Annexure-A

Addendum to the specification given in the standard bidding documents, following are in additional requirement from the utility (UGVCL) as under:

1. Server:

The minimum hardware configuration of the servers shall be:

- Multi-core Processor (Min. 2 X 8 core), Processor speed: 2.9 Ghz or better
- Minimum 2 Processors
- 128GB Main memory (RAM) and scalable up to 512 GB
- Hard disk - SAS HDD with 1 TB usuable space with RAID 10 or better configuration (For ISR Server SSD type hard disk with Min. 4 TB usable space)
- 19" Rack Mount kit
- 4 nos. of Gigabit Ethernet ports (2 nos. for DTS & Development Server)
- DVD-R/W drive
- One hot pluggable port for external Storage drive (Servers for which external storage connectivity is required)
- Redundant power supply (230 VAC) & fan

2. Operator Workstation

The minimum hardware configuration of operator workstation shall be:

- Multi core (min Quad), Processor Speed: 3.6 Ghz or better.
- 64 GB Main memory (RAM)
- 1TB Auxiliary memory (Hard disk drive)
- 21 inch LED colour monitors, Aspect Ratio- 16:9
- Graphic adaptor cards
- Sound card for audible alarms with configurable tones
- Keyboard & Mouse
- Dual 10/100/1000Mbps Ethernet ports
- Power Supply 230 VAC

3. LDMS Work station

Model with Industrial grade machine having fan less design with below minimum specifications:

- Multi core (min Quad) Processor speed, 3.6 GHz or later
- 64 GB Main memory (RAM)
- 1TB Auxiliary memory (Hard disk drive)
- 21 inch LED colour monitors, Aspect Ratio- 16:9
- Graphic adaptor cards
- Two speakers for audible alarms with configurable tones
- Keyboard & Mouse
- Dual 10/100/1000Mbps Ethernet ports
- Power supply 110VDC (Utility to confirm based on available Power supply in Substation)

Minimum Technical Specifications of Laptop	
Model	Model name should be specified by bidder
Processor	11th Generation Intel Core i7, 8 core or higher / AMD Raizen 7, 8 core or higher
Chipset	System on Chip Intel/AMD
RAM	8GB * 1, DDR4, 3200 MHz and upgradable to 32GB or higher
Hard Disk	1 TB PCIe NVMe SSD
Graphics Card	Inbuilt intel UHD / Iris graphics card/AMD Radeon or better
Network	Integrated Ethernet 10/100/1000LAN; Integrated wireless (WiFi type) 802.11b/g/n or better
USBPort	03 USB ports with at least 02 dedicated for USB 3.0
HDMIPort	One
RJ45 Port	One
Bluetooth	5.0 or better
WebCam	Integrated HD WebCam with Integrated Digital Microphones
Keyboard	Backlit keyboard
Pointer Device	Touchpad
Speakers	Integrated speakers, HD audio
Headphone Out/Microphone-in Combo Jack	One
Battery	Internal battery with minimum 5hrs backup or better
Display	14 to 15.6 inch diagonal, HD anti-glare LED Backlit, resolution 1920 x 1080 or better
Operating System	Preloaded Genuine Windows 11 professional edition (64 Bit)
OS Certification	Must be certified for Linux, Windows & DOS
AC Adapter	Standard Indian Adaptor
Other Accessories	Power cord and other required connection cord
Weight	Less than 2.00 kg
Laptop Bag	Laptop bagpack
Warranty	5 years onsite comprehensive with battery and charger

UGVCL
Uttar Gujarat Vij Company Ltd.
CIN – U40102GJ2003SGC042906

Annexure: B

- ERP system (Oracle)
- Existing SCADA/DMS system
- Customer care center (CCC)
- Online Bill Payment
- AT&C Losses System
- LT Metering & Billing system
- Helpdesk Support System
- Legacy Financial Accounting System (FAS)
- Legacy Billing and Revenue Information System (BRIF)
- E-Gram / Agency Cash collection system

Note: Bidder Should note that, all system is in working. For detail understanding , bidder can visit on their own in UGVCL with their core team

Annexure: C

Addendum to the specification given in the standard bidding documents, following are in additional requirement from the utility (UGVCL) as under:

1. **The bidder should have experience of deployment and commissioning all necessary Enterprise GIS software modules and features to meet the requirements of the specifications as stated in the Requirements Specifications of this document, the broad functional modules include**

1.01 Geographic Information System solution shall support modelling of High voltage, Medium voltage and Low voltage distribution network and associated assets including Generators, HV lines, HV Transformers, MV lines (OH & UG cables), Poles, Primary Substations, LV lines (OH, ABC & UG cables, 1Phase, 2Phase & 3Phase), Switchgears, Auto-Reclosers, Load Break Switches, Distribution Transformers, LV fuses, Retail & Bulk customers etc., using appropriate GPS coordinate system.

1.02 The proposed GIS shall support modelling of distribution generation capacity including roof top solar, solar farm, wind farm etc.

1.03 The GIS product shall have an industry standard Data Model and shall be CIM compliant. Standard adaptors to export the data in CIM model should be available off the shelf.

1.04 The proposed GIS shall support structured export of connected network in CIM/XML format for one-time initial load as well as incremental changes. Shall also support structured publishing of proposed network changes with ADMS system.

1.05 The proposed GIS shall support for Standard distribution operations such as Phase Change/Phase propagation, Replacement or Addition of Conductor, Rotation of phasing information, updating flow directions, updating voltages etc.

1.06 Availability of a mechanism for ensure the circuit/feeder number and proper phasing are propagated to topologically connected assets when a permanent electric network change occurs

1.07 The proposed GIS shall have standard Designing and Workflow Management Tool with easy to use design layout tools, Bill of Material(BoM) generation and cost estimation, Reporting for streamlining the entire design process and making it easier for users to "design to standards" and "build to design".

1.08 The proposed GIS shall have in built QA/QC tools for network and Landbase. There should be a Quality Management framework that shall provide robust data quality analysis and reporting, enabling users to

reduce data quality related costs. It should have a graphical user interface-driven management tool for use with application.

1.09 The solution shall support OpenLayers such as Google, Bing, Open street maps

1.10 GIS should support standard interface for network planning (Cymdist interface)

1.11 GIS should support standard interface for integration with SCADA/DMS

2. Modules for supporting an efficient network update and consumer mapping

2.01 Web Based Application for network design/update capabilities that can be accessed from field on mobile devices without any installation of apps.

2.02 The application shall provide the process-focused functionality for field and office users

2.03 The application shall be a single page web-app that shall enable users to make updates to the network data, without using the full desktop client application

2.04 The application shall be easy to deploy to 3rd parties and remote workers

2.05 The application shall be tightly integrated with desktop application providing thick client users with defined workflow to review and accept changes and run quality check tools before the updates are integrated to the as-build network

2.06 The application shall be configurable to enable only the specific types of updates and by the Authorised users.

2.07 The application shall enable users to update the geometry (points, lines, polygons) and attributes

2.08 The user shall be able to review the changes before submitting the changes to the back-end office users.

2.09 The user shall be able to view the changes already submitted.

3. The proposed solution shall have a proven Utility specific electric distribution data model with the generalized conducting model and flexible circuit model. The OOB data model shall include the following:

3.01 The proposed Utility data model and application shall be matured industry standard product supported by OEM with existence for more than 5 years and have been implemented by at least 10 electric distribution

utilities. OEM shall share a self-certification along with the list of reference customers meeting the said criteria.

3.02 The GIS database shall be deployment on standard OEM supported RDBMS (Oracle, SQL Server etc.) already in use by similar sized utilities – Bidder has to ensure the support of proposed RDBMS from its respective OEM.

3.03 The GIS Enterprise software package with latest version, and spatial database engine with industry proven database specifically for maintaining spatial networks and long transaction spatial handling scaling up to very large numbers of users and terabytes of data database. The system shall have to be Open GIS consortium (OGC) registered compliant product, time tested, widely deployed at multiple utilities worldwide.

3.04 **Data Security:** The system needs to provide comprehensive, flexible and reliable facilities to ensure proper user authentication, guarantee the privacy and integrity of data, manage the assignment of database privileges, and monitor database operations across the enterprise including the intranet and internet environments.

3.05 **Conducting equipment**: this includes objects such as cables, wires, switches and transformers. GIS database shall use specifications to define the non-changing properties of electrical assets, that is, those properties of the asset, such as manufacturer, material and so on, that are independent of the asset's role in the network.

3.06 Structure objects that capture the non-conducting assets of the utility such as the Poles, Manholes and Towers which are used to physically support or house the conducting network. Conducting equipment shall be mounted on or contained inside these structures. The structure model shall also provide facilities for modeling the underground network including trenches, duct line and manholes, and for modeling the relationship between structures and conducting equipment.

3.07 **Communications equipment:** these can be mounted or housed in structures

3.08 **Circuits and Sections**: for a comprehensive model to record the conducting equipment that comprises a specific circuit. This circuit can be broken up into discrete circuit sections for improved partitioning and management of the network. Circuits may be fed from other circuits (for example, meshed networks).

3.09 The data model shall partition the network by voltage level, into EHT, HT and LT networks. Any conducting equipment object shall be used in any of these networks: the actual network shall be specified

by the Network Type field. The value of the Network Type maps the geometry into the appropriate network and conducting equipment objects can only connect to other conducting equipment in the same network. All objects in the same network will connect, so all LT objects will connect to all other LT objects. It shall be possible to refine this by object collection and the ability to extend connectivity rules to be driven by attribute values. For example, it is possible to refine the connectivity model so that only LT equipment with the same voltage level will connect.

3.10 Conducting objects and Structure objects shall have a Status attribute that determines whether the object forms part of the current (as–built) network or the future (proposed) network.

3.11 The data model shall manage the Electrical phasing for the conducting objects

3.12 The data model shall maintain Specification records to define the non–changing properties of electrical assets. Assets shall be joined to a specification record.

3.13 The application shall be able to model the contents of structures, such as manholes and substations in a separate container object in its respective internal world map. The contents within the container shall be electrically connected with the geographical objects. For the underground network, an internal world can also display cross sections of connected trenches and duct lines and their contents.

3.14 Management of multiple coordinate spaces – or worlds – with full interaction between them for viewing, updating and tracing. For ex. a substation boundary shall be available in the geographic map but to avoid cluttering of map, the internal equipment and their connectivity shall be available in a separate view with intelligent interaction between the view for viewing, updating and tracing the network,

3.15 Templates: It shall provide the ability to save a set of objects and place them as one action. These saved configurations shall be used to populate the internal worlds of structures and are, for example, also used to store the configuration of devices which make up a composite switch.

3.16 Tracking database changes: Changes in a design shall be tracked to provides a simple log of whether a record was inserted, updated or deleted in a design. There shall also be an audit history tracking of all database changes that shall provide a more granular and more persistent record of change, recording which fields have changed.

3.17 **Asset:** A real physical conductor or item of equipment (single phase or multi–phase) in the network shall be modelled as an Asset. Each Asset shall have a specification, which records its inherent unchanging attributes. The remaining asset attributes shall be those which distinguish it from all physically and

electrically identical assets in the network, such as Asset ID, Serial Number and Date Manufactured. Assets will not have geometry.

3.18 **Installation:** An installation record shall be used to represents a location at which a single three-phase asset or up to three single-phase assets are placed and manages all the connectivity of the assets in the electrical network. An installation must have a geometry. The attributes of an installation shall be those which are common to all of the assets 'within' that installation, such as the type of network to which the assets are attached. The specifications of the assets within an installation will often be identical, but do not have to be.

3.19 **Phases:** Electrical networks may consist of one, two or three phases. To aid visualization of objects a single line or point shall be used on the map to represent electrical objects with multiple phases in the network. For the management of phases and the physical assets supporting the respective network installation, certain electrical objects shall be able to be managed as assets, installations, and specifications.

3.20 **Specification:** An asset's specification describing its unchanging physical and electrical properties, that is, those properties which are independent of whether the asset is connected to the network or not and how it is connected. Many individual assets in the network could have the same specification. Attributes stored in specifications might include manufacturer, rated current, rated voltage, resistance per unit length, material and so on.

3.21 This separation between role (installation) and device (asset) allows assets to be replaced at the installation without altering the connectivity of the electrical network. This means that third-party systems that consume the GIS data are less affected by operational changes in the network.

4. Planning and Design

4.01 The proposed solution shall support planning and design of future changes to the network, such as line extensions and upgrades. Designers shall be able to work on a 'future' or 'proposed' state of the network, to produce and validate designs, and to create construction plans and equipment data to support field crews.

4.02 he solution shall manage the life cycle of a design with a state model which controls the evolution of the design and triggers specific actions upon state transitions: For ex. designs shall be validated by quality

checks at defined stages as they progress through the state model. Design state models shall be configurable to support different modes of working, for example, when the planned network changes have been constructed, the 'future' state of the network can then be made 'current' to reflect the as–built state of the network. The solution shall also support customization to integrate the workflow with other enterprise applications.

4.03 The solution shall include functionality for costing a design by allowing users to assign cost objects to assets. There shall be a costing model which allows cost objects to contain specific costs for a specific design intent.

5. Existing, future and past views of the network

5.01 The data model shall support an existing and future view of the network, primarily to support network builds for consuming systems such as outage management systems and distribution management systems. These systems need to know both the current and future configuration of the network. The current view of the network shall represent the existing 'as–built' state and the future view shall show the effects of proposed changes on the existing network. All operations within a design, including circuit building shall work on the future view of the network.

5.02 Assets shall be associated with an installation in a way that allows users to view current (as built), future (designed) and past views of the network. This shall be modeled by associating the asset with its installation via an Existing Phase, a Future Phase or a Past Phase.

5.03 The lifecycle status of an installation shall be derived from the status of its constituent assets and shall determine whether an installation is considered as part of the current or future network, or both.

5.04 The Past Phase shall allow users to track where a specific asset used to be installed in the electrical network. Electrical equipment can have a very long lifespan and is often recovered from the field, serviced, and then installed elsewhere, so GIS shall allow users to identify where an asset has previously been in the network.

6. CIM Compliance

6.01 The solution shall be capable of integrating with external systems, which require a clean model of network connectivity. For example, the solution shall enable a Common Information Model (CIM) extract of network data to be loaded to DMS/OMS/ADMS applications

7. Asset Management

7.01 The solution shall provide native facilities for asset management or can integrate with an external asset management system.

7.02 The solution shall provide functionality to record essential information about assets, such as installation and maintenance dates, ownership, and specification information together with the asset's identifier and geographic location. The solution shall be able to record this information independently of other packages and can fulfil the asset management needs for electrical network.

7.03 Every asset shall have an asset identifier. When integrated with the asset management system, this asset id shall be used as a link to the corresponding data in the asset management system. In this case the asset management system records the properties of the asset, including the specification data. When the connected network model is exported from GIS to the ADMS or analysis engines such as load flow (for example, CYMDIST), the electrical properties required to support these complex electrical functions can be retrieved from the asset management system, because each asset in GIS can identify the correct reference to look up the properties. In this instance, there is no need to capture this detailed asset data in GIS

7.04 In either scenario, the GIS database shall provide connected network model and asset information to an ADMS or other engineering analysis packages, such as a system that performs transformer load management (TLM).

8. Offered solution should have mechanism for workflow based utility network digitization with in-built QC features.

9. The system must have capability for CIM based integration with advanced distribution management systems.

10. Direct Data Access

10.01 Registration and display of standard raster format without any conversion/import or translation including TIFF, PNG, JPEG, GIF, PCX, Targa, BMP, WMF, and CIT

10.02 Should provide direct access to special data from a variety of data sources including ESRI SHP files, Oracle spatial, GE Smallworld VMDS, Microsoft SQL server, MySQL, ESRI ArcSDE, databases and other industry standard data bases.

10.03 Direct Access means no data translations, which helps to ensure integrity. (Specify all supported direct access format).

11. The solution shall organize objects in the map by real world features that they represent such as roads, buildings, cables, or switches, transformers etc. When user creates an object using object classification its shall automatically take properties and values from its object class maintaining consistency and establishing standards though out the mapping data.

12. Shall support multi picture objects. For example, subtraction object may have a point geometry as well as boundary geometry stored within same object without duplication of any attributes.

13. "Shall have readymade and configurable templates for digitizing complex structured features sets for example:

    i. RMU Panel + switches

    ii. Pole+ HVDS Transformer+ Primary Fuse+ Secondary Fuse

Note– The above examples are only indicative the solution shall provide a framework for creation of templates."

14. **Workflow/ Wizard based Digitization:** Shall have the capability to automate repetitive tasks with a workflow based frame work and user interface. With this framework one shall be able build, save, and share simple and complex work flows with a simple GUI based editor. Workflows can include logic and initiate calls to other workflows. – all with a single mouse click improving productivity, efficiency, and consistency in results.

15. **Map Book:** It shall be possible to quickly and easily produce accurate, up–to–date tiled map books of service area and provide field crews with necessary information for the project.

16. **Publishing Tools:** It should be possible to distribute geospatial data maps and design in ways that meet organization's needs. It shall be possible to create maps and publish them to the internet quickly or distribute them as individual geo–referenced files, mainsheet PDF map books or paper plot.

17. Shall have an option of displaying attribute info on toll tip without clicking on the features

18. Complete set of GIS drawing tools related to snapping, splitting etc. shall be available.

19. ″General Editing:

- Bulk updates for common data propagation like feeder id, voltage levels, network type etc.
- Perform unlimited undo/redo operations
- Snap tips indicating what is being snapped to
- Dockable snapping dialog to make it Quick and easy to change″

20. ″Topology processing:

- Add Topology
- Add Feature to topology
- Add Rule to topology
- Create Topology
- Remove Features from Topology
- Remove Rule from topology
- Set tolerance levels
- Validate Topology
- Network Analysis″

21. ″Electrical Tracing (upstream, downstream, Both)

- Find Common Ancestors
- Find Connected Network Features
- Find loop in network
- Find Disconnected network features
- Isolate point on the network
- Shall support underground and overhead network
- Shall support customization of network analysis engine″

21.01 The system shall have tracing facility for tracing electrical network both up-stream and down-stream as per electrical network voltage hierarchy and also reporting mechanism for all traced objects with details like length of network, support structures, switching objects etc.

21.02 The trace function should be able to trace inside a feature like trace a cable inside a substation etc.

21.03 Multi-phase tracing: The system shall have tracing facility for tracing electrical network both up-stream and down-stream as per electrical network phase and also reporting mechanism for all traced objects with details like length of network, support structures, switching objects etc.

22. ″Data Analysis & Queries: The proposed software shall support the following data query and analysis capabilities:

- Buffer analysis using query builder
- Fuzzy Address Search (Assisted, Google style search)
- Assisted, Google style search for electrical assets
- Linear network analysis
- Attribute Query using Query builder
- Query on Google maps internally from GIS interface
- Spatial Queries using Query Builder"

23. Electric Utility Tools

23.01 The tool shall provide a mechanism to ensure the circuit/feeder number and proper phasing are propagated to topologically connected assets when a permanent electric network change occurs.

23.02 The ability to manage the electric distribution data by circuit.

23.03 Updates circuit information concerning conductor "backbone" and circuit extents. All facilities shall have the ability to know on which circuit they reside and if they have changed.

23.04 The ability to know which customers are associated with a circuit and figure circuit load based on that customer information.

23.05 The ability to export a changed circuit based on business rule triggers of key fields and equipment type.

23.06 Shall provide a framework for a consistent network of hierarchically related records. The circuit is a representation of set of objects (conductors, towers, insulators, jumpers etc) that have a common circuit id. It shall be possible to synchronize the updated circuit information across all objects

24. Standard Utility Specific Reports & Custom Reports: Shall have pre-defined utility specific reports available

25. DATA MODELLING

25.01 The system shall have capabilities to assimilate existing data model along with user friendly GUI based configuration environment to add/remove/modify any spatial/non spatial data.

25.02 The system shall have capabilities for editing extending domains/enumerators.

25.03 The system shall support multiple data model versions within the database

26. Multiple Database interface: Shall fully interface with other RDBMS, such as/Oracle/SQL Server.

27. DATA IMPORT/EXPORT: shall allow import and Export of data from other GIS formats.

28. Symbology

28.01 There should be a library of standard utility icons, symbols etc. for facility features like transformers, circuit breakers, isolators, battery bank, earth switch etc. The existing symbols from CST 4.0 needs to be migrated to the new EGIS platform.

29. Shall also be facility to modify and/or create, import new symbols

30. GIS Interoperability

30.01 It shall be possible to overlay geographic data layers from separate databases of other GIS providers with the utility network layers. The data shall then be rendered into a single interactive map accessible to the users via the web. Using any overlay or otherwise combine different ″map layers″ of the same geographic region.

30.02 It shall allow for querying objects and perform analysis within these Data layers and attributes.

30.03 The offered GIS system shall support methods, tools and services for data management in order to acquire, process, analyze, access, present and transfer such data between different users, systems and locations as per the OGC standards for geographic information. These standards are intended to support data and service interoperability between different environments. The contractor shall be responsible to demonstrate that the offered Software will provide these capabilities.

30.04 The offered EGIS system shall adhere to the OGC standards interface specifications

30.05 Web Map Server (WMS) Services to produces maps of georeferenced data, to create a standard means for users to request maps on the Web and to create a standard means for servers to describe the data holdings.

30.06 Web Feature Server and Filter (WFS) to provide access to geographic feature (vector) data, Support query requests and Implement interfaces for data manipulation operations on GML (Geographic Markup Language) features served from data stores that are accessible via Internet.

30.07 CIM: The data model of the EGIS shall be CIM compliant and shall have an OOB application to export data in CIM compatible format in CIM RDF/GML files. The application shall be able to be configured to export data in different versions of CIM standards.

31. Schematics

31.01 The system shall support the schematics functionality for the ability to create network schematics in which network objects have persistent representations in schematic views of the network.

31.02 User shall be able to create as many schematics as required and network objects can be represented on any number of them, according to the definition of the schematic.

31.03 The schematics engine shall generate a layout of the Schematic Node objects as close as possible to the layout of the corresponding network objects in the geographic world.

31.04 Users shall be able to manually adjust the positions of the schematic objects using geometry manipulation tools to achieve the required layout.

31.05 The System shall support automatic generation of schematic representations of geographic networks managed in the GIS databases

31.06 This shall allow users to dynamically create a schematic of a complete circuit or only the downstream or upstream from a selected device.

31.07 The Schematic application shall represent any type of network and diagrams within a symbolic system, in a defined space and without scaling constraints. It shall produce diagrams, which can represent physically or logically and type of network.

31.08 The schematic definition shall be configurable and shall determine which network objects are included in the schematic and whether they are represented as nodes or as links. 'Significant' network objects, such as transformers or isolating equipment, shall be represented as individual nodes in the schematic. Linear network objects, such as cable or wire segments, shall be represented as links. Equipment in container objects (such as the electrical equipment inside a substation) shall be included in the schematic.

32. Plotting

32.01 System to support plotting functionalities including template creation for standard layouts and output the plot to PDF. Plot Series creation for creating map books and job sheets is also required.

32.02 The system shall support to quickly generate plots for the Construction. It shall provides tools to create construction plots and manage these and other related documents.

32.03 "The system shall support users to add content to layout document pages. The content could be:

- Text annotation: users can add free text or they can add predefined annotations to database objects shown in the viewport
- Lines, arrows and symbols
- Images
- Additional Views
- Stencils"

33. Analysis & Report Generation

33.01 Report Generation Tools. A business user shall be able to connect to proposed GIS, other standard GIS databases including Smallworld, ArcGIS, shape files, KML, AutoCAD etc. as well as other enterprise system databases (Oracle, SQL Server) and flat file databases like excel, csv etc. without any data extraction or loading.

33.02 Report Generation Tools. Business User shall then be able to define its own Business logic to combine data from different sources and create required Report without any need for development/coding.

33.03 System should enable business users to create their own business analysis and generate thematic reports by combining spatial and non-spatial data from industry standard databases without any development efforts and data import/export.

33.04 The user shall be able to create and save queries on the business collections to select a subset of a collection. Queries can have parameters that need to be filled out before running them.

33.05 "The user shall be able to export the entire business collection, filtered query results or the result of the analysis to the following geospatial and alphanumeric formats:

- Google KML/KMZ
- ESRI Arc shape
- AutoCAD
- MapInfo
- Microstaion DGN
- Excel
- csv
- geoJSON
- GML
- HTML"

33.06 Users shall be able to use reports to generate a predefined report document for a collection. Reports shall corresponds to the records in the results list and shall be for all records in the list or for a single record from the object properties panel.

33.07 The analysis shall allows users to analyze business data by refining, enhancing and combining the business collections into new models corresponding to an analysis to be carried out. The resulting enhanced data shall be used for creating analysis maps, allowing thematic mapping to be carried out on the analysis collections.

33.08 The user shall be able to create the thematic map display. A thematic map displays the spatial pattern of a theme or series of attributes. In contrast to reference maps which show many geographic features (transformers, switches, conductors), thematic maps emphasize spatial variation of one or a small number of geographic distributions.

34. User Management: Authentication and Authorization

34.01 ″The proposed solution shall provides authorization facilities to:

control access to tables in a user dataset, with separate controls on fields and records

control access to as-build view and design views of a user dataset give named rights to users ″

34.02 Shall have feature of creating user groups and assign right to group that will allow cascading of the right to all users of the group.

34.03 Shall have facility to restrict users to update data only on certain alternatives (Versions of data)

34.04 Shall have facility to restrict view or update data based on specific bounds of administrative boundaries.

34.05 The system shall support local user authentication: users, their passwords and their group memberships are maintained within the proposed GIS Authorization database.

34.06 The system shall also support LDAP user authentication where users, their passwords and their group memberships are defined by an LDAP server. LDAP user groups will be mapped to the user groups of the proposed GIS system authorization system.

35. SECURITY

35.01 ″The security functionality shall ensure protection of objects, data, and the software. Standard security and protection shall be provided, including physical access controls by:

- Application
- geography
- Workspace (versioned Alternative)″

35.02 38.02 ″Multiple classes and levels of security must be able to be defined/assigned. Four levels of data/map access control are preferred which are as follows:

- Full control
- Add/Modify/Edit
- Delete
- View only″

35.03 The level of security required is at User level and User group level. Users can be grouped as normal users, view only users, system developers, system Administrators, Data entry operators, department based users etc. This facility of user grouping shall be available in the offered system.

36. Administration Requirements: Version Management

36.01 The e-GIS system shall have version management for supporting long transactions, with facility for parallel data update, merging, posting and conflict resolution.

36.02 The transaction journal shall have details of original and modified data, user id, machine id etc. The log file shall preferably be a database table for analysis and not a text file.

36.03 Shall have tools to view, analyze and resolve conflicts graphically.

36.04 Shall support automatic conflict resolution for actually non-conflicting changes, and also allow for configuring rules for automatic conflict resolution

36.05 Shall support large number of versions in the range of 5000 minimum

36.06 Multiple editors shall simultaneously edit the same features in a multiuser database.

36.07 Isolate editing projects in separate versions (create version)

36.08 Merge versions

36.09 Manage conflicts between Editors by row or column

36.10 Mange conflicts between editors interactively or automatically

36.11 Delete versions

37. SYSTEM MAINTAINANCE

37.01 System Maintenance/System Administration includes the management of user accounts, passwords, and management of Applications, operating systems and Databases. Adequate tools shall be provided to facilitate the administration of the system and the users (through a simple GUI) as well as the installation and configuration of the Software.

37.02 User's accounts, passwords and Security levels, access, permissions shall be managed through a GUI based interface.

37.03 Performance monitoring tools shall be provided.

37.04 Log Files, Error Logs, access logs shall be provided automatically. It shall be possible to enable/disable the log files and customize the output and the level of details shown in these logs.

37.05 System shall have failover/restart capability that allows users to automatically recover data and system recovery mechanism in case system crashes or has abnormal shutdown.

37.06 Transaction history/log to be available showing the audit trail of data modified/deleted/added, what and when.

38. Backup & Recovery Procedure:

38.01 The backup/recovery mechanism shall support the following backup types:

38.02 Full: A backup that is non– incremental, that is, it backs up all used data blocks in the data files together with all required system/applications files as required.

38.03 Incremental: A backup of data files that includes only the blocks that have changed since a previous incremental backup. Incremental backups require a full Backup to serve as a basis.

38.04 Open: A backup of any part of the target database when the database is open with users connected.

38.05 Closed: A backup of any part of the target database when it is mounted but not open.

38.06 A multi–level incremental backup strategy is expected to be followed for GIS system. The backup/recovery strategy shall support an automated backup and recovery tasks by recovery manager.

39. Integration with SCADA/ADMS

39.01 GIS shall export entire existing network data in standard formats like CIM/XML so that it can be used by DMS for network creation.

39.02 GIS shall be exporting incremental changes per circuit/substation as "patches" in standard formats like CIM/XML so that network can be updated on DMS system without re– importing the whole network every time.

39.03 The status tracking of acceptance or rejection of "patch"/ data package by DMS system and an appropriate message shall be returned to GIS by DMS system.

39.04 The integration shall be fail proof without any data loss. There shall be provision to report details of export, validation and acceptance / rejection on DMS side at any time.