EAST BAY
MUNICIPAL UTILITY DISTRICT

Laboratory Information Management System

Request for Information

[February 15, 2018]

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1.0 General Information

1.1 Overview of EBMUD

East Bay Municipal Utility District (EBMUD) supplies water and provides wastewater treatment for parts of Alameda and Contra Costa counties on the eastern side of San Francisco Bay in Northern California. Approximately 390,000 accounts, 1.3 million people are served by EBMUD's water system in a 325-square-mile area extending from Crockett on the north, southward to San Lorenzo (encompassing the major cities of Oakland and Berkeley), eastward from San Francisco Bay to Walnut Creek, and south through the San Ramon Valley. The wastewater system serves approximately 177,000 accounts, 685,000 people in an 83-square-mile area of Alameda and Contra Costa counties along the Bay's east shore, extending from Richmond on the north, southward to San Leandro.

EBMUD is a publicly owned utility formed under the Municipal Utility District Act passed by the California Legislature in 1921. EBMUD has a seven-member Board of Directors publicly elected from wards within EBMUD's service area. The Board of Directors and management believe that EBMUD has a public responsibility to preserve the region's resources and set industry standards for the way water and wastewater utilities conduct themselves. EBMUD is a customer-oriented and environmentally sensitive public agency, firmly committed to serving people and the environment.

1.2 Overview of EBMUD Laboratory

The EBMUD Main Laboratory (Lab) is a full service, California Environmental Laboratory Accreditation Program (ELAP) certified environmental laboratory providing analysis of water, wastewater, and solids. The Laboratory provides organic, inorganic, microbial and toxicological analyses in support of the Clean Water Act (CWA), Safe Drinking Water Act (SDWA), and Resource Conservation and Recovery Act (RCRA). The focus of the laboratory is to provide legally defensible, technically valid data of known and documented quality that meets or exceeds the requirements of Environmental Protection Agency (EPA), ELAP, and other applicable regulations in a cost-effective and timely manner.

Organizationally, the Laboratory is divided into four sections. The Organic Chemistry Section performs extractions, chromatographic analyses, oil and grease, and total organic carbon analyses. The Inorganic Chemistry Section performs the wet chemistry and trace metals analyses. The Biology Section is comprised of microbiology, molecular biology, taxonomy, and aquatic toxicology. The quality management system and Laboratory Information Management System (LIMS) fall under the Quality Assurance Section. On an average, the laboratory receives 2,000 - 2,500 samples and conducts 4,000 – 6,000 analyses per month.

The EBMUD Main Laboratory is co-located at the Main Wastewater Treatment Plant in Oakland, CA. In the event the Main Laboratory is not available due to catastrophic events such as an earthquake, EBMUD has a limited service laboratory co-located at the Walnut Creek Water Treatment Plant in Walnut Creek, CA. This emergency facility is limited to Total Coliform and E.coli analyses for drinking water and wastewater.

2.0 Project Overview

2.1 Introduction of Project

Over the past 15 years, the Lab has made concerted effort to improve quality of results, documentation, and efficiency. To this end, the Lab has increased the automation of business processes. LIMS forms the overarching IT solution that integrates Lab functions and is critical to maintain the level of automation achieved so far. With ELAP's adoption of the NELAC Institute (TNI) standards, the need for documentation has grown. Reporting is a major responsibility of the Lab, including generating configurable reports according to regulatory specification.

The District has decided to replace the existing LIMS with a supportable LIMS that can be used by the District for the next 20 years. It must have transparent integrations to all of the Lab's equipment and interface with District Water, Wastewater and administrative systems.
Some key LIMS Project objectives are to identify a LIMS that:

- Meets the business needs of the District and the users
- Has the potential to grow as business needs change
- Supports documentation requirements of TNI standards
- Improves business processes, efficiency, and reduce labor intensive data processing
- Provides a user friendly interface
- Consolidates, integrates, and retires existing applications – as appropriate
- Provides needed mobile access to functions
- Provides enhanced reporting and tracking capabilities
- Provides long-term availability of functionality

2.2 Request for Information

EBMUD is considering the implementation of a new LIMS to address its current and future needs. This Request for Information (RFI) has been prepared to assist EBMUD in fully understanding the functionality and associated services that are available in the marketplace as it relates to these types of information solution. This RFI is a vehicle for information discovery of existing, deployed solutions and should not be construed as a solicitation.

Vendors are encouraged to respond whether they offer technical solutions for all or some of the business areas documented below. If you provide solutions to some of the business areas, it is critical for you to document how your system would interface with other business areas and existing systems.

Select vendors will be asked to demonstrate their solutions to EBMUD stakeholders. Project requirements may be revised over the course of this discovery process based on any additional information acquired.

(***NOTE*****:** *A response to this RFI does not constitute a bid; however, any information or demonstration provided in a response to this RFI may be considered as historical data by EBMUD if EBMUD decides to issue a Request for Proposal (RFP).)*

3.0 Current Business Environment

3.1 Business Environment

The original LIMS, SeedPak, was purchased in the 1980's and comprised of IDXL Scripts as the Business Layer and Oracle Forms as the User Interface (UI). In 2012, Oracle forms were replaced with Cold Fusion Web User Interface. Now the current LIMS application is comprised of IDXL scripts, ColdFusion pages, an Oracle database, and an Excel VBA application. The current LIMS can access over 20+ years of historical data.

The LIMS aid the Lab to meet compliance and quality requirements. The 34 Lab staff use LIMS daily, with up to 20 concurrent users. In addition to the core users of LIMS in the laboratory, other departments within the District interface with LIMS to view results, view upcoming sampling events or request a sampling event. This can increase the traffic to the LIMS at different times during the day.

DEFINITIONS

For the purposes of this RFI, the following definitions will apply:

- LIMS (Laboratory Information Management System) is the project name selected to describe the goals and objectives of the project.
- Sample type is the how the sample was collected, i.e. grab, composite, 24h composite, etc.
- Sample matrix is the material type of the sample, i.e. liquid, solid, drinking water, etc.

4.0 Functional Business Requirements

4.1 Functional Requirements

Please find the functional requirements for the various business units in Appendix.

1. Please use the attached spreadsheet to provide your responses for the functional Business Requirements.
2. For each item, please provide the following information:
    a. In the Solution Type column, indicate how the business needs will be met i.e., whether it is out-of-the-Box (Base), an extra add-on package, a customized solution or if it is not supported.
    b. In the Availability column, indicate whether the feature is available currently or in a future release.
    c. In the response column, please provide the following information
        i. A description of the functional capabilities of your solutions.
        ii. Information that EBMUD needs to provide to your solution to accomplish the business need and how that information can be supplied.
        iii. Description of how users can interact with your system to accomplish the business needs (web, tablet, other mobile device, etc.)

5.0 Technical Requirements

5.1 Security and Compliance

Technical solutions must be designed to protect EBMUD from unauthorized access (especially any financial or personally identifiable information) from internal or external parties. Sample data and chain of custody must be treated as immutable information.

1. Please describe the security features of your product. Identify features at the user, application, transaction, and data levels.

2. Describe the configuration features that allow EBMUD policies to be consistently enforced throughout the organization.

3. Discuss how your solution adheres to Open Web Application Security Project (OWASP) security principles.

4. Describe any cryptographic technologies used by your solution in support of data privacy.

5. Describe the auditing features of your solution.

6. Discuss how your solution uses role-based access control.

7. Describe how your system authenticates users. Do you support single sign on using Active Directory Federation Services (ADFS), Central Authentication Service (CAS) or Security Assertion Markup Language (SAML)?

8. If your application allows for external access (mobile, external customer, vendors, etc.), describe the security features associated with it.

5.2 Risk Management

EBMUD plans to run its LIMS for the next 20 years. There are events, however, that could happen that would pose a risk to the support of a system for 20 years. For example, a company providing EBMUD services may go bankrupt; it may be sold to a company not interested in maintaining an existing solution, etc.

1. Will the source code base of the vendor's solution be made fully accessible to EBMUD? Will it be readily available to be built or modified by competent EBMUD programmers should EBMUD choose to support the solution in-house? If so, please describe the application development environment and any tools required for enhance the source code? If not, please describe how EBMUD moves forward should your company be unable or unwilling to support the system.

2. Are clients required to upgrade to new versions of your system?
    a. Can EBMUD decide to stay on one version of your system?
    b. Do you publish end-of-life support dates? Are there paid options for continuing support on non-current software releases?

5.3 Interfaces and Standards

EBMUD software environment consists of numerous applications and instruments with varying integration requirements.

1. How does your solution interface with other software systems?
    a. Describe the technical architecture of your solution and what types of protocols are used to transfer information, both real-time and as needed.
    b. Describe how data is secured while in transit from one system to another.
    c. Does your solution utilize protocols to verify sender and recipients?

2. Describe what mechanism you use to manage time-sensitive data transmissions.

3. Describe any audit features associated with your interface architecture.

4. Describe how data can be exported from your solution to be loaded into EBMUD's Oracle-based data warehouse.

5. Describe any important standards that your solution implements that promotes interoperability with other systems.

6. Describe how your system handles electronic documents, i.e. what security does it use, what backup mechanism is employed, what API's are available. Describe any electronic documents generated by your system, e.g. electronic invoices.

5.4 Reporting Infrastructure

1. Provide a description on how reporting works in your systems. In particular:
    a. What reports are standard with your systems?
    b. What reporting software is standard with your systems?
    c. What mechanisms are available for EBMUD to generate custom reports? Are there additional costs associated with this? If so, please describe the fee structure.
    d. What mechanisms are available for EBMUD to generate ad-hoc reports? Are there additional costs associated with this? If so, please describe the fee structure.
    e. What tools are available to schedule report generation?
    f. What options are available for internal report distribution?
    g. Describe how your system maintains template versions and renditions.
    h. Describe how your system allows the user to mark a report as preliminary, amended, or final.
2. Describe the types of users who can run queries and reports?

5.5 Data Conversion

1. What is your data conversion strategy for transitioning to your solution with minimal business interruption to EBMUD?
    a. Please describe the advantages and disadvantages of your strategy.
    b. Describe your experience in data conversion or migration activities including staffing requirements and duration.

c. What tools do you utilize for the data-mapping phase?
d. How do you ensure data integrity during the transition?

5.6 Mobile Options

EBMUD is seeking solutions, which take advantage of current technologies to provide real-time access to critical business functionality. In addition, we plan to provide our staff with tools to improve productivity ensure compliance and provide flexibility.

1. Describe the extent to which your solution supports mobile access.
    a. What technology platforms are compatible with your solution (e.g. tablets, smartphones, etc.)?

2. Describe any additional hardware and software that would be required to implement mobile access to business functionality.
    a. Please describe any additional fees associated with your mobile options.
    b. Describe what additional maintenance and support activities are associated with your mobile features.

3. Describe your application standard response time.

6.0 Vendor Requirements

6.1 Vendor Information and Experience

EBMUD is especially interested in partnering with a vendor who has demonstrated a successful track record for LIMS implementations. Successful implementations are defined as on-time, at or under budget, meeting all functional and technical requirements and helping the customer take full advantage of the efficiencies provided by the solution for end users and their business units.

1. Provide a brief history of your company, its products, and its strategic focus.

2. Please provide a brief history of your experience working with governmental agencies within the past five (5) years?

3. Please provide a list of all government clients where you have implemented this solution, including the following information:
    a. Date of implementation
    b. Length of engagement
    c. Contact information for each client (name, email and phone)

4. What makes your company uniquely qualified to provide and implement the solution? Please include a description of the qualifications of your staff, effectiveness of your methodologies and depth of your experience.

5. What is the size and financial stability of your company? Provide copies of your annual reports for the last three years. Provide any additional information that you feel would be significant in evaluating the financial soundness of your company.

6. State the nature of any pending litigation, liens or claims involving your organization. Has your company filed Chapter 7 or 11 bankruptcies in the last ten years?

6.2 Product Information and Hosting Options

EBMUD is open to exploring all hosting options available by our responding vendors. If you offer several options, please be sure to clearly identify the pricing structure of each.

1. If you provide an on-premises solution (a solution hosted in the EBMUD data center), please address the statements below.
    a. Describe the technical architecture of your application: presentation tier, application tier, databases supported, operating systems supported, etc.
    b. List the hardware specifications required for each tier in your architecture.
    c. List the software specifications required for each tier in your architecture: database versions, middleware versions, etc.
    d. Does your solution support load balanced, high-availability architecture?
    e. Describe how your solutions handle failover or disaster recovery scenarios. Does this require any additional licenses?
    f. Describe any system tools included in your solutions that assists in monitoring application performance and stability.

2. If you provide a cloud-based solution (a solution not hosted in the EBMUD data center), please address the statements below.
    a. Please state where your data centers are located.
    b. Please state whether you own and/or lease these data centers. If you do not own this center, describe your contingency plan in the event your hosting partner goes out of business.
    c. Describe the size and structure of your information security organization.
    d. Describe the physical security associated with your data centers and who is responsible for it.
    e. Describe your disaster recovery and business continuity plan.
    f. Describe the various methods by which EBMUD can access its data. What costs or fees are associated with accessing our data?
    g. Describe the process and timeframe required to export all EBMUD data should we decide to change hosting option or vendor.
    h. How does your organization log and monitor system performance?
    i. Describe your organization's data backup strategy.
    j. Describe your application, middleware and operating system patching strategy including frequency.
    k. Describe your organization's privacy program.
    l. Describe your incident management program.

3. Please describe your product roadmap. What features or strategic goals are incorporated within it?

6.3 Pricing Information

1. Please describe the pricing structure of your solution. If you offer different hosting options, please clearly distinguish the difference between each option.

a. Please itemize the fees for each component.
b. Does your product offer a perpetual license?
c. Please itemize all recurring costs over the first 10 years.

2. Describe your implementation fee structure. Please itemize all fees associated with the installation, configuration, data migration, functional, regression and integration testing of your solution.

6.4 Product Implementation

Product implementation will require the completion of numerous tasks, including but not limited to testing (functional, regression, integration, and acceptance), training (users, administrators) and go-live through post-go-live technical support.

1. Please describe your implementation methodology.

2. Please provide a high-level schedule for the implementation of your solution.

3. Please describe the number and skill set of EBMUD employees you need to assist in the implementation of your solution. Please state the time (person hours/weeks/etc.) you would require from each.

6.5 Training

The LIMS Replacement project will impact the Laboratory and its customers. These users have a very diverse background, such as Chemists, Microbiologists, Laboratory Technicians, Information Systems Administrators, Engineers, etc. EBMUD desires to provide our users all necessary initial and ongoing training to take full advantage of the new software solution.

1. Please describe the training you would recommend for your solution.
    a. Describe the different training methods you provide (e.g. online, live, etc.).
    b. Provide your training fee structure.
    c. Describe how many hours of training would be optimal for your solution.
    d. Describe what training resources you provide (e.g. manual, reference guides, etc.)

2. Describe the components of your training plan for a diverse user group.

3. Do you conduct a needs assessment before recommending your training options?

4. What type of post-implementation or ongoing training do you recommend?

6.6 Ongoing Production Support

This replacement project addresses several critical business functions, thus application uptime and stability will be important.

1. Provide a summary of your on-going customer service and support programs.
    a. What levels of customer support are available? What are the main service level agreement (SLA) components of each?

b. Describe the escalation procedure in the event that the SLA is not met.

2. Please describe what is involved in a typical software upgrade (e.g. is any system down-time required, and if so, how long do you typically need)
    a. Please identify the typical tasks required for a software upgrade.
    b. What would be a standard timeline for an upgrade?
    c. How frequently do you release product upgrades?
    d. Describe how disruptions to business processes are minimized during software upgrades.
    e. Are release notes included with all your upgrades? Briefly describe the content and structure.
    f. What is the process and timeline for evaluating and incorporating specific enhancements into your system?
    g. What is the process and timeline for evaluating and incorporating high priority bug fixes into your system?
    h. How often have you released major software upgrades to clients in the last 5 years?

3. Please describe what is involved in an emergency software upgrade?
    a. What is the notification process for an emergency software upgrade?
    b. How often have you released emergency software patches in the past 5 years?

4. In the event that an upgrade impacts the existing database schema, describe how data conversion activities will be coordinated.

5. Please describe the process of adding additional users to the system including any additional costs.

7.0 Business Function Questions

7.1 General Questions

1. Describe your approach to implementation. Include staff engagement, training, collaboration, timing and strategy.

2. Describe strategies for increasing user adoption of the new tools and system.

3. Describe best practices you use for monitoring the system to ensure it stays up to date and to understand how staff are using the tools

4. Describe best practices for administration support for the product.

8.0 Vendor Information

8.1 Terms and Conditions

- This RFI requests information regarding potential product and services and no contractual obligations on behalf of EBMUD whatsoever shall arise from this RFI process.

- The Respondent shall be solely and fully responsible for all costs associated with the development, preparation, transmittal and submission of any material in response to this RFI.

- Responses to this RFI become the exclusive property of EBMUD upon receipt.

- Responses received in response to this RFI may be subject to the California Public Records Act.

- The Respondent may designate elements in the response, which are defined as business or trade secrets and plainly marked as "Confidential," "Trade Secret," or "Proprietary."

8.2 Schedule and Contact Information

Please see schedule below. Submit your responses to the address below. Email (electronic documents) and/or hard copies are acceptable. To ensure all vendors have equal access to information regarding this RFI, please submit any questions or requests for clarification to Suma Popat, Senior Programmer Analyst via email at suma.popat@ebmud.com

Event	Dates
RFI Release	COB, February 16, 2018
Questions Due By	COB, February 23, 2018
Answers Posted By	COB, March 02, 2018
Responses Due By	COB, March 16, 2018

Thank you in advance for your interest in this request.

Send RFI responses to:

East Bay Municipal Utility District
375 11th Street, MS #302
Oakland, CA 94607-4240
Attn: Suma Popat

9.0 Appendix

General System Requirements

1. Comply with regulatory requirements and industry standards, not limited to:

1.1.	Good Automated Laboratory Practices (GALP)	Must have
1.2.	International Organization for Standardization: ISO/IEC 17025	Must have
1.3.	NELAC Institute (TNI) • National Environmental Laboratory Accreditation Program (NELAP)	Must have
1.4.	Title 40 Code of Federal Regulations Part 3 (40 CFR Part 3) -- the Cross-Media Electronic Reporting Rule (CROMERR)	Must have

2. Support capacity to handle:

2.1.	Diverse personnel of over 30 persons including chemists, microbiologists, technicians, managers and supervisors, administrative clerks, and IT professionals.	Must have
2.2.	An average of 4500 samples per month	Must have
2.3.	An average of 6000 analyses per month	Must have
2.4.	An average of 20000 analytes per month	Must have
2.5.	The system will support electronic signatures at various locations where applicable (e.g. Approval).	Must have
2.6.	The system will support use of Electronic Lab Notebook (ELN) system	Good to have

3. Support data hierarchy requirements:

3.1.	The system will capture and store data by Budget Unit	Must have
3.2.	The system will capture and store data by Program	Must have
3.3.	The system will capture and store data by Site/Locator (Sample Point)	Must have
3.4.	The system will capture and store data by Sample Type	Must have
3.5.	The system will capture and store data by Test	Must have
3.6.	The system will capture and store data by Analyte	Must have
3.7.	The system will capture and store data by Permitted/Not Permitted	Must have
3.8.	The system will capture and store data by sampling event (date/time)	Must have
3.9.	The system will allow for multiple samples to be analyzed for each program/project	Must have
3.10.	The system will allow for samples to be analyzed for multiple analyses	Must have
3.11.	The system will allow for multiple analytes to be reported for each analysis	Must have

4. Configure system-wide data format attributes:

4.1.	The system will store date as YYYY/MM/DD but system can display on users preference (i.e. MM/DD/YYYY)	Must have
4.2.	The system will store and format time in military time as HH:MM	Must have
4.3.	The system will be flexible to recognize and convert non-military time into	Good to have

	military time.	
4.4.	The system will support the creation of user define rounding rules that specify both significant figures and decimal places to be reported (per client, permit, program, concentration, analysis, analyte, or QC type)	Must have

Client & Contact Information

5. Record Client information:

5.1.	Client ID (unique)	Must have
5.2.	Client Description	Must have
5.3.	Client Mailing Address	Must have
5.4.	Client Reporting Address	Must have
5.5.	Client Billing Address	Must have
5.6.	Client Phone Number	Must have
5.7.	Client Fax Number	Must have
5.8.	Client Cell Phone Number	Must have
5.9.	Client Email	Must have
5.10.	Client Job No. and comment (multiple job numbers)	Must have
5.11.	Client messaging details	Must have
5.12.	Client Project Manager details	Must have

6. Record Contact information:

6.1.	Contact Name	Must have
6.2.	Contact Mailing Address	Must have
6.3.	Client Reporting Address	Must have
6.4.	Client Billing Address	Must have
6.5.	Contact Phone Number	Must have
6.6.	Contact Fax Number	Must have
6.7.	Contact Cell Phone Number	Must have
6.8.	Contact Position/Title	Must have
6.9.	Contact Email	Must have
6.10.	Contact messaging details	Must have
6.11.	Contact Project Manager details	Must have
6.12.	The system will allow multiple contacts to be associated with a Client	Must have

7. Client Management functionality:

7.1.	The system will be able to track and capture Client complaints	Must have
7.2.	The system will have the ability to setup automatic notifications to Clients	Must have
7.3.	The system will have a web portal for Clients to access their information (e.g. update their own contact information, access results, etc.)	Nice to have
7.4.	The system will provide a means for Client to perform self-service queries	Must have

7.5.	The system will allow changes to the reports to be made by the end-user	Good to have
7.5.1.	The system will allow the reports to be expanded/updated by the EBMUD staff	Must have
7.5.2.	The system will allow changes to how data is displayed in reports (e.g. unit conversions)	Good to have
7.5.3.	The system will report to specified significant figures and/or decimal places as specified by the regulatory agency, and/or by the method	Must have
7.5.4.	The system will be able to associate cost with Test, Analyte, or group of tests	Must have
7.5.5.	The system will allow adjustment to cost directly or with multipliers	Must have
7.5.6.	The system will be able to associate cost for billing to client by report ID, sampling event or frame of time.	Must have
7.5.7.	The system will be able to generate a quote and Work Authorization for client approval of new projects	Must have
7.5.8.	The system will be able to generate a billing log for invoicing clients. The log will lock costs associated with numbered report.	Must have
7.5.9.	The system will be able to generate a cost forecast reports for clients of their projects for frame of time (calendar year, fiscal year, etc.).	Must have
7.5.10.	The system will be able to generate the cost value of analyses for custom reports to include/exclude in-house projects, clients, time frame, etc.)	Must have
7.5.11.	The system will be able to capture cost for sample collection labor, analytical labor, and reporting labor.	Nice to have
7.5.12.	The system will be able to capture shipping costs, special supplies, and/or equipment needed for project and client.	Must have
7.5.13.	The system will allow user defined parameters for the use of "<", ">", or ">=" values in calculations (i.e., treat "<" value as on-half the value, as zero, absolute value, etc.)	Must have
7.6.	The system will restrict Client-level queries to those projects/programs assigned to the Client	Must have
7.7.	The system will allow external access via a secure portal for specific client data	Nice to have

Program Information & Analysis Templates

8. Record Program information:

8.1.	The system will record the associated Client	Must have
8.2.	The system will record the job number	Must have
8.3.	The system will record the program name	Must have
8.4.	The system will record the program type	Must have
8.5.	The system will record Start Date	Must have
8.6.	The system will record End Date	Must have
8.7.	The system will calculate program duration based on start and end dates	Good to have
8.8.	The system will record the project manager	Must have
8.9.	The system will record the exact sampling locations	Must have

8.10.	The system will record the sampling type (e.g. grab/composite)	Must have
8.11.	The system will be able to have 30+ sampling types	Must have
8.12.	The sampling types will be able to be defined by the user	Must have
8.13.	The system will record sampling frequency by program and parameter	Must have
8.14.	The system will record the methods included in the project	Must have
8.15.	The system will record the analytes measured in the project	Must have
8.16.	The system will record project-specific analytical limits, rounding, reporting	Must have
8.17.	The system will allow special QA requirements per program/permit	Must have
8.18.	The system will record at the project level the bottle type and preservation to be used with samples	Must have
8.19.	The system will record multiple types of final report required (Federal and State forms)	Must have
8.20.	The system will record multiple recipients of the final report	Must have
8.21.	The system will allow comments to be entered against a project	Must have
8.22.	The system will have the ability to link a project to an outside document	Good to have
8.23.	The system will have the ability to schedule receipt of samples pending against a project	Must have
8.24.	The system will have the capability of building a recurring sample schedule for on-going or routine sampling and analysis	Must have
8.24.1.	The system will allow the recurring schedule to repeat indefinitely without user intervention	Must have
8.24.2.	The system will have the capability of removing unreceived samples from the sample schedule, when configured to do so	Must have
8.24.3.	The system will have the ability to change the expect date for the unreceived samples based on Client request/operational changes	Must have
8.24.4.	The system will have the ability to globally change all sample information fields (such as container type, container quantities, analysis method, location) for all scheduled but not yet received samples and program information (i.e. container type for alkalinity analysis changes and all scheduled samples need to be updated with the new container type).	Must have
8.25.	The system will have the ability to create project and program templates that facilitate in creation of common project configurations	Must have
8.26.	The system will link to program maps (editable)	Must have
8.27.	The system will have ability to attach documents and hyperlinks (editable)	Must have
8.28.	The system will have Program corrective action capabilities	Must have
8.29.	The system will have Program re-versioning capabilities	Must have

9. Record Analysis Template information:

9.1.	The system will record user-defined templates for analysis (i.e. test codes)	Must have
9.2.	The system will record a name for the analysis code	Must have
9.3.	The system will record a method for the analysis code	Must have
9.4.	The system will record the matrix for the analysis	Must have
9.4.1.	The system will allow multiple test codes to point to a single method	Must have
9.5.	The system will record results for one or more parameters for the test code	Must have
9.5.1.	The system will allow parameters to be indicated as reportable or non-	Must have

	reportable	
9.5.2.	The system will allow calculations to be defined based on parameters in multiple test codes, based on parameter results (e.g. Bacti, hardness, multiple containers)	Must have
9.5.3.	The system will maintain, assign and meet certification requirements for each instrument & piece of equipment	Must have
9.5.4.	The system will maintain a list of valid instruments, analysts (IDOC/DOC) for each test	Must have
9.6.	The system will identify sample and analysis for regulatory reporting	Must have
9.7.	The system will associate the container, based on the analysis, with the location of storage/analysis (i.e. in-house, specific sub-lab, satellite lab)	Must have
9.8.	The system will associate a test with a specific type of container	Must have
9.9.	The system will have the ability to link an analysis/method to an outside document	Must have
9.10.	The system will have the ability to link an analyte to an outside document	Good to have
9.11.	The system will have the ability to create analysis templates that facilitate the creation of common analytical configurations, including:	Must have
9.11.1.	Analysis Name	Must have
9.11.2.	Analysis Section	Must have
9.11.3.	Analytes	Must have
9.11.4.	Analyte STORET numbers	Must have
9.11.5.	CAS No.	Must have
9.11.6.	Method	Must have
9.11.7.	Holding Time/Preservation	Must have
9.11.8.	Certification/Not (Multiple)	Must have
9.11.9.	Units	Must have
9.11.10.	Method Detection Limit (MDL)	Must have
9.11.11.	Detection Limit for Reporting (DLR)	Must have
9.11.12.	Reporting Limit (RL) or Practical Quantitation Limit (PQL)	Must have
9.11.13.	Method Reporting Limit (MRL)	Must have
9.11.14.	Indication of whether result is reportable or non-reportable	Must have
9.11.15.	Calculations associated with analysis	Must have
9.11.16.	Comments (Internal and reportable - editable)	Must have
9.11.17.	Analysis template information required by regulatory agencies	Must have
9.11.18.	Approximate labor hours	Must have

Sampling Location Information

10. Record Sampling Location information:

10.1.	The system will record the sampling location name	Must have
10.2.	The system will record the description of the sampling location	Must have
10.3.	The system will record the address of the sampling location	Must have
10.4.	The system will allow multiple permit numbers to be associated with a sampling location	Good to have
10.5.	The system will record other identifiers associated with the sampling	Must have

	location:	
10.5.1.	Latitude, Longitude	Must have
10.5.2.	Structure ID	Must have
10.5.3.	Locator name	Must have
10.5.4.	Site Name	Must have
10.5.5.	Surface Water Classification	Must have
10.5.6.	Monitoring Type	Must have
10.5.7.	District Customer ID	Good to have
10.5.8.	Matrix	Must have
10.5.9.	Pressure Zone	Must have
10.5.10.	The system will be able to add other identifiers associated with the sampling location	Must have
10.6.	The system will store the sampling location information for re-use during future sampling events	Must have

Sample Information

11. Capture Sample information:

11.1.	The system will create a unique sample number identifier where the numbers increase sequentially.	Must have
11.2.	The system will be able to handle 99 aliquots per container with a unique ID and trackable to the parent	Must have
11.3.	The system will be able to handle 999 samples at a single location	Must have
11.4.	The system will record Sample Number and Sample Name	Must have
11.5.	The system will record collection type (e.g. composite, grab, other as defined by user)	Must have
11.6.	Composite (16/24 hr manual or auto sampler)	Must have
11.6.1.	The system will be capable of tracking individual grab samples used for composites	Must have
11.6.2.	The system will record whether the sample is flow-weight composited or collected over pre-set time intervals	Must have
11.6.3.	The system will be able to build Flow Compositing Worksheets where flow by hour is required.	Must have
11.6.4.	The system will record the duration (in hours or days) of the composite sampling	Must have
11.6.5.	The system will record the temperature of the composite samples	Must have
11.7.	Grab	Must have
11.7.1.	The system will record the type of collection	Must have
11.7.2.	The system will record the collection method name	Must have
11.7.3.	The system will record the Equipment (SSB, Peristaltic Pump, Plastic Bucket, etc.) used to collect the grab sample	Must have
11.8.	The system will record sample date range and time	Must have
11.9.	The system will record sample matrix	Must have
11.10.	The system will record sample description (1000 characters)	Must have
11.11.	The system will record sample container information	Must have

11.11.1.	The system will be able to have multiples of the same container for a single site (sample)	Must have
11.11.2.	The system will support multiple containers per sample	Must have
11.11.3.	The system will handle spares that are collected but may not be analyzed	Must have
11.11.4.	The system will record number of containers	Must have
11.11.5.	The system will record sample container type	Must have
11.11.6.	The system will record sample container lot number	Must have
11.11.7.	The system will record sample amount	Must have
11.11.8.	The system will support volume units	Must have
11.11.9.	The system will support weight units	Must have
11.12.	The system will record the sample analysis that was requested	Must have
11.13.	The system will allow for multiple analyses per sample	Must have
11.14.	The system will allow for multiple projects per sample	Must have
11.15.	The system will allow the user to specify a priority (turnaround time (TAT))	Must have
11.16.	The system will allow the adjustment of prices as TAT is adjusted using a factor if possible	Must have
11.17.	The system will allow the user to add/delete analyses based on role/privileges	Must have
11.18.	The system will allow the user to add /delete samples at any time during the project	Must have
11.19.	The system will require the user to provide an explanation for deletion/cancelation of samples	Must have
11.20.	The system will be allowed to cancel all containers at a single location	Must have
11.21.	The system will record comments at the sample level	Must have
11.22.	The system will record comments at the project level	Must have
11.23.	The system will record comments at the analyte level	Must have
11.24.	The system will have the ability to create user-defined fields and store data in those fields at the sample level	Must have

Chain-of-Custody, Container Labels, & Sample Kits

12. Generate a Chain-of-Custody (CoC):

12.1.	The system will include an all-electronic/paperless CoC process option	Must have
12.2.	The system will generate a chain-of-custody identifier automatically	Must have
12.3.	The system will provide the sample identifier for each sample on the CoC	Must have
12.4.	The system will allow the user to break up a sampling event into multiple CoCs	Must have
12.5.	The system will provide the aliquot identifier for aliquots included in the CoC	Must have
12.6.	The system will provide the program name/code, if appropriate	Must have
12.7.	The system will provide the sampling information:	Must have
12.7.1.	Sample Site	Must have
12.7.2.	Sample Location	Must have
12.7.3.	Sample Location description for non-routine/unknown samples	Must have

12.8.	The system will provide the sampling agency, if required	Good to have
12.8.1.	The system will provide the address (ID No.)	Good to have
12.8.2.	The system will provide the phone number	Good to have
12.8.3.	The system will provide the fax number	Good to have
12.8.4.	The system will provide the contact person	Good to have
12.8.5.	The system will provide the email address	Good to have
12.9.	The system will provide the sampling program	Must have
12.10.	The system will provide the sampling event date range	Must have
12.11.	The system will provide the sampling event time	Must have
12.12.	The system will provide the sample location	Must have
12.13.	The system will provide the sampling address	Good to have
12.14.	The system will provide the requested analysis per container	Must have
12.15.	The system will provide the sample information	Must have
12.15.1.	Expected sample matrix	Must have
12.15.2.	Grab/Composite	Must have
12.15.3.	Container type with lot number	Must have
12.15.4.	Container size	Must have
12.15.5.	Preservative needed	Must have
12.16.	The system will associate COC, program, kits, and containers	Must have
12.17.	The system will record the number of containers covered by the CoC	Must have
12.18.	The system will record additional comments (report and internal fields)	Must have
12.19.	The system will generate a chain-of-custody that is compliant with NELAC standards.	Must have

13. Generate Container Labels:

13.1.	The system will create a unique container identifier, based on the sample identifier	Must have
13.2.	The system will generate container labels with the following information:	Must have
13.2.1.	The label will display the Container ID	Must have
13.2.2.	The label will display a barcode representation of the sample #/Container ID	Must have
13.2.3.	The label will display the sample location	Must have
13.2.4.	The label will include sample composition information (if applicable)	Must have
13.2.5.	The label will display the requested analysis	Must have
13.2.6.	The label will display the sample matrix	Must have
13.2.7.	The label will display the preservative (If Applicable)	Must have
13.2.8.	The label will contain the bottle type	Must have
13.2.9.	The label will display the collection date and time	Must have
13.2.10.	The label format will be compliant with NELAC standards	Must have
13.2.11.	The label format should contain Recollect Identification (If Applicable)	Must have
13.2.12.	The label format may contain Route, program, permitted Y/N, and client name	Must have

14. Manage Sample Kits:

14.1.	The system will allow for safety alerts for sampling potentially hazardous or industrial sites to notify field sampling personnel and analysts	Must have

14.2.	The system will capture the Kit ID used for sample transport	Must have
14.3.	The system will assign status to Kit ID so that the kit can be tracked during the following phases: scheduled, packed, reviewed, ready for deployment, deployed, received	Must have
14.4.	The system will generate sampling instruction to sampler based on analysis requested in sampling kit	Must have
14.5.	The system will be able track comments associated with Sample Kits	Must have

Sample Collection

15. Capture Sample Collection information:

15.1.	The system will record the sampler (name)	Must have
15.1.1.	The system will validate against EBMUD employee directory to populate/auto-complete employee name or employee ID number interchangeably, but also allow for entering non-District employee names	Good to have
15.2.	The system will record that the pH of the samples was checked by the sampler	Good to have
15.3.	The system will record that the chlorine of the samples was checked by the sampler	Good to have
15.4.	The system will record that the conductivity of the samples was checked by the sampler	Good to have
15.5.	The system will record that the water temperature of the samples was checked by the sampler	Good to have
15.6.	The system will record that some other definable field measurement of the samples was checked by the sampler	Nice to have

16. Have In-the-Field mobile app:

16.1.	The mobile application will record the pH checked by the sampler	Nice to have
16.2.	The mobile application will record the chlorine checked by the sampler	Nice to have
16.3.	The mobile application will record the conductivity checked by the sampler	Nice to have
16.4.	The mobile application will record that the water temperature checked by the sampler	Nice to have
16.5.	The mobile application will record other field measurements checked by the sampler	Nice to have
16.6.	The mobile application will record comments and other field notes by the sampler	Nice to have
16.7.	The system will allow the user to indicate one or more malfunction codes for field instruments or meters	Nice to have

Sample Login Information

17. Capture Sample Login information:

17.1.	The system will record comments at the container level	Must have
17.2.	The system will record Chain-of-Custody number	Must have
17.3.	The system will record the project identifier	Must have
17.4.	The system will record the sample analysis at the time of receipt	Must have
17.4.1.	The system will flag analyses being assigned to containers lacking the required bottle type and/or preservative	Must have
17.4.2.	The system will allow a user to reject a kit or individual samples (e.g. for wrong container, temperature anomaly, cracked bottle, air bubbles) prior to login.	Must have
17.4.3.	The system will allow qualifiers for kit anomalies to be captured during sample receiving	Must have
17.5.	The system will record the sample matrix (water, solid, etc.)	Must have
17.6.	The system will record the pH upon receipt, if required.	Must have
17.7.	The system will record the temperature upon receipt	Must have
17.8.	The system will record sample preservatives per method requirements	Must have
17.9.	The system will record lot# and time of preservation (e.g. metals)	Must have
17.10.	The system will record who preserved the sample (Analyst ID or preserver's name)	Must have
17.11.	The system will record date sample taken	Must have
17.12.	The system will record sample collection time	Must have
17.13.	The system will record date sample received	Must have
17.14.	The system will record time sample received	Must have
17.15.	The system will record who received the samples	Must have
17.16.	The system will allow the user to document that all samples are present	Must have
17.17.	The system will allow the user to indicate sample/container conditions with receiving qualifiers and comments	Must have
17.17.1.	Received frozen	Must have
17.17.2.	Sample container damaged in shipment, no analysis performed	Must have
17.17.3.	Sample container damaged, analysis performed	Must have
17.17.4.	Sample temperature (Targeted sample container in received samples)	Must have
17.17.5.	Thermometer ID	Must have
17.18.	The system will allow each sample/container condition to trigger an action in the system when applied to a sample/container:	Must have
17.18.1.	Continue with analysis	Must have
17.18.2.	Cancel analysis and why	Must have
17.18.3.	Recollect Notes or Comments	Must have
17.19.	The system will allow the user to indicate one or more codes for no analysis	Must have
17.19.1.	No analysis required	Must have
17.19.2.	No analysis due to holiday schedule	Must have
17.20.	The system will allow the user to indicate one or more codes when no sample was taken	Must have
17.20.1.	Low flow or no flow	Must have

17.20.2.	No sample required at this time	Must have
17.20.3.	Scheduled sample not received	Must have
17.20.4.	No sample due to equipment failure	Must have
17.21.	The system will record receiving codes at the container level	Must have
17.22.	The system will record at the container level receipt conditions for containers for analyses that have not met method criteria for sample receipt (i.e. air bubbles in VOA containers) and allow user to assign a qualifier that may appear on the final report with the results	Must have
17.23.	The system will be capable of receiving samples by entering data via keyboard	Must have
17.24.	The system will be capable of receiving samples individually	Must have
17.25.	The system will be capable of receiving samples by CoC	Must have
17.26.	The system will allow a sample received at the primary laboratory to be transferred to another laboratory for testing of all or a subset of parameters	Must have
17.27.	The system will allow receiving codes to be entered against individual or multiple samples containers at the time of receipt	Must have
17.28.	The system will allow comments to be entered against a sample container at the time of sample receipt	Must have
17.29.	The system will record coolant type and condition and if they met method requirements	Must have

Subcontracted Laboratories

18. Manage interaction with Subcontracted Laboratories:

18.1.	The system will record information about subcontracting laboratories	Must have
18.1.1.	The system will allow to attach files to subcontracted laboratory details	Must have
18.1.2.	The system will record laboratory name	Must have
18.1.3.	The system will flag data from subcontract laboratories that are not NELAC compliant	Must have
18.1.4.	The system will flag data from subcontract laboratories that are client/permit/matrix approved	Must have
18.1.5.	The system will record multiple laboratory contact	Must have
18.1.6.	The system will capture the EBMUD vendor code from purchasing to link to our system to make tracking of costs easier	Must have
18.1.7.	The system will record multiple laboratory address	Must have
18.1.8.	The system will record multiple laboratory phone/fax numbers	Must have
18.1.9.	The system will record multiple laboratory email address	Must have
18.1.10.	The system will record multiple laboratory certification number	Must have
18.2.	The system will record the date sample is sent	Must have
18.3.	The system will record the date sample was received by a subcontract lab	Must have
18.4.	The system will record the analysis requested by method	Must have
18.5.	The system will record the analysis results	Must have
18.6.	The system will record the number of bottles sent	Must have
18.7.	The system will record the sample description	Must have

18.8.	The system will record the sample holding time	Must have
18.9.	The system will record the sample container's preservation method	Must have
18.10.	The system will record the sample preparation date and time relating to the subcontracted analysis	Must have
18.11.	The system will record or calculate the turnaround time for each subcontracted analysis	Must have
18.12.	The system will apply limits to samples analyzed by a subcontractor in the same manner they are applied to samples analyzed within the lab	Must have
18.13.	The system will record the price of the analysis	Must have
18.14.	The system will have the capability to import subcontracted analyses results provided in a variety of electronic formats (e.g. XML, CSV).	Must have
18.15.	The system will support multiple import scripts that can be reused	Must have
18.16.	The system will generate sub-contract CoC using laboratory unique identifiers for the sample	Must have
18.17.	The system will support association of import scripts with a program or subcontract entity	Must have
18.18.	The system will be able to build invoices for subcontract laboratories that can be passed to accounting	Must have

19. Capture Subcontracted Laboratory sample information:

19.1.	The system will record the subcontracted laboratory (Name & ID) that is assigned to perform the analysis	Must have
19.2.	The system will capture the name of the subcontracted test	Must have
19.3.	The system will capture the subcontracted parameter	Must have
19.4.	The system will capture the subcontracted parameter MDL	Must have
19.5.	The system will capture the subcontracted parameter RL	Must have

Sample Management

20. Have Sample Management and Tracking functionality:

20.1.	The system will track the location of each sample container (i.e. in-house, subcontract lab)	Must have
20.2.	The system will allow for multiple analyses using the same container	Must have
20.3.	The system will allow for multiple containers for a single analysis	Must have
20.4.	The system will record the sample status	Must have
20.4.1.	Scheduled	Must have
20.4.2.	Pre-logged	Must have
20.4.3.	Received	Must have
20.4.4.	Pending Prep	Must have
20.4.5.	In Progress Prep (associated batch)	Must have
20.4.6.	Pending Analysis	Must have
20.4.7.	Completed	Must have
20.4.8.	In Progress Analytical (associated batch)	Must have
20.4.9.	Cancelled	Must have
20.4.10.	Re-sampled	Must have

20.4.11.	Re-analysis	Must have
20.4.12.	Sent (Commercial Lab)	Must have
20.4.13.	Reviewed	Must have
20.4.14.	Final Reviewed	Must have
20.4.15.	Senior Chemist Reviewed	Must have
20.4.16.	Manager Approved	Must have
20.4.17.	Un-reported	Must have
20.4.18.	Re-Reported	Must have
20.4.19.	Disposed	Must have
20.5.	The system will capture a time stamp at each status change to allow duration calculations	Must have
20.6.	The system will have the ability to change the sample status by login, batch, analytical group	Must have
20.7.	The system will record whether a sample is identified as hazardous	Must have
20.8.	The system will record the date the sample is disposed	Must have
20.8.1.	The system will capture who disposed of the sample	Must have
20.8.2.	The system will need to generate a Disposal Status Summary report requested by clients	Good to have
20.9.	The system will indicate the sample's disposal method	Must have
20.9.1.	Un-approved samples will be marked to be exclude from disposal	Must have
20.10.	The system will be able to dispose of sample on the container, login, batch level or user defined requirements	Must have
20.11.	The system will generate a Daily Sample Status report	Must have
20.11.1.	The system will provide the ability to generate the report by any combination of laboratory group/unit and method	Must have
20.11.2.	The report will be sorted and/or filtered by assigned analyst	Must have
20.11.3.	The report will be sorted and/or filtered by lab unit then method and/or analyte	Must have
20.11.4.	The report will include sample date and time	Must have
20.11.5.	The report will include sample ID	Must have
20.11.6.	The report will include sample name	Must have
20.11.7.	The report will include sample location	Must have
20.11.8.	The report will indicate holding time remaining by analyte	Must have
20.11.9.	The report will indicate the holding time by analyte	Must have
20.11.10	The system will store and display the client due date & associated TAT	Must have
20.12.	The system will allow the user to search and retrieve sample information (ad-hoc reporting)	Must have
20.12.1.	Retrieve sample information based on comments, collection, flow, matrix, analyte, permitted/not permitted, sample collection attributes, reported result value, flag, sample site attributes	Must have
20.12.2.	Retrieve sample information based on Client	Must have
20.12.3.	Retrieve sample information based on program	Must have
20.12.4.	Retrieve sample information based on sampling location	Must have
20.12.5.	Retrieve sample information based on sample type	Must have
20.12.6.	Retrieve sample information based on status	Must have
20.12.7.	Retrieve sample information based on analysis type	Must have

20.12.8.	Retrieve sample information for “overdue” samples	Must have
20.12.9.	Retrieve based on CoC# or sample number	Must have
20.12.10	Retrieve based on Client sample identifier	Must have
20.12.11	Retrieve based on Analyst	Must have
20.12.12	The system will support the tracking of groups of Client samples, such as by worklist.	Must have
20.13.	The system will generate a sample receipt report daily showing submitted samples (Custom report)	Must have

21. Track Aliquots for Sub-sampling:

21.1.	The system will append when needed, an aliquot number to the sample identifier	Must have
21.2.	The system will capture date aliquot was taken	Must have
21.3.	The system will capture time aliquot was taken	Must have
21.4.	The system will capture the person who performed the aliquot	Must have
21.5.	The system will capture what analytes the aliquot is being tested for	Must have
21.6.	The system will maintain Parent/Child relationship	Must have

Scheduling

22. Feature scheduling tools:

22.1.	The system will have comprehensive scheduling tools for all functional aspects of the system	Must have
22.2.	The system will support interval scheduling (once a day, week, month, etc.)	Must have
22.3.	The system will support calendar/absolute date scheduling	Must have
22.4.	The system will have flexible recurring scheduling options, and take into account weekends and holidays	Must have
22.5.	The system will have a calendar view	Must have
22.6.	The system will generate a report showing future schedule of analyses by project/program, client, and analysts for a specified time, test, parameter, and/or analysts	Must have

Sample Preparation

23. Capture Sample Preparation information:

23.1.	The system will record preparation method	Must have
23.1.1.	The system will allow for and link multistep preparation methods	Must have
23.2.	The system will have a QC template for the prep batch based on matrix and analytical method	Must have
23.3.	The system will record the analyst who performed the preparation.	Must have
23.4.	The system will record analyst(s) who initiated sample preparation	Must have
23.5.	The system will record date/time and analyst who performed filtration	Must have
23.6.	The system will record/allow for one analyst to start prep and another to finish	Must have

23.7.	The system will record analyst(s) who completed sample preparation	Must have
23.8.	The system will record the date and time started	Must have
23.9.	The system will record the date and time completed	Must have
23.10.	The system will record the starting/ending sample amount	Must have
23.11.	The system will record standards and reagents used during the preparation	Must have
23.12.	The system will record sample multiple dilutions	Must have
23.13.	The system will record comments about the sample preparation process	Must have
23.14.	The system will record all supporting instrumentation (balance, incubator, pipettes, etc.) and allow for multiple instruments	Must have
23.15.	The system will be able to capture incubator temperatures or interface with thermocouples	Good to have
23.16.	The system will generate a unique prep batch number	Must have
23.17.	The system will be able to record prep type (chloro freezing)	Good to have
23.18.	The system will record preparation criteria (e.g. digestion temp, time, pressure)	Must have

Sample Analysis

24. Generate Sample Batches:

24.1.	The system will allow the user to generate batches by method and/or analyte	Must have
24.1.1.	The system will allow user to generate batches with multiple methods (test codes) and/or analyte, e.g. MTF batches have SM 9221B, SM9221E and SM9221F	Must have
24.2.	The system will allow the user to generate batches with multiple sets of QC samples	Must have
24.3.	The system will have a user defined QC template for the analytical batch based on matrix and analytical method	Must have
24.4.	The system will capture the analyst ID that created any batch within the system.	Must have
24.5.	The system will allow an analytical batch to be associated with one or more corresponding prep batches.	Must have
24.6.	The system will allow the user to specify the order of samples within a batch.	Must have
24.7.	The system will allow samples to be selected for batching from a list of pending analyses/preparations	Must have
24.8.	The system will record multiple dilutions	Must have
24.9.	The system will allow the user to sort the list of pending analyses/preparations	Must have
24.9.1.	Sort by holding time	Must have
24.9.2.	Sort by due date	Must have
24.9.3.	Sort by sample type and location	Must have
24.9.4.	Sort by permitted/ not permitted	Must have
24.10.	The system will allow users to add/remove analytes from analysis.	Must have
24.11.	The system will have a visual warning of samples in the list of pending	Must have

	analyses/preparations that are in jeopardy of exceeding their holding time (e.g. color scale)	
24.12.	The system will allow samples to be added or removed from the batch after initial creation	Must have
24.13.	The system will generate a unique batch identifier	Must have
24.14.	The batch will contain the Sample ID	Must have
24.15.	Each QC sample created will have a unique identifier	Must have
24.16.	The batch will contain the Sample Container ID	Must have
24.17.	The batch will contain sample weight	Must have
24.18.	The batch will contain final volume of sample	Must have
24.19.	The batch will contain filtered volume of sample	Must have
24.20.	The batch will contain the spike information	Must have
24.20.1.	Sample identifier of sample spiked	Must have
24.20.2.	Amount spiked	Must have
24.21.	The batch will record comments from the user	Must have
24.22.	The system will print out a benchsheet	Must have
24.23.	The system will print out a batch summary	Must have
24.24.	The system will allow for each QC sample to be referred back to the specific batch	Must have
24.24.1.	The system will allow the user to configure QC samples and define intervals	Must have
24.24.2.	The system will allow the definition of batch templates by analysis, which indicates how QC samples and production samples are to be structured in the batch.	Must have
24.24.3.	The system will allow the user to define QC sample calculations based on user roles and privileges	Must have
24.25.	The system will allow the user to develop an instrument sample sequence from the batch	Nice to have
24.25.1.	The system will allow a sequence created in LIMS to be ported into the instrument software if bi-directional integration is possible	Nice to have
24.25.2.	The sequence will contain the sample number identifier	Nice to have
24.25.3.	The sequence will contain the date of analysis	Nice to have
24.25.4.	The sequence will contain the instrument calibration standards	Nice to have
24.25.5.	The sequence will contain sample type and QC type	Nice to have
24.25.6.	The sequence will contain calibration check standards	Nice to have
24.25.7.	The system will record all supporting instrumentation (balance, incubator, pipettes, etc.) and allow for multiple instruments	Nice to have
24.26.	The system will allow multiple products or a wildcard function when selecting analyses for a batch	Must have

25. Capture Sample Analysis information:

25.1.	The system will capture analysis date	Must have
25.2.	The system will capture analysis time	Must have
25.3.	The system will capture analyst identifier	Must have
25.4.	The system will capture multiple analyst's identifiers for a single analysis	Must have
25.5.	The system will capture the batch ID	Must have

25.6.	The system will capture the process date and time, indicating when results were processed against quality control measures	Must have
25.7.	The system will capture the method name	Must have
25.8.	The system will capture the method reference version (e.g. 18th Edition)	Must have
25.9.	The system will capture the version of the standard operating procedure in effect for the analysis	Must have
25.10.	The system will capture any standards used in the analysis	Must have
25.11.	The system will capture any reagents used in the analysis	Must have
25.12.	The system will allow for analysis of duplicate samples and associate the results of the analysis	Must have
25.13.	The system will record all supporting instrumentation (balance, incubator, pipettes, etc.)	Must have
25.14.	The system will capture calibration data	Must have
25.14.1.	The system will allow calibration data to apply to multiple batches	Must have
25.15.	The system will allow a sample to be reanalyzed	Must have
25.15.1.	The system will store the result of the original analysis and re-analysis	Must have
25.15.2.	The system will retain a reference from multiple re-analysis to the original analysis	Must have
25.15.3.	The system will adjust results based on dilution factor	Must have
25.15.4.	The system will adjust MDL/PQL/RL/MRL limits based on dilution factor	Must have
25.16.	The system will have the capability of qualifying samples that fall outside of user defined acceptance level criteria, as defined by a program	Must have
25.17.	The system will have the capability of notifying that samples fall out of the historical ranges by sample point	Must have
25.17.1.	Calculate the average of a specified date range +/- deviation	Must have
25.18.	The system will record comments related to sample analysis at the batch, method and analyte levels	Must have
25.19.	The system will have the capability of "flagging" results from analyses for which the EBMUD is not accredited.	Must have
25.20.	The system will allow the user to approve data	Must have
25.20.1.	The system will indicate that the data was reviewed/approved by the analyst	Must have
25.20.2.	The system will indicate a final data approval for reporting	Must have
25.20.3.	The system will indicate a Senior Chemist approval for reporting	Must have
25.20.4.	The system will indicate a Laboratory Manager approval for reporting	Must have
25.20.5.	The system will require data to be re-approved, if it is changed after approval.	Must have
25.21.	The system will flag results that do not pass user-specified integrity checks, such as a Total Nitrogen result being less than the Total Kjeldahl Nitrogen result for the same sample	Must have
25.22.	The system will allow for data to become available to our designated users (clients) after final approval	Must have

Data Entry

26. Support Data Entry needs:

26.1.	The system will support for the entry of mobile, wireless and hardwired (internal) data:	Must have
26.2.	The system will allow data entry in a grid or tabular format (Allow user to order parameters as needed)	Must have
26.3.	The system will allow the user to design tabular data entry forms for each analysis type	Must have
26.4.	The system will allow entry of data from a pre-defined list of values	Must have
26.5.	The system will allow data to be entered manually with spell checking of free text	Must have
26.6.	The system will allow data to be pushed to instruments (e.g. run lists)	Nice to have
26.7.	The system will allow data to be captured from instruments (e.g. balances, meters, probes, GC/MS, BOD analyzer, ELISA plate reader, flow injection analyzer)	Must have
26.8.	The system will support bi-directional communication with ELNs	Nice to have
26.9.	The system will allow the user to define/modify calibration standards and QC samples	Must have
26.10.	The system will allow the user to define calculated fields	Must have
26.11.	The system will support basic calculations	Must have
26.11.1.	The system will have a visual queue for results outside limits or fails	Must have
26.11.2.	The system will support complex calculations with look-up tables capabilities	Must have
26.11.3.	The system will allow the user to define validation rules that confirm impossible values are not entered (e.g. pH = 62, MPN codes greater than 5)	Must have
26.12.	The system will capture calibration data	Must have
26.13.	The system will capture a failure if calibration fails	Must have
26.14.	The system will capture dilution data from both preparation and analysis	Must have
26.15.	The system will allow the user to define data entry templates that can be used for future analysis	Must have
26.16.	The system will allow the user to archive and retrieve the tabular data entry forms	Must have
26.17.	The system will allow supervisors to approve data and add comments	Must have
26.18.	The system will store the final reportable result for all tests, whether entered by the analyst or calculated by the LIMS.	Must have
26.19.	The system will compute results for parameters that are calculated from analytical data that may all be entered from distinct batches	Must have
26.20.	The system will store the raw, un-manipulated/unrounded data as well as the final result	Must have
26.21.	The system will use raw data values (not rounded) in calculations	Must have
26.22.	The system will allow a comment to be added at the parameter, sample, batch, login level	Must have
26.23.	The system will designate if comments are reportable or non-reportable	Must have

26.24.	The system will have the ability to attach photos with report, login, batch	Must have
26.25.	The system will record data entry in real-time, no manual saving required	Must have
26.26.	The system will execute calculations automatically upon result entry	Must have
26.27.	When a result is modified, the system will automatically trigger an update to the calculated value	Must have

27. Capture Organic Extraction data:

27.1.	The system will capture the extraction start/stop date/time	Must have
27.2.	The system will capture the analysis	Must have
27.3.	The system will capture the matrix	Must have
27.4.	The system will indicate if sample is outside of method hold time for extraction	Must have
27.5.	The system will capture the extraction method	Must have
27.6.	The system will capture the extraction equipment	Must have
27.7.	The system will capture the extraction reagents	Must have
27.8.	The system will capture the extraction solvent lot #	Must have
27.9.	The system will capture the surrogate spike solution ID	Must have
27.10.	The system will capture the surrogate concentration	Must have
27.11.	The system will capture the surrogate spike solution volume	Must have
27.12.	The system will capture the internal standard spike solution ID	Must have
27.13.	The system will capture the internal standard concentration	Must have
27.14.	The system will capture the internal standard spike solution volume	Must have
27.15.	The system will capture the analyte spike solution ID	Must have
27.16.	The system will capture the analyte spike concentration	Must have
27.17.	The system will capture the analyte spike volume	Must have
27.18.	The system will capture who spiked the sample	Must have
27.19.	The system will capture the clean-up date	Must have
27.20.	The system will capture the pH	Must have
27.21.	The system will capture the sample volume/weight	Must have
27.22.	The system will capture the final volume	Must have
27.23.	The system will allow for comments	Must have
27.24.	The system will capture “extracted by” (multiple people)	Must have

28. Capture Metals Preparation data:

28.1.	The system will record preparation method	Must have
28.2.	The system will record digestion equipment	Must have
28.3.	The system will record Acids used for digestion & associated lot #s	Must have
28.4.	The system will record who prepared the sample (multiple people)	Must have
28.5.	The system will exclude filtered samples from metals prep batch	Must have
28.6.	The system will record the date/time started	Must have
28.7.	The system will record the date/time completed	Must have
28.8.	The system will record the Start and End temperature	Must have
28.9.	The system will record what the sample was analyzed for	Must have
28.10.	The system will record the sample amount	Must have
28.11.	The system will record pH Check <2 and time performed	Must have
28.12.	The system will record the turbidity of the sample	Must have

28.13.	The system will record spike solution	Must have
28.14.	The system will record final volume	Must have
28.15.	The system will record the digestion vessel	Must have
28.16.	The system will record the digestion vessel before digesting	Must have
28.17.	The system will record the sample weight for solid samples before digesting	Must have
28.18.	The system will record comments	Must have
28.19.	The system will record the initials of person who put sample in storage	Must have
28.20.	The system will record sample storage date	Must have
28.21.	The system will record who reviewed the results	Must have

29. Capture Microbiology data:

29.1.	The system will capture date/time analysis started	Must have
29.2.	The system will capture the temperature of the incubator/waterbaths twice a day, 4 hours apart	Must have
29.3.	The system will capture multiple processing analyst names	Must have
29.4.	The system will capture date/time incubation began	Must have
29.5.	The system will capture date/time incubation ended	Must have
29.6.	The system will capture the raw results (single or multiple counts)	Must have
29.7.	The system will calculate precision criteria from the last 15 samples with positive results of each matrix annually or user specified time interval	Must have
29.8.	The system will determine the Most Probable Numbers from reference tables	Must have
29.9.	The system will capture qualifying comments	Must have
29.10.	The system will report text comments	Must have
29.11.	The system will track number of field samples in a batch and alert the user to number of duplicates required for the batch as per method	Must have
29.12.	The system will evaluate duplicate precision against precision criteria for each analytical batch with duplicate	Must have
29.13.	The system will have the ability to configure qualitative fields (Yes/No)	Must have
29.14.	The system will perform the following calculations	Must have
29.14.1.	Percent Recovery	Must have
29.14.2.	RPD for BOD	Must have
29.14.3.	Average for Heterotrophic Plate Count	Must have
29.14.4.	Percent Weight Loss for Heterotrophic Plate Count	Must have
29.14.5.	The system will calculate Membrane Filter results, CFU/100 mL, from sample volume and raw results	Must have
29.14.6.	The system will calculate MDL based on sample volume	Must have
29.15.	The system will calculate acceptable read date/time range	Must have
29.16.	The system will compare raw values to ideal counting range and add qualifier where required	Must have
29.17.	The system will capture research project results	Must have
29.17.1.	Numerical data	Must have
29.17.2.	Journal entries (comments)	Must have
29.18.	The system will have the ability to qualify QA/QC of prepared media and reagents	Must have
29.18.1.	The system will capture the media/reagent lot #	Must have

29.18.2.	The system will be able to link the media/reagent to the sample ID	Must have
29.19.	The system will have the ability to generate and print labels for prepared media	Must have
29.20.	The system will capture sample dilution data	Must have
29.20.1.	The system will be able to recalculate concentration data based on sample dilution	Must have
29.21.	The system will have the ability to generate QA/QC forms for prepared media	Must have
29.22.	The system will import data from .xls or .txt file type (export from Skalar BOD software)	Must have
29.22.1.	Dilution	Must have
29.22.2.	Sample ID	Must have
29.22.3.	Sample volumes	Must have
29.22.4.	Seed vol.	Must have
29.22.5.	Initial Dissolved Oxygen reading, temperature, date/time	Must have
29.22.6.	Final Dissolved Oxygen reading, temperature, date/time	Must have
29.22.7.	Depletion	Must have
29.22.8.	BOD	Must have
29.22.9.	Average BOD	Must have
29.22.10	Error codes	Must have
29.22.11	Seed correction factor	Must have
29.23.	The system will capture raw data and perform calculation of result based on complex sets of logic and mathematics (i.e. BOD, Enterococcus)	Must have
29.24.	The system will integrate with dynamic worksheets for microbiology analyses	Must have

30. Capture Molecular Biology (ELISA) data:

30.1.	The system will capture the sample ID	Good to have
30.2.	The system will capture the assay type	Good to have
30.3.	The system will capture the cell lysis date	Good to have
30.4.	The system will import data from .xls, .txt, or .xml file type (export from SkanIt software)	Good to have
30.4.1.	Well number	Good to have
30.4.2.	Raw absorbance per well	Good to have
30.4.3.	Normalized absorbance per well	Good to have
30.4.4.	Analyte concentration	Good to have
30.4.5.	Standard curve r2 value	Good to have
30.4.6.	CV% (coefficient of variance expressed in %) of replicate absorbance data	Good to have
30.5.	The system will calculate the RPD of duplicate sample	Good to have
30.6.	The system will calculate the % Recovery of spiked sample	Good to have
30.7.	The system will calculate the average concentration of replicate samples	Good to have
30.8.	The system will calculate the CV% of replicate concentrations	Good to have
30.9.	The system will store Minimum Detection Limit value	Good to have
30.10.	The system will store Reporting Limit value	Good to have
30.11.	The system will capture sample storage conditions	Good to have

30.12.	The system will capture sample dilution data	Good to have
30.12.1.	Recalculate captured concentrations based on sample dilution	Good to have
30.13.	The system will capture analyst name	Good to have

31. Capture Bioassay & Toxicology data

31.1.	Test Species	Must have
31.2.	Organism Source	Must have
31.3.	Organism Age	Must have
31.4.	Type of bioassay (chronic or acute; static or renewal)	Must have
31.5.	Method reference	Must have
31.6.	Start Date & Time	Must have
31.7.	End Date & Time	Must have
31.8.	Test concentrations	Must have
31.9.	Most sensitive species	Must have
31.9.1.	Date(s) of last most sensitive species test	Must have
31.9.2.	Date of next most sensitive species test	Must have
31.10.	Statistical Analysis: Test lethal and sublethal endpoints	Must have
31.10.1.	Lowest no effects concentration (NOEC)	Must have
31.10.2.	Point estimate (LC50) and 95% confidence interval	Must have
31.10.3.	Survival of sample	Must have
31.10.4.	Survival of Control	Must have
31.10.5.	Percent Minimum Significant Difference (PMSD)	Must have
31.10.6.	Toxicity units	Must have
31.10.7.	Text Comments	Must have
31.11.	Sample Water Quality:	Must have
31.11.1.	Conductivity (uS/cm or mS/cm)	Must have
31.11.2.	Alkalinity (mg/L)	Must have
31.11.3.	Hardness (mg/L)	Must have
31.11.4.	Salinity (ppt, parts per thousand)	Must have
31.11.5.	Dissolved Oxygen (mg/L)	Must have
31.12.	Daily water quality	Must have
31.12.1.	New/Old only for renewal bioassays	Must have
31.12.2.	Sample concentration	Must have
31.12.3.	pH	Must have
31.12.4.	Temperature (°C)	Must have
31.12.5.	Dissolved Oxygen (mg/L)	Must have
31.12.6.	Salinity (ppt, parts per thousand)	Must have
31.12.7.	Instrument ID	Must have
31.12.8.	Text field	Must have
31.13.	Control Chart: Concentration Coefficient of variation	Must have
31.14.	The system will be able to link to concurrent reference toxicant analyses	Must have
31.15.	The system will have the ability to link multiple samples to one analysis	Must have
31.16.	The system will be able to link multiple analyses with one sample	Must have
31.17.	The system will be able to track reference toxicant stock information associated with analysis	Must have
31.17.1.	Lot Number Format to be determined (administrator defined)	Must have

31.17.2.	Chemicals used along with vendor and lot#	Must have
31.18.	Water Quality Information for reference toxicant test • Mortality • Conductivity (uS/cm or mS/cm) • Dissolved Oxygen (mg/L) • pH • Temperature (˚C)	Must have
31.19.	The system will track the food source associated with an analysis	Must have
31.20.	The system will be able to link to the associated field observations	Must have
31.21.	The system will track additional instrument ID associated with each test	Must have
31.22.	The system will capture comments	Must have

Data Review

32. Feature Data Review functionality:

32.1.	The system will be able to allow 4+ stages of review of data (analyst, supervisor, Senior Chemist, Lab Manager)	Must have
32.2.	The system will record the lab staff who reviewed/approved data	Must have
32.3.	The system will allow the user to review data on the screen	Must have
32.4.	The system will allow the user to review data on a printed/electronic report	Must have
32.5.	The system will allow multiple limits to be associated with parameters.	Must have
32.6.	The system will allow the user to view limits associated with the analyses during data review	Must have
32.7.	The system will allow the user to view tests that are scheduled but not complete and their status	Must have
32.8.	The system will allow the user/requestor to mark a sample for reanalysis/recollection and display notification of reanalysis/recollection	Must have
32.9.	The system will allow the user to request an additional analysis	Must have
32.10.	The system will allow the user to view comments from data entry	Must have
32.11.	The system will allow the user to enter additional comments	Must have
32.12.	The system will have the capability of qualifying samples with results in exceedance (i.e. falling outside of user-defined acceptance criteria).	Must have
32.13.	The system will allow the user to indicate the data is approved (final)	Must have
32.14.	The system will allow the user to add a Permitted/Not Permitted flag	Must have
32.15.	The system will display a user defined # of results for samples taken from that sampling location, based on # of points or date range	Must have

33. Support Data Qualifiers and Receiving Qualifiers:

33.1.	The system will include descriptions for all data qualifiers and receiving qualifiers	Must have
33.2.	The system will allow the user to create and define data qualifiers and receiving qualifiers, and set logic for assignment	Must have

34. Review of Quality Control Data:

34.1.	The system will display all associated QC information with a sample number	Must have
34.1.1.	The system will show the batch identifier of the QC samples	Must have
34.1.2.	The system will show the analyst identifier	Must have
34.1.3.	The system will show all related QC samples	Must have
34.1.4.	The system will show the analysis performed on the batch	Must have
34.1.5.	The system will show the parameters	Must have
34.1.6.	The system will show the results	Must have
34.1.7.	The system will show spike recoveries	Must have
34.1.8.	The system will have the ability to flag and notify when an analysis is out of control	Must have
34.1.9.	The system will have the ability to log and track investigations and corrective actions	Must have
34.1.10.	The system will show relative percent difference (RPD)	Must have
34.1.11.	The system will show relative standard deviation (RSD)	Must have
34.1.12.	The system will show critical range for microbiology	Must have
34.1.13.	The system will calculate and report absolute value of difference between logarithmic sample A and sample B (method specific)	Must have
34.1.14.	The system will show average value of replicates	Must have
34.2.	The system will force the user to address QC failures before data review/approval. can continue	Must have
34.3.	The system will allow the ability to evaluate the following quality control parameters	Must have
34.3.1.	Duplicate sample results and their average	Must have
34.3.2.	Percent recovery on QC	Must have
34.3.3.	Percent recovery on MS/MSD	Must have
34.3.4.	Relative Percent Difference on MS/MSD	Must have
34.3.5.	Positive control	Must have
34.3.6.	Negative control	Must have
34.3.7.	BEG blank (for membrane filtration)	Must have
34.3.8.	MID blank (for membrane filtration)	Must have
34.3.9.	END blank (for membrane filtration)	Must have
34.3.10.	Filter blank (for membrane filtration)	Must have
34.3.11.	Blank (for MPN)	Must have
34.3.12.	Dilution factor/initial sample amount	Must have
34.3.13.	Sterility check	Must have
34.3.14.	Statistical analysis of QC data • Mean • Mean % recovery • Mode • Geometric mean • Median • Standard deviation • Mean Relative % difference (RPD) • % Recovery (including surrogates)	Must have
34.3.15.	The system will be able to perform statistical calculations of control	Must have

	limits based on historical data.	
34.3.16.	MDL or current acronym	Must have
34.3.17.	ML/RL	Must have
34.3.18.	MRL	Must have
34.3.19.	PQL or current acronym	Must have
34.3.20.	The system will provide the ability to define QC rules. (editable/versionable)	Must have
34.4.	The system will capture the QC data for all approved methods	Must have
34.5.	The system will be able to round (significant figures) based on concentration	Must have
34.6.	The system will allow calculations using log functions	Must have
34.7.	The system will allow the parameter criteria to be set by analysis, by matrix, by sample type (field, QC)	Must have
34.8.	The system will allow MDL calculation by parameter, by # samples, by type of samples	Must have
34.9.	The system will allow re-versioning of analysis MDL and MRL. The system will be configurable or, better yet, regularly updated to current regulations on detection and reporting limits calculation (e.g. MUR for wastewater, EPA methods).	Must have
34.10.	The system will have a MDL calculation tool using the current options for MDLs, including the low level fortified standard and method blanks per CFR 136.6 MUR 2017	Must have

Sample Results & Reporting

35. Feature Sample Results & Reporting functionality:

35.1.	The system will export the following sample data	Must have
35.1.1.	Sample Identifier	Must have
35.1.2.	Sample Location	Must have
35.1.3.	Sample Site	Must have
35.1.4.	Testing Lab	Must have
35.1.5.	COC number	Must have
35.1.6.	Date Collected	Must have
35.1.7.	Time Collected	Must have
35.1.8.	Date Received	Must have
35.1.9.	Time Received	Must have
35.1.10.	Date of Sample Prep	Must have
35.1.11.	Time of Sample Prep	Must have
35.1.12.	Analyst(s) for Sample Prep	Must have
35.1.13.	Date/Time Analyzed	Must have
35.1.14.	Analyst(s) for Analysis	Must have
35.1.15.	Permit/Program Name	Must have
35.1.16.	Prep/Analytical Batch Number	Must have
35.1.17.	Analytical Method	Must have
35.1.18.	Sample Prep Method	Must have

35.1.19.	STORET code	Must have
35.1.20.	Test/Analyte	Must have
35.1.21.	Detected (“Y” or “N” format)	Must have
35.1.22.	Numeric result (Results like "<2" are stored as "<2" for use in calculations and data exports)	Must have
35.1.23.	Fully Qualified Result (Results like "<2" appear as "<2")	Must have
35.1.24.	Results labeled as "Presence" or "Absence"	Must have
35.1.25.	Result qualifier	Must have
35.1.26.	Accredited parameter ("Y" or "N" format)	Must have
35.1.27.	The system will have the ability to separate the result or lab results qualifier from the result itself (e.g. "<3.2" becomes "<" and "3.2")	Must have
35.1.28.	Result unit	Must have
35.1.29.	Method detection limit (MDL)	Must have
35.1.30.	MDL units	Must have
35.1.31.	Quantitation limit	Must have
35.1.32.	Quantitation limit units	Must have
35.1.33.	PQL limit	Must have
35.1.34.	PQL limit units	Must have
35.1.35.	MRL limit	Must have
35.1.36.	MRL limit units	Must have
35.1.37.	RL limit	Must have
35.1.38.	RL limit units	Must have
35.1.39.	Include results in reports (“Y” or “N” format)	Must have
35.1.40.	Quality Control Type, such as Blank, Calibration Blank, Duplicate	Must have
35.1.41.	Basis (“Wet” or “Dry” basis)	Must have
35.1.42.	Dilution factor	Must have
35.1.43.	Percent recovery	Must have
35.1.44.	RPD	Must have
35.1.45.	Critical Range	Must have
35.1.46.	Sub Sample amount	Must have
35.1.47.	Sub Sample amount unit	Must have
35.1.48.	Initial volume	Must have
35.1.49.	Initial volume unit	Must have
35.1.50.	Final volume	Must have
35.1.51.	Final volume unit	Must have
35.1.52.	Comments	Must have
35.1.53.	Flag indicating data reviewed by QA Group	Must have
35.1.54.	QA Date	Must have
35.1.55.	QA Comment	Must have
35.1.56.	QA Staff User Identifier	Must have
35.1.57.	Kit IDs	Must have
35.1.58.	Receiving Temperatures	Must have
35.1.59.	Preservation	Must have
35.1.60.	Collection Method	Must have
35.1.61.	Testing Lab Certification ID number	Must have
35.1.62.	CAS No.	Must have

35.1.63.	Results ">="	Must have
35.1.64.	Results below MDL as MDL with U qualifier	Must have
35.1.65.	Client and associated information (e.g. job number)	Must have
35.1.66.	Sample site attributes	Must have
35.1.67.	Program attributes	Must have
35.1.68.	The system will allow the user to define query fields	Must have
35.1.69.	The system will allow the user to generate and save export queries	Must have
35.1.70.	The system will allow users to query by 'Expected Date' for planning.	Must have
35.1.71.	The system will display queries on monitor	Must have
35.2.	The system will have the following reporting capabilities:	Must have
35.2.1.	The system will allow the user to report only project-specific analytes	Must have
35.2.2.	The system will allow reporting of multiple dilutions with corrected MDL/PQL/ML/MRL	Must have
35.2.3.	The system will allow reporting of the wet/dry weight basis for each test	Must have
35.2.4.	The system will indicate which results, if any, in a report are preliminary (i.e. yet to complete the data review process)	Must have
35.2.5.	The system will allow reporting of historical trending for single locations and/or parameters	Must have
35.2.6.	The system will allow reporting of comparative trending between two or more locations and/or analytes	Must have
35.2.7.	The system will allow reporting of statistical analysis of analytical results, including: • Standard deviation • Historical trending • Geometric mean • Mean • Average • One sided Manns Kendall • TSI • WQI • Half MDL • At MDL • At 0	Must have
35.2.8.	The system will be able to pull multiple report within the system as a final Client report	Must have
35.3.	The system will indicate on all reports the dates of the original and reissued reports	Must have
35.4.	The system will indicate what information has changed on a reissued report	Must have

36. Generate Electronic Data Deliverable (EDD) compatible with:

36.1.	STORET report and the STORET replacement, WIN	Must have
36.2.	EZ DMR system	Must have
36.3.	DW Report	Must have
36.4.	CIWQS, PET Tool	Must have
36.5.	SMARTS	Must have

Quality Assurance & Control

37. Generate Control Charts:

37.1.	The system will allow control standards to be charted for each method/analyte	Must have
37.1.1.	The system will accommodate negative controls	Must have
37.1.2.	The system will accommodate positive controls	Must have
37.2.	The system will provide the ability to define the QC data points for evaluation of data	Must have
37.3.	The system will provide the ability to define the QC rules (such as user-specified or statistically derived control limits)	Must have
37.4.	The system will plot the mean line on graph	Must have
37.5.	The system will allow the user to manually enter data	Must have
37.6.	The system will allow for the automatic data entry from instruments	Must have
37.7.	The system will allow for the control limits to be based on plotted data	Must have
37.8.	The system will allow for the control limits to be user defined and displayed on graph	Must have
37.8.1.	The system will allow Lower Control Limits to be defined and displayed on graph	Must have
37.8.2.	The system will allow Upper Control Limits to be defined and displayed on graph	Must have
37.9.	The system will produce charts on a log-log axis	Must have
37.10.	The system will produce charts on a log-linear axis	Must have
37.11.	The system will allow the user to establish alert criteria	Must have
37.12.	The system will produce Individual-X/Moving Range Charts	Must have
37.13.	The system will produce X-Bar and Range Charts	Must have
37.14.	The system will produce Bar Charts	Must have
37.15.	The system will produce Line Charts with mean line	Must have
37.16.	The system will produce Pie Charts	Must have
37.17.	The system will have the ability print all charts and graphs	Must have
37.18.	The system will allow the user to produce charts by various parameters	Must have
37.18.1.	Analyst	Must have
37.18.2.	Instrument	Must have
37.18.3.	Sample type	Must have
37.18.4.	Sample point	Must have
37.18.5.	Matrix	Must have
37.18.6.	Date range	Must have
37.18.7.	Method	Must have
37.18.8.	Procedure	Must have
37.18.9.	Analyte	Must have
37.18.10	Client	Must have
37.18.11	Program	Must have
37.19.	The system will have the ability to save queries used to generate control charts for future reuse.	Must have
37.20.	The system will summarize statistics	Must have

37.20.1.	The summary will include recoveries	Must have
37.20.2.	The summary will provide precision	Must have
37.20.3.	The system will be able to calculate and update criteria automatically (with QA review/approval) by test, parameter, method, and matrix with the option to specify a date range (maintain historical results)	Must have
37.20.4.	The system will alert appropriate personnel when limits have been updated.	Must have
37.20.5.	The system will have the ability to flag and notify when an analysis is out of control and will be taken off line until an investigation can be conducted (seven recoveries on one side of the mean, applied to recoveries of QC, etc.)	Must have
37.20.6.	The system will calculate upper and lower control limits(mean +/- 3 std dev) and upper and lower warning control limits (mean +/- 2 std dev)	Must have
37.20.7.	The system will flag data outside +/- 4 std dev for possible removal when calculating limits (huge error rule)	Must have
37.20.8.	The system will allow for ranges to be set by method	Must have
37.20.9.	The system will calculate microbiology critical control and warning limits	Must have
37.21.	The system will be able to have add-on module for complex control charts such as NWA	Must have
37.22.	The X axis of the chart shall display the last X points for sample type, matrix and test combination; a time value of each point can be displayed	Must have
37.23.	the Y axis of the chart shall display the numeric value of a data point being displayed and calculated values from data points as defined for sample type, matrix and data point combination	Must have

38. Track Proficiency Testing (PT):

38.1.	The system will allow scheduling/pre-logging and requesting of PT samples by method	Must have
38.2.	The system will record the acceptance ranges associated with the reported results based on the PT provider's evaluations	Must have
38.3.	The system will allow the PT Provider's evaluation to be electronically imported	Must have
38.4.	The system will allow for pre-logging or requesting of each PT sample by analyte, method and/or standard operating procedure (SOP)	Must have
38.5.	The system will report the status of all PT's sorted by analyte, method, and/or SOP	Must have
38.6.	The system will generate reports with reported result, analyst, analytical date, sample prep and determinative methods, and analyte(s)	Must have
38.7.	The system will generate reports to include analytes, reported result, and acceptance range	Must have
38.8.	PT Results (% Passed, first or second attempt)	Must have

39. Track Demonstration of Capabilities (DOCs)

39.1.	The system will be able to track by analyst, method, analyte, date range	Must have
39.2.	Separate criteria for initial and continuing	Must have
39.3.	The system will allow to pre-log DOC samples (for initial DOC)	Must have

39.4.	The system will notify user defined personnel when training records are nearing expiration date and/or expired	Must have
39.5.	The system will allow to report on DOC (cover sheet, supporting data)	Must have
39.6.	The system will calculate acceptance limits for DOCs and define pass/fail criteria	Must have
39.7.	The system will allow for DOCs by work cell	Must have
39.8.	The system will automatically generate data set for continuing DOCs (e.g. last 4 RE/LRs, LCS, spikes, or other duplicates) by analyst, work cell or method/analyte	Good to have
39.9.	The system will allow for DOC approval at the supervisor and QAO levels	Must have
39.10.	The system will calculate mean and std dev and determine whether bias is high or low	Must have
39.11.	The system will track training per analysis, per analyst, per matrix based on IDOC, PT	Must have
39.12.	The system will be able to update training records by analyst, by analysis, by matrix (allowing multiple matrices to be selected)	Must have
39.13.	The system will be able to manage user training records for verification of current training and certification of users to execute, review and/or approve test procedures	Must have
39.14.	The system will prevent the creation of batches, performance of analysis, and entry of test results if the person has not been trained on the test method or if the training certification has expired	Must have
39.15.	The system will track whether an analyst who is trained on a specific SOP has reviewed newly updated SOP prior to creating a new analytical or preparation batch	Nice to have
39.16.	SOP numbers are linked to test methods in training database	Must have
39.17.	Training record is updated automatically for DOC when a PT sample is analyzed or four consecutive spike blanks were performed and pass QC	Must have
39.18.	The system will have the ability to extract employee overtime hours worked from District ETS and merge with employee overtime hours offered (manually tracked field). The system will display the employees ranked by the addition of these two fields and filtered according to valid training records.	Nice to have
39.19.	The system will allow IDOC/training records for multiple matrices if preparation/analytical steps are identical, e.g., water and wastewater for anions.	Must have
39.20.	The system will issue an automatic warning message to Analyst/lab staff when an SOP is updated in the system	Nice to have

Instrument Management

40. Integrate laboratory instruments:

40.1.	The system will allow instruments to be integrated by the EBMUD without involvement of an outside party	Must have
40.2.	The system will allow existing integration with instruments to be modified by the EBMUD without involvement of the LIMS vendor	Must have

40.3.	The system will allow the upload of data into LIMS in the following, but not limited to txt, csv, etc.	Must have
40.4.	The system will allow for creation of a sample sequence with sample preparation information for upload into instrument software	Nice to have

41. Track instrument maintenance:

41.1.	The system will record instrument/equipment Identification (ID) information including manufacturer, serial number, instrument location, date in service, model number, purchase year, service provider, and service provider contact	Good to have
41.2.	The system will record the date the maintenance was performed	Good to have
41.3.	The system will record the person performing the maintenance (internal personal and/or vendor technician)	Good to have
41.4.	The system will record the instrument or equipment identifier on which maintenance was performed	Good to have
41.5.	The system will allow users to select from a pre-defined list of maintenance actions	Good to have
41.5.1.	The system will restrict the pre-defined list of actions to only what is appropriate for the selected instrument	Good to have
41.6.	The system will allow users to enter free-form text describing the maintenance performed	Good to have
41.7.	The system will track when each instrument is in or out of service.	Good to have
41.8.	The system will alert the analyst/coordinator when an instrument has upcoming maintenance (timeframe determined by lab)	Good to have
41.9.	The system will not allow an instrument to be selected by an analyst if under maintenance or overdue for maintenance	Good to have
41.10.	The system will provide notifications for instrument maintenance	Good to have
41.11.	The system will track instrument Service Contract/Agreements	Good to have

42. Capture pipette verification data:

42.1.	The system will capture pipette ID	Good to have
42.2.	The system will capture calibration date	Good to have
42.3.	The system will capture target weight(s)	Good to have
42.4.	The system will capture actual weight(s)	Good to have
42.5.	The system will capture the person performing the calibration	Good to have
42.6.	The system will capture temp of water	Good to have
42.7.	The system will capture the balance ID and weights	Good to have
42.8.	The system will calculate % coefficient of variation, Standard deviation, % relative Standard deviation, bias, acceptance limits	Good to have

43. Capture balance calibration data:

43.1.	The system will capture balance ID	Good to have
43.2.	The system will capture calibration date	Good to have
43.3.	The system will capture target weight(s)	Good to have
43.4.	The system will capture actual weight(s)	Good to have
43.5.	The system will capture the person performing the calibration	Good to have

43.6.	The system will check actual weight against acceptance range	Good to have
43.7.	The system will capture the weight ID	Good to have

44. Capture thermometer calibration data:

44.1.	The system will capture the thermometer id	Good to have
44.2.	The system will capture calibration date	Good to have
44.3.	The system will capture target temperature(s)	Good to have
44.4.	The system will capture actual temperature(s)	Good to have
44.5.	The system will capture the person performing the calibration	Good to have
44.6.	The system will check actual temperature against acceptable range	Good to have
44.7.	The system will also cover NIST thermometer(s)	Good to have

45. Capture Refrigerator, Incubator, Freezer, and Oven (RIFO) data:

45.1.	The system will be able to track daily temperature reading from refrigerators, freezers, ovens and incubators (RIFO)	Good to have
45.2.	The system will push notifications when RIFO has an outlier	Good to have
45.3.	The system will allow the user to edit RIFO thermometer entries	Good to have
45.4.	The system will include worksheet to track and store daily temperature readings from refrigerator, incubators, freezers and ovens (RIFO).	Good to have
45.5.	The system will link the calibration of thermometers (correction factor) with the RIFO tracking	Good to have

46. Contain Instrument Management reports:

46.1.	Report: Maintenance: history, past due, etc.	Good to have
46.2.	Report: Calibration history, past due, etc.	Good to have
46.3.	Report: Instrument usage/utilization by user, method, etc.	Good to have

Consumables Management

47. Feature Consumables Management functionality:

47.1.	The system will provide a comprehensive set of reports for consumables, summarizing such information like expiration, usage levels, etc.	Must have
47.2.	The system will allow for different status types for consumable status: open, in use, expired, out of stock, etc.	Must have

48. Capture incoming consumable information from vendors:

48.1.	The system will capture be able to file import information from vendor (such as CSV, txt)	Nice to have
48.2.	The system will record the date received	Must have
48.3.	The system will record the number of items and units received	Must have
48.4.	The system will record the standard type	Must have
48.5.	The system will have allow existing reagents/standards to be used to create new types used in the laboratory	Must have
48.6.	The system will record the compounds in the standard	Must have

48.7.	The system will allow a link to MSDS sheets from file server	Must have
48.8.	The system will record the volume/amount	Must have
48.9.	The system will assign a unique identifier	Must have
48.10.	The system will record the vendor	Must have
48.11.	The system will record the vendor's catalog number	Must have
48.12.	The system will record the vendor's lot number	Must have
48.13.	The system will record the vendor's expiration date	Must have
48.14.	The system will record comments	Must have
48.15.	The system will record the date the standard was placed into service	Must have
48.16.	The system will record the date the standard was taken out of service	Must have
48.17.	The system will record the expiration date	Must have
48.18.	The system will record the extension of an expiration date and all associated details (person, date, etc.)	Must have
48.19.	The system will print labels/barcodes with user defined info	Must have
48.20.	The system will be able to record concentration	Must have
48.21.	The system will record the storage location	Must have
48.22.	The system will be able to attach a file (picture, supporting documentation, Certificate of Analysis)	Must have
48.23.	The system will have fields for microbiology genus/species (controls)	Must have
48.24.	The system will indicate storage criteria (frozen, refrigerated, etc.)	Must have
48.25.	The system will communicate with ELN	Good to have
48.26.	The system will record the mode of reagent/material disposition, date/time, and by whom	Must have
48.27.	The system will allow user defined notifications (i.e. expiration date)	Must have
48.28.	The system will record test and section where reagent will be used	Must have
48.29.	The system will have the ability to print labels small enough to fit on a 2 mL vial	Must have
48.30.	The system will record the bacteria strain of control culture stock	Must have

49. Manage Reagent, Media, and Standard Preparations:

49.1.	The system will record the date of preparation	Must have
49.2.	The system will record the starting material	Must have
49.2.1.	The system will record the reference stock identifier	Must have
49.2.2.	The system will record the parent standard used to create intermediate standards	Must have
49.2.3.	The system will record the parent standard used to create working standards	Must have
49.2.4.	The system will record amount used (e.g. g or mL, etc.)	Must have
49.2.5.	The system will record the analytes, if appropriate	Must have
49.2.6.	The system will indicate if the reagent/standard is hazardous	Must have
49.3.	The system will record the stock diluents	Must have
49.3.1.	The system will record the manufacturer	Must have
49.3.2.	The system will record the lot number	Must have
49.4.	The system will record the final volume	Must have
49.5.	The system will record pH	Must have
49.6.	The system will record the concentration of each analyte, if appropriate	Must have

49.7.	The system will record the expiration date	Must have
49.8.	The system will record the extension of an expiration date and all associated details (person, date, etc.)	Must have
49.9.	The system will record the product standard	Must have
49.10.	The system will create a unique reagent/media identifier	Must have
49.11.	The system will record "Prepared by/date"	Must have
49.12.	The system will record "Opened by/date"	Must have
49.13.	The system will record the mode of reagent/material disposition, date/time, and by whom	Must have
49.14.	The system will record spike solution	Must have
49.14.1.	The system will have the capability to record multiple standards used to comprise the spike or spike solution	Must have
49.14.2.	The system will record the components of the spike solution	Must have
49.14.3.	The system will record the spike solution concentration	Must have
49.14.4.	The system will record the spike solution volume used	Must have
49.15.	The system will record comments	Must have
49.16.	The system will have the capability to create a new reagent/standard/media by copying an existing record and altering the pertinent information, and allow error check for duplication	Must have
49.17.	The system will indicate visually when reagents/standards/media are approaching expiration or are expired.	Must have
49.18.	The system will notify the user of upcoming expiration dates	Must have
49.19.	The system will link the reagent/standard/media to appropriate SDS information external to the system.	Must have
49.20.	The system will allow user defined notifications	Must have
49.21.	The system will record test and section where reagent will be used	Must have
49.22.	Reagents, standards, and media can be checked for validity (expiration and qualification status) prior to use	Good to have
49.23.	The system can automatically calculate expiration dates for standards, reagents, and media.	Good to have
49.24.	The system will associate the parent control culture stock used in the creation of daughter culture	Must have
49.24.1.	The system will track each pass a parent control culture stock is used to create daughter culture	Must have
49.24.2.	The system will allow user to define the maximum passes for each parent control culture stock	Must have
49.24.3.	The system will prohibit user to associate the control culture stock to create new daughter culture when the maximum number of passes is reached	Must have

Container Management

50. Feature Container QC functionality:

50.1.1.	The system will allow user defined container types with description	Good to have
50.1.2.	The system will track the following for each container type: vendor name,	Good to have

	vendor lot number, C of A availability	
50.1.3.	The system will track the lot numbers of multiple components that make up a container	Good to have
50.1.4.	The system will track status of container: ordered, received, quarantine, passed QC	Good to have
50.1.5.	For quarantined containers, the system will define and request all user defined QC tests	Good to have
50.1.6.	The system will link supporting documents with container type	Good to have
50.1.7.	The system will notify staff of containers that pass all QC tests and are ready for deployment	Good to have
50.1.8.	The system will recognize future containers with lot numbers which have passed QC and are ready for deployment upon receipt	Good to have

Financial Management

51. Feature financial management tools:

51.1.1.	The system will have the ability to maintain a Price Schedule	Must have
51.1.2.	The system will have Quotation & Invoice functionality and associated tracking	Must have
51.1.3.	The system will have the ability to generate various financial analysis reports.	Must have

Audit Trail

52. Feature Audit Trail functionality:

52.1.1.	The system will record the date the information was changed	Must have
52.1.2.	The system will record the time the information was changed	Must have
52.1.3.	The system will record the user/person that made the changes, requiring proper approvals as needed and record who was the approver	Must have
52.1.4.	The system will retain the original value	Must have
52.1.5.	The system will record the new/adjusted value	Must have
52.1.6.	The system will record the removal or deletion of information, such as canceled analyses or samples	Must have
52.1.7.	The system will require the user to record a reason for the change	Must have
52.1.8.	The system will not allow the audit trail function to be disabled, deleted, or altered	Must have
52.1.9.	The system will allow the system administrator to configure the level of auditing and corresponding "reasons for change" required of users with QAO approval	Must have
52.1.10.	The system will be able to generate an audit trail report (user defined)	Must have
52.1.11.	The system will track changes of approved data and require proper approval (e-signature) • Each data change will have a unique ID relating to a form that documents the reason and supporting documents.	Must have

	• System will prevent the user from using a previously assigned unique ID to make changes to another sample	
52.1.12.	The system administrator will be able to configure what level of auditing is required on a table and field basis	Must have
52.1.13.	Any changes made by the system administrator will also be stored in the audit trail	Must have
52.1.14.	The system will ensure that only authorized individuals can create, modify or delete a record	Must have
52.1.15.	The system will ensure that only authorized individuals can create, modify or delete a record	Must have
52.1.16.	The system's audit trail can be archived	Must have
52.1.17.	All changes on user's permissions will be recorded in the audit trail	Must have