Evaluated , Develop a data migration plan . • Collect and evaluate blueprints The Paperless and put Transfer plan Their own. • Develop a plan for modernization and Check the basemap • Reviewing the current situation of the aerial and satellite photographers available in the Municipality, and developing a plan to purchase some of the required photographers And the These visualizations may be used to verify and update data. • Measures Will Includes verifying data through field surveys from the field when needed. • Layer contour lines development And elevations. You will use this layer to develop your 3D map To Medina. • Update and correction Basemap, based on the modernization plan.
Project goals	<ul style="list-style-type: none"> • Provide a correct, complete and updated base map that meets the needs of all departments of the Municipality and the relevant authorities • Improving departmental productivity • Ensuring municipal services on a world class level
Duration of implementation	32 AD
Time data and factors On which the project depends	<ul style="list-style-type: none"> • It is based on a project to develop a geographic data repository (GIS Data (D01) Warehouse
The required human cadres To implement the project	216 people
Estimated Cost	4,485,000 SAR

Project 9: Development of the Geographic Information Systems Portal (ArcGIS Portal)

Program name	Enhancing business procedures
project name	Development of the geographic information systems portal
project number	A08
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Providing a means through the portal for exchanging geographical • data. Providing a means through the portal for exchanging index data • Developing mechanisms and infrastructure to facilitate data exchange and information dissemination
Project goals	<ul style="list-style-type: none"> • Increasing customer satisfaction through the use of GIS techniques. Ensuring • a highly effective service for clients through GIS • Enhancing electronic services by building them through GIS techniques • Increase the effectiveness of planning, analysis and • decision-making. Ensure an access to geographic information • sources. Improve productivity and service quality, increase response • speed, improve departmental productivity • Ensuring municipal services on a world class level
Duration of implementation	6 Gregorian months
Time data and factors On which the project relies the	-
required human resources To implement the project	15 people
Estimated Cost	2,400,000 SAR

Project 10: Developing the base map for the governorates - the first stage

Program name	Development and sharing of a data warehouse
project name	Developing the base map for the governorates - the first stage
project number	D07
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Executing the tasks of creating the base map for all governorates of the Medina region, where the names of the governorates that will be within the scope of the project will be determined during the preparation of the bid book for the first phase of the project • Collect AutoCAD files , Evaluated , Develop a data migration plan . • Collect and evaluate blueprints The Paperless and put Transfer plan Their own. • Develop a plan for modernization and Check the basemap
Project goals	<ul style="list-style-type: none"> • Providing a correct, complete and updated base map for the Madinah region that meets the needs of all Municipality departments and the relevant authorities • Ensuring municipal services on a world class level
Duration of implementation	6 Gregorian months
Time data and factors On which the project relies the	-
required human resources To implement the project	15 people
Estimated Cost	Depends on the area of the provinces

Project 11: Development of the base map for the governorates - the second phase

Program name	Development and sharing of a data warehouse
project name	Development of the base map for the governorates - the second phase
project number	D08
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> Carrying out the tasks of creating the base map for all governorates of the Madinah region, where the names of the governorates that will be within the scope of the project will be determined during the preparation of the bid book for the second phase of the project Collect AutoCAD files , Evaluated , Develop a data migration plan . Collect and evaluate blueprints The Paperless and put Transfer plan Their own. Develop a plan for modernization and Check the basemap
Project goals	<ul style="list-style-type: none"> Providing a correct, complete and updated base map for the Madinah region that meets the needs of all Municipality departments and the relevant authorities Ensuring municipal services on a world class level
Duration of implementation	6 Gregorian months
Time data and factors On which the project relies the	-
required human resources To implement the project	15 people
Estimated Cost	Depends on the area of the provinces

Project 12: Development of the base map for the governorates - the third phase

Program name	Development and sharing of a data warehouse
project name	Development of the base map for the governorates - the third phase
project number	D09
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Executing the tasks of creating the base map for all governorates of the Madinah region, where the names of the governorates that will be within the scope of the project will be determined during the preparation of the bid book for the third phase of the project • Collect AutoCAD files , Evaluated , Develop a data migration plan . • Collect and evaluate blueprints The Paperless and put Transfer plan Their own. • Develop a plan for modernization and Check the basemap
Project goals	<ul style="list-style-type: none"> • Providing a correct, complete and updated base map for the Madinah region that meets the needs of all Municipality departments and the relevant authorities • Ensuring municipal services on a world class level
Duration of implementation	6 Gregorian months
Time data and factors On which the project relies the	-
required human resources To implement the project	15 people
Estimated Cost	Depends on the area of the provinces

Project 13: Assessment and planning to strengthen the infrastructure for the project account

Program name	Infrastructure strengthening
project name	Evaluation and planning to strengthen the infrastructure for the calculation of projects
project number	lo1
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Review secretariat requirements • Design Systems architecture and inclusion of its requirements from Devices , And software Geographic information systems , Networking, and products 3rd party product , Remote sensing software , Etc. ...
Project goals	<ul style="list-style-type: none"> • Establish an integrated information • infrastructure to improve departmental productivity • Ensuring municipal services on a world class level
Duration of implementation	1 calendar month
Time data and factors On which the project depends	<p>This project falls under the strategic plan projects of the General Administration of Information Technology, which will in turn implement this project.</p>
The required human cadres To implement the project	1
Estimated Cost	Determined by the General Administration of Information Technology

Project 14: Implementation of the infrastructure development plan for the projects account

Program name	Infrastructure strengthening
project name	Implementation of the infrastructure development plan for the projects account
project number	lo2
Description of the project	The project will include implementation tasks Systems architecture
Project goals	<ul style="list-style-type: none">• Establish an integrated information infrastructure• Improving departmental productivity• Ensuring municipal services on a world class level
Duration of implementation	6 Gregorian months
Time data and factors On which the project depends	<ul style="list-style-type: none">• Depends on project evaluation and planning to strengthen the infrastructure for the account Projects (I01)• This project falls under the strategic plan projects of the General Administration of Information Technology, which will in turn implement this project.
The required human cadres To implement the project	1
Estimated Cost	Determined by the General Administration of Information Technology

Project 15: Training and Capacity Building

Program name	Organizational strengthening
project name	Training and capacity building
project number	O03
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Project tasks must be repeated annually • Developing a capacity building plan for the GIS team and other departments of the Secretariat . • Implementation of the capacity building plan f Provide Training needed . • Strengthening staff capabilities of the GIS team so that they can spread awareness to GIS and conduct Training courses Internally (Train the trainers). • Attending conferences .
Project goals	<ul style="list-style-type: none"> • Staff capacity strengthening for GIS team spread awareness to Geographic Information systems in the secretariat 32 months AD
Duration of implementation	
Time data and factors On which the project relies the	This project can be integrated with other projects
required human resources To implement the project	2
Estimated Cost	870,000 SAR

Project 16: Awareness and Publicity

Program name	Organizational strengthening
project name	Awareness and publicity
project number	O04
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Project tasks must be repeated annually • Developing a stakeholder engagement plan to ensure their continued support and participation, raising awareness and providing the necessary support to all departments to access GIS applications in the Secretariat • Preparing promotional materials and organizing advertising campaigns • Hold frequent GIS awareness seminars and courses, participate in conferences and exhibitions • Publish news and emails for geographic information systems • Enhancing geographic information systems by displaying posters about geographic information systems in the secretariat's offices
Project goals	<ul style="list-style-type: none"> • Improving and enhancing citizens' awareness of the services of the Municipality of Medina. Maximizing the importance of using geographic information systems and spreading awareness among users • Motivating employees and retaining qualified and trained
Duration of implementation	employees, 32 AD
Time data and factors On which the project relies the	This project can be integrated with other projects
required human resources To implement the project	31
Estimated Cost	765,000 SAR

Optional projects

Project 17: Development of Cadastral Map and Land Registry Data

Program name	Development and sharing of a data warehouse
project name	Cadastral Map Development
project number	D04
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> Collecting and evaluating land registry charts and data Correct incorrect plans by field surveying. Convert the charts to GIS format Reside in the central geographic database Developing the mechanism for continuous modernization through the General Administration of Lands and Properties
Project goals	<ul style="list-style-type: none"> Standardize station and data format on GIS Standardize information source Integration of land plans with the base map of Medina, 32
Duration of implementation	AD
Time data and factors On which the project relies the	It depends on the project to update the basemap (D03)
required human resources To implement the project	288
Estimated Cost	5,040,000 SAR

Project 18: Development of the naming and numbering system

Program name	Development and sharing of data
project name	warehouse Development of the naming and numbering system
project number	D04
Description of the project	<p>The project will include the following tasks:</p> <ul style="list-style-type: none"> • Development of addressing and numbering system • Review and completion of street numbering • The project does not include establishing a new numbering system, but it is intended to implement the numbering system on the map. • Inventory and collect addressing data and populating it into the base map
Project goals	<ul style="list-style-type: none"> • Provide correct and updated data for electronic addressing through the base map of Madinah
Duration of implementation	32 AD
Time data and factors On which the project relies the	It depends on the project to update the basemap (D03)
required human resources To implement the project	372
Estimated Cost	3,840,000 SAR