GIS BASED LAND RECORD & OPERATION MANAGEMENT SYSTEMRMS

For DHA Lahore



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Session Outline





► Objective:

Streamline land acquisition processes and improve efficiency in DHA Lahore's Land Acquisition Branch.

► Solution:

Introducing a comprehensive GIS-based system tailored to the specific needs of DHA Lahore's land acquisition operations.

Benefits:

Improved efficiency and accuracy in land acquisition processes.

- Enhanced data management and analysis capabilities.
- Secure access control and data confidentiality.
- Streamlined communication and collaboration within the branch.

Components

- System Architecture
- User Role-Based Management System
- Content Management System (CMS)
- Land Ledger Management
- Core GIS Mapping Application
- Operation Management System
- QR Code-Based Map Request Requisition



System Architecture

- PostgreSQL: Manages user roles, logs, and attribute data.
- PostGIS: Geospatial database extension for PostgreSQL.
- GeoServer: Provides Web Map Service (WMS), Web Feature Service (WFS), and offline mb tile caching.
- PHP: Utilized for APIs.
- Apache: Web server software.
- JavaScript (JS): Programming language for web development.
- Leaflet: A popular JavaScript library for interactive web maps.
- Bootstrap: Front-end framework for developing responsive websites.

JavaScript













System Architecture



Centralized Geodatabase

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PostgreSQL

PostGIS

User Role-Based Management System

- Handles user authentication, management, and authorization.
- Manages user credential operations.
- Implements role-based management for modules and sections.

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Content Management System (CMS)

- Manages modules.
- Handles project and assignment branch management.
- Facilitates notification and communication.
- Implements role-based data access.
- Generates reports and performs analysis.

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- Digitizes complete jamabandi records.
- Records mauza, khssra, khewat, khatooni data.
- Manages file records including accurate land details, possession, sale deed, mutation, land provider, and land owner information.
- Maintains khasra balances.
- Manages all data entry, data quality control, and generates reports.



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Land File Purchase Entry form and Acquired, Possession, Saledeed, Mutation, Land Owner, Land Provider



Data Digitization progress daily, monthly and total count in digits and charts

-May-2024 16-May-2024 17-

- Integrates GIS application with ledger , file offering and intimation data set.
- Digitizes complete revenue data into vector format in UTM coordinate system
- Visualizes land provider-wise land on GIS map with images such as demarcation images, newspaper advertisements, and sale deed images.
- Incorporates multiple vector layers with attributes including phase boundary, sector boundary, mauza, khasra, offered land, purchased land, extensions boundary, plots, roads/railways, and water lines.
- Utilizes offline MB cache satellite imagery.
- Enables spatial and attribute queries.
- Integrates drone video with location and streaming capabilities.
- Integrates planning data with khasra.
- Facilitates phase-wise filtering and searching by attribute.





Rectify Revenue Map With Ground



Vectorization of data in geodatabase at low level geometry.(Polygon, Polyline, Point, direction) in UTM



Digitize Revenue Data



Final Map





2

Prepared Based Satellite Map in MB Cache Format

Map Panel

Overlay Vector Data Layers with Attributes:

- Phase Boundary
- Sector Boundary
- Mauza
- Khasra
- Offered Land
- Purchased Land
- Extensions Boundary
- ► Plots
- Roads/Railway
- ► Water Lines



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Map Panel



Integrated Planning data with khasra

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Land Provider Record on GIS Map

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Operation Management System

Controls and manages daily progress and activities of the team.

- Khasra Verification Module
- Land Purchase and Progress Module
- File Rates Module
- Land Exemption Module
- QR Code-Based Map Request Requisition Module
- Team Progress Reports Module
- News and Updates Module



Khasra Verification Module

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88 Dashboard		Dashb	oard / Rep	orts																				
GIS MAP		Kha	asra Verifica	ation Report	No.9																			~
GIS Application	~	Na	me:Lt Col	(Retd) Saad	Saleem, ADL 10B																			
Khasra Verification	^	Sta	tus: Land S	tatus																				
 KVR Requisitions 		Ma	UZA: Julkay																					
 KV Reports 		Dai	e: 16-01-20	024 10:09:53			1																	
MAP REQUISITION							Total Kh	Land in asra			Land A	cqn [)etails				Bal La	and De	etails		Bal K	Land in hasra		
Map Requisitions	\sim	#	File No.	Khewat No	Land Khasra No. (New)	Land Khasra No. (Old)			Awa	ard	Purchased	M	lutation		Posn	Purc	hased	Mut	ation	Posn			Remarks	Settings
🚟 QR Code	\sim						к	M	к	м	(30)	ĸ	м	ĸ	м	к (,	м	ĸ	М	км	к	M		
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Reports	\sim																							
USER MANAGEMENT		2	66	148	1193		17	08			1 0	1	0	1	0						16	08		
2 Users Profile	\sim	3	46	148	1197		5	05			4 08-065	5 4	08- 065	4	08- 065						0	16-165		
OTHERS News & Updates	\sim	4	20, 46, 66, 74	141	1228		12	04			2 16-164	2	16- 164	2	16- 164						9	07-061		Ū
		5	83	112	1354		12	07		1	10 0	10	0 0	10	0						2	07		
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Khasra Verification Module

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88 Dashboard		Dashbo	oard / Rej	ports									
GIS MAP		Rep	ports										~
GIS Application	~	Sho	ow 10 e	entries							Search:		
Khasra Verification	^	#	Req.	Req. Status	Create at 💧	Update at 💧	Phase Name	Mauza 💧	Officer	Report Generated by	Tracking 🌢	Status	🔹 View 🜢
 KVR Requisitions 		1	9	Land Status	16-01-2024 10:09:53	16-01-2024 10:23:13	Ph-X - B	Julkay	Lt Col (Retd) Saad Saleem, ADL 10B	N/Sub (Retd) Muhammad Nawaz Qamar, Supdt	Processing		
 KV Reports 													
MAP REQUISITION		2	5	Land Status	15-01-2024 16:37:34	15-01-2024 16:45:35	Ph-IX - A	Motta Singh Wala	Lt Col (Retd) Zarar Bari, ADL	N/Sub (Retd) Muhammad Nawaz Qamar, Supdt	Shared	<i>"</i>	
Map Requisitions	~	3	8	Land Status	15-01-2024 16:18:06	16-01-2024 09:29:12	Ph-IX - A	Motta Singh Wala	Lt Col (Retd) Zarar Bari, ADL	Nk (Retd) Muhammad Ayub Khan, LDC	Processing		
器 QR Code	\sim	4	3	New Offer	12-01-2024 12:03:09	12-01-2024 12:04:07	Ph-IV	Charrar	Civ Azeem Sultan, GIS Tech	N/Sub (Retd) Muhammad Nawaz Qamar, Supdt	Shared	~//	
Map Category TEAM PROGRESS	~	5	0	Land Status	09-01-2024 12:55:27	09-01-2024 12:56:30	Ph-X - A	Raja Bole	Lt Col (Retd) Asad Ullah Sheikh, ADL	Nk (Retd) Muhammad Ayub Khan, LDC	Shared	~	
🗇 Reports	~	6	0	New Offer	09-01-2024 12:41:04	12-01-2024 14:45:46	Ph-X - A	Malkho ki	Lt Col (Retd) Asad Ullah Sheikh, ADL	Nk (Retd) Muhammad Ayub Khan, LDC	Processing		
USER MANAGEMENT		Cha		C of C ontring									
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OTHERS													
🗐 News & Updates	~							© Copyright DH Designe	IA Lahore. All Rights Reserved ad by GIS Section Lacqn				

News & Updates

Verification Report approval and pdf download

Land Purchase and Progress Module

2										
#	Date	Phase Name	Total Land	Built up	PVT Societies	Acquirable Land	Acquired Land	Balanced Land	Excavated Land	Мар
1	2023-02-21	Phase-1	22222	22222	22222	22222	22222 22 %	22222 22 %	22222	a
2	2022-12-01	Phase-2	194767	34679	32326	85627	22524 26.1 %	67624 84.9 %	32457	۵ ۵
3	2023-02-21	Phase-3	33333	33333	33333	33333	33333 33333 %	33333 33333 %	33333	a
4	2023-02-20	Phase-4	2313	123	123	123	12312 123 %	123 12321 %	12312	α I
5	2023-02-02	Phase-5	476547	55765	66765	56765	64567 66 %	55444 55 %	66444	四
6	2023-02-15	Phase-6	457656	34532	43545	43554	43536 435 %	34544 435 %	45444	每
7	2023-02-14	Phase-7	123	123	123	12312	123 123 %	123 123123 %	123	W
8	2023-02-22	Phase-8	33870	492	492	492	492 123 %	492 123 %	492	<u>م</u>] ه
9	2023-02-22	Phase-9	369	369	369	369	369 123 %	369 123 %	459	<u>م</u>
10	2023-02-21	Phase-10	343566	32455	23488	32499	66666 23.5 %	24467 23.5 %	24367	(C)



File Rates Module



• Presents section-wise file rate information in charts and tables.

Land Exemption Module

💷 Ex	emption																						
C																							
						Resdl													Cmrl				
			Land	Exempt	ion %	2К			1K			10M			5M				4M &&				
#	Date	Phase	Offered	Rsdl	Cmrl	Due	Issued	%	Due	Issued	%	Due	Issue	si %	Du	e Iss	ued	%	Due	Issued	%	Action	
1	2023-02-27	Phase-1	1 Acr 2 k	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19		
2	2023-02-27	Phase-2	213 Acr 2342 k	234	234	234	234	234	234	234	234	234	234	234	4 234	234	l	234	234	234	234	Ø	
3	2023-02-28	Phase-10	579 Acr 669 k	579	579	579	268	334.5	388	690	345	690	690	284	45 380	780)	345	690	780	345		 Image: A second s
×																							
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				E	xemption	~	2К		1	к			10M			5M				4M &&			
#	Date	Phase	Land Offer	ed R	sdl C	mrl	Due Iss	ued	% E)ue Issu	ed	%	Due	Issued	%	Due	Issu	ed	%	Due I	ssued	%	Action
1	2023-02-28	Phase-10 - A	234 A 234 K	cr 2:	34 23	34	234 23	4	324 3	45 345		345	345	345	345	345	435		345	345	345	345	0
1	2023-02-27	Phase-10 - B	345 A 435 K	cr 34	45 34	45	345 34	;	345 4	3 345		345	345	345	5345	35	345		345	345	435	345	a

• Manages land exemptions for land providers, including residential, commercial, issued, percentage, etc.

QR Code-Based Map Request Requisition Module

- Creates online requisitions by clerks and approves by ADL for GIS team.
- Generates system-generated QR codes for each requisition and attaches them to printed maps for hard copy integration.
- Maintains a complete archive for map printing.
- Tracks complete history and progress for each map category on a daily and monthly basis.

Categories include:

- 1. Blowup map on initial offer
- 2. Preparation of approval maps
- 3. Verification of DMR data
- 4. Identification of Government Land in DHA Boundary
- 5. Identification of Encroachment and Litigation in DHA Boundary
- 6. Location of plots based on khasra numbers
- 7. Updation of acquired land according to development data
- 8. Updation of all phases revenue data
- 9. Alignment of planning data on Satellite Imagery
- 10. Temporal analysis of position
- 11. Biometric Verification of Landowners for Sale Deed



Map Request Requisition Module

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		Requisitio	on id: [1223]			
# Dashboard		Ser	Heading	Details		
GIS MAP		1.	Requisition Status	Pending Approval By ADL @ 16-05-2024 09:45:02		
GIS Application	~	2.	Phase	Ph-IV		
KHASRA VERIFICATION	~	3.	Mauza	Amer Sidhu		
MAP REQUISITION		4.	Sector	Nil		
Map Requisitions	^	5.	File No.	421		Creates
 Map Summary 		6.	Plot No.	Nil		online
 Create Requisition 		7.	Khasra No (New)	1541,1542,1543,1575,& 1582	<u>ب</u>	requisitions
 Requisitions 		8.	Khasra No (Old)		۲)	by clerks
题 QR Code	\sim	9.	Мар Туре	Dmr Map		and
III Map Category	\sim	10.	Purpose/Requirement	For Land Status		
TEAM PROGRESS		11.	initiate by	Hav (Retd) Muhammad Arshad, UDC		approves
🗇 Reports	\sim	12.	Officer (Rank,Name & Designation)	Lt Col Muhammad Sohail Aslam, ADL		by ADL for
USER MANAGEMENT		13.	Remarks			GIS team
2 Users Profile	~					9
OTHERS	\sim				li	
in news & opdates		14.	Approved By:	• System		
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				O System		

Map Request Requisition Module

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GIS OMS v 2.0		≡												😤 😤 🚱	Sohail Akbar 🕶
88 Dashboard		QR	-Code												
GIS MAP GIS Application KHASRA VERIFICATION	ř												v QR-Code		
MAP REQUISITION	Č,		#+	QR Code	Reference	Req. ID	Version	Update Version	Area 🕴	Category	Officer 🕴	Staff 💧	MXD +	Map ϕ	Reque: at
鬷 QR Code	^		1		GIS-0001456	1215	1	- +	Ph-X - A	Land Approval Map	Khurshid Ahmed	Muhammad Ismail	D:\Phase-XUTMMXD2022\Ph- X_Soura_File_28_15-5-2024_1.mxd	Ph-X_Soura_File_28_15-5-2024_1.jpeg	15-05-2
 Create QR-Code Archive QR-Code 			2		GIS-0001455	1213	1	- +	Ph-X - A	Land Approval Map	Khurshid Ahmed	Muhammad Ismail	D:\Phase-XUTMMXD2022\Ph- 10_Khan_Nau_File_143_Khasra_3491- 3770_15-5-2024_1.mxd	Ph- 10_Khan_Nau_File_143_Khasra_3491- 3770_15-5-2024_1.jpeg	15-05-2
Map Category	~		3		GI5-0001454	1214	1	- +	Ph-X - A	Land Approval Map	Khurshid Ahmed	Muhammad Ismail	D:\Phase-XUTMMXD2022\Ph- 10_Ahlu_File-96_Khasra_442-812_15- 5-2024_1.mxd	Ph-10_Ahlu_File-96_Khasra_442- 812_15-5-2024_1.jpeg	15-05-2
Reports USER MANAGEMENT	~		4		GIS-0001453	1155	1	- +	Ph-IX - A	Posn Map	Zarar Bari	Tahir Nabi Qaisar	D:\Phase-9_28-5-20112022 MXD_Ph- 9_3-1-2022\Ph-9_MTSW_Khasra_509- 1108_15-5-2024_1.mxd	Ph-9_MTSW_Khasra_509-1108_15-5- 2024_1.jpeg	15-05-2
OTHERS	~		5		GIS-0001452	1205	1	- +	Ph-X - B	Land Status	Saad Saleem	Aamir Hayat	D:\Phase-XUTMMXD2022\Ph- 10_Rora_Hassan-Ishtiaq_Khasra_670- 688_14-5-2024_1.mxd	Ph-10_Rora_Hassan- Ishtiaq_Khasra_670-688_14-5- 2024_1.jpeg	14-05-2
			6		GIS-0001451	1203	1	- +	Ph-X - B	Land Offers Map	Saad Saleem	Aamir Hayat	D:\Phase-XUTMMXD2022\Ph- 10_Julkay_New-Ofr_LP- Malik_Munawar_LP_Ahmed- Malik_13-5-2024.mxd_1.mxd	Ph-10_Julkay_New-Ofr_LP- Malik_Munawar_LP_Ahmed- Malik_13-5-2024.mxd_1.jpeg	13-05-2

Generates systemgenerated QR codes for each requisition and attaches them to printed maps for hard copy integration.



Print a hard copy of a map with a QR code



Scan the QR code using a scanner



System searches for the soft copy and MXD link in the drive

Map opens in ArcMap and web portal for update

Map Request Requisition Module

QGIS OMS v 2.0	≡	142 🚦 🎯 Sohail Akbar 🗸
88 Dashboard	Requisitions / Summary	
GIS MAP GIS Application KHASRA VERIFICATION KHASRA Verification MAP REQUISITION	Today Map Isat Month Map Last Year Map Last Year Map 0 69 69 16 Apr 2024 to 16 May 2024 731 17 May 2023 to 16 May 2024 16 Apr 2024 to 16 May 2024 17 May 2023 to 16 May 2024	Total Map 5
Map Requisitions	Monthly Map Print Count	<u>^</u>
 Create Requisition 	250	=
 Requisitions QR Code 	200	
III Map Category V		
Reports ~		
USER MANAGEMENT	50	
others News & Updates V	0 May 2022 Jun 2022 Sep 2022 Nov 2022 Dec 2022 Jan 2023 Feb 2023 Mar 2023 Apr 2023 May 2023 Jun 2023 Jul 2023 Aug 2023 Sep 2023 Oct 2023 Nov 2023 Dec Plain Inverted Polar	z 2023 Jan 2024 Feb 2024 Mar 2024 Apr 2024 May 2024

Tracks complete history and progress for each map category on a daily and monthly basis.

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News & Updates

2022 Jun 2022 Sep 2022 Nov 2022 Dec 2022 Jun 2023 Feb 2023 Mar 2023 Mar 2023 May 2023 Jun 2023 Jul 2023 Aug 2023 Sep 2023 Oct 2023 Nov 2023 Dec 2023 Jun 2024 Feb 2024 Mar 2024 Mar 2024 May 2024

Team Progress Reports Module



Generates progress reports for the GIS team map making and other assignments by the system.

News and Updates Module

QGIS OMS V 2.0		≡								2 16	Sol	hail Akbar
B Dashboard											☆ New I	Update
GIS MAP		News &	Updates									~
GIS Application	~	Show N	0 entries						Search	:		
Khasra Verification	~	# 🔶	Picture	Heading		Create at	•	Update at	Update	by	Action	•
MAP REQUISITION	~		EXAMPLE A LA CARACTERIZACIÓN DE LA CARACTERIZ									
I QR Code	~	1		Internship Programme	d 2023 in DHA Lahore	24-08-2023 1	5:09:09	24-08-2023 15:09:09	admin		Ħ	
Map Category TEAM PROGRESS	~											
🗇 Reports	~		(*)									
USER MANAGEMENT 왕 Users Profile	~	2	DHA	14 August Celebrations in DHA Lahore	24-08-2023 15:07:41	5:07:41	24-08-2023 15:07:41	admin		Ħ		
News & Updates	^		LAHORE									
 New Updates 												
 News & Updates 		2		Land Automation ⁻ Inno	ovation in Land Acon Branch	24.09.2022.1	E-03-E2	24 09 2022 15:02:52	admin			
 Organogram Directory 		5			24-08-2023 1	15.02.55	24-08-2023 15:02:53					
		4	na i the here	DHA Celebrates Defer	nce Day 2023	OE 00 3033 1	-3-34+44	0E 00 2022 12:21:44	5300 B		2	
 News & Updates Organogram Directory 												

Shares news and updates within the branch for information dissemination

Thank You

