TABLE 3-1
Data Quality Objectives for the Area 3 Hydrogeologic Conceptual Site Model (Remedial Investigation Subtask 1)
Remedial Investigation
San Gabriel Valley Area 3 Superfund Site

Step 1 – Define Basis of Evaluation

Overall Goal	Justification
Develop a hydrogeologic conceptual model for Area 3, which includes assessments of: – Surface water recharge. – Depth to groundwater. – Groundwater geochemistry. – Horizontal and vertical groundwater flow directions. – Groundwater flow velocities. – Geologic controls of groundwater flow.	– The hydrogeologic conceptual site model provides a foundation for completing Subtasks 2 through 6. Tables 4-1, 5-1, 6-1, 7-1, and 8-1 present the DQOs for the subtasks, respectively. – Site hydrogeology is the primary mechanism controlling the fate and migration of contaminants in groundwater.

Step 2 – Identify Potential Evaluation Results

Potential Result	Consequences of Incorrect Results	Basis for Potential Incorrect Result	Methods for Avoiding an Incorrect Result
An accurate and adequate hydrogeologic conceptual site model.	An inadequate hydrogeologic conceptual site model may adversely affect the accuracy of the other subtask evaluations. See Step 2 on Tables 4-1, 5-1, 6-1, and 7-1 for the potential consequences of predicting incorrect results for subsequent subtasks.	Use of unreliable or inadequate data for critical decision making.	Ensure sufficient confidence in data used to support decision making. Complete Step 7 (Optimize the Design).
Additional data collection needed to adequately develop the hydrogeologic conceptual site model for Area 3.	Collecting unnecessary data may waste resources.	Use of unreliable data for critical decision making.	Ensure sufficient confidence in data used to support decision making. Complete Step 7 (Optimize the Design).

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Subtask 1 – Hydrogeologic Conceptual Site Model
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Step 3 – Define Evaluation Boundaries

Boundaries for Consideration	Justification for Consideration
Area of groundwater contamination. Geographic boundaries that most closely coincide with the groundwater contamination in Area 3: – South of the Raymond Basin. – West of Rosemead Boulevard. – North of I-10. – East of the Repetto Hills.	Actual site boundaries defined by area of groundwater contamination underlying Area 3.
Geographic boundaries (areas adjacent to Area 3): – South El Monte OU. – El Monte OU. – Raymond Basin. – West of the Repetto Hills. – Areas east of Rosemead Boulevard. – South of I-10.	Fine-grained and coarse-grained geologic units in Area 3 extend to adjacent areas.
Aquifer boundaries (Area 3): – Western Alluvial Aquifer and Western Bedrock Aquifer. – Eastern Alluvial Aquifer – Shallow, Intermediate, and Deep Groundwater Zones.	– Advective contaminant transport (contaminant transport due to groundwater flow) is the primary driver of contaminant migration in Area 3. – Contaminated groundwater present at monitoring wells screened in the western alluvial aquifer and bedrock aquifer in western Area 3. – Contaminated groundwater present at production wells screened in the intermediate and deep groundwater zones of the eastern alluvial aquifer in eastern Area 3.
Aquifer boundaries (areas adjacent to Area 3): – Raymond Basin, down to approximately 500 feet bgs. – South El Monte OU, shallow, intermediate, and deep groundwater zones. – El Monte OU, shallow, intermediate, and deep groundwater zones.	– Shallow and deep groundwater zones in the El Monte OU and South El Monte OU are equivalent to the shallow and intermediate groundwater zones, respectively, in Area 3. – Raymond Basin production wells near Area 3 screened down to approximately 500 feet bgs.
Temporal limitations: – Current groundwater flow directions.	Contamination migration conceptual site model depends on understanding the current and past groundwater flow directions.

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Step 4 – Identify Areas Outside of the RI Evaluation Boundaries

Excluded Areas	Justification for Exclusion
Geographic boundaries (areas adjacent to Area 3): – San Fernando Basin. – Areas south of I-10.	– Groundwater does not flow between the San Fernando Basin and the San Gabriel Basin; therefore, the characteristics of the San Fernando Basin are unconnected to Area 3. – No contamination in production wells or groundwater monitoring wells identified south of I-10.
Aquifer boundaries (Area 3): – Deep Bedrock Aquifer(s) (western portion of Area 3 only). – Portions of the deep groundwater zone and below in the eastern portion Area 3.	Limitations in the data set for Area 3 limit the scope of evaluation possible of aquifer conditions. Data from production wells and monitoring wells primarily characterize the shallow, intermediate and only portions of the deep groundwater zones.
Aquifer boundaries (areas adjacent to Area 3): – Raymond Basin, below approximately 500 feet bgs. – South El Monte OU, below the deep groundwater zone. – El Monte OU, below the deep groundwater zone.	Limitations in the data sets for the El Monte and South El Monte OUs and limited data for the production wells in the Raymond Basin limit the scope of the evaluation possible of aquifer conditions.
Temporal limitations: – Potential future groundwater flow directions. – Past groundwater flow directions.	Area 3 potential future groundwater flow directions qualitatively evaluated. Groundwater flow modeling will evaluate past and potential future groundwater flow as part of the Area 3 feasibility study.

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TABLE 3-1
Data Quality Objectives for the Area 3 Hydrogeologic Conceptual Site Model (Remedial Investigation Subtask 1)
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Step 5 – Identify Data Needs and Uses

Data Need	Data Use(s)	RI Report Reference(s)
Topographic data.	– Assess the direction of surface water flow. – Develop a preliminary assessment of the groundwater flow direction in the shallowest aquifer.	Section 3.1.1. Section 3.1.4. Section 3.1.6.3. Figures 3-2 and 3-9.
Precipitation data.	– Estimate potential groundwater recharge volume. – Assess the potential seasonality of groundwater recharge. – Future groundwater flow model calibration.	Section 3.1.2. Section 3.1.5.2. Section 3.1.6.3. Figure 3-5.
Land use data.	– Estimate potential groundwater recharge from rainfall and where it occurs.	Section 3.1.3. Figure 3-3.
Recharge data: Total recharge at Eaton Basin.	– Estimate potential groundwater recharge volume. – Assess the potential seasonality of imported water recharge to groundwater. – Assess the effect of imported water on groundwater elevations, flow directions, and quality. – Future groundwater flow model calibration.	Section 3.1.4. Section 3.1.5.2.
Surface water data: Surface water flow data for the Alhambra, Rubio, and Eaton Washes.	– Estimate potential groundwater recharge volume. – Future groundwater flow model calibration.	Section 3.1.4.
Pumping data: Production well pumping rates.	– Assess well status (active/inactive) changes over time. – Identify production wells that are most likely to affect current groundwater flow directions. – Identify production wells that are most likely to have affected groundwater flow directions over time. – Future groundwater flow model calibration.	Section 3.1.3. Section 3.1.5.2. Section 3.1.6.3. Figure 3-7. Table D-6.

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Step 5 – Identify Data Needs and Uses, continued

Data Need	Data Use(s)	RI Report Reference(s)
Well data: – Well locations and reference point elevations. – Groundwater monitoring well and production well screened intervals.	– Develop geologic cross sections. – Calculate groundwater elevations. – Develop groundwater elevation contour maps. – Identify which groundwater zones are influenced by pumping at production wells. – Calculate the groundwater elevation of specific groundwater zones. – Determine if groundwater elevation measurements from production wells represent a specific groundwater zone or multiple groundwater zones.	Section 3.1.5.1. Section 3.1.6.1. Figures 3-5, 3-10 through 3-15. Figures 3-8, 3-17 through 3-20. Table 2-3. Tables D-1 and D-4.
Lithologic logs.	– Assess geologic properties. – Estimate porosity. – Develop geologic cross sections. – Assess the presence of separate hydrostratigraphic units. – Assess the presence of geologic controls on groundwater flow (low/high hydraulic conductivity lithology, bedrock fractures, degree of weathering, faulting, etc.).	Section 3.1.5.1. Section 3.1.6.1. Figures 3-4, 3-10 through 3-15. Well Installation Reports in Appendix B.
Geophysical logs.	– Refine assessment of geologic properties. – Assess the depth of the alluvium/bedrock contact.	Section 3.1.5.1. Section 3.1.6.1. Figures 3-4, 3-10 through 3-15.
Groundwater elevation data: Groundwater elevations at groundwater monitoring wells and production wells.	– Assess groundwater flow directions. – Identify potential monitoring well locations. – Calculate hydraulic gradients. – Calculate vertical gradients. – Calculate groundwater flow velocities. – Assess the potential presence of geologic controls of groundwater flow (separate hydrostratigraphic units). – Future groundwater flow model calibration.	Section 3.1.5.2. Section 3.1.6.3. Figures 3-5 through 3-7. Figures 3-12 through 3-13. Figure 3-17 and Figures D-9, D-15 through D-16. Tables D-1 and D-4.

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Step 5 – Identify Data Needs and Uses, continued

Data Need	Data Use(s)	RI Report Reference(s)
Regional geologic data.	– Assess the potential presence of geologic controls of groundwater flow (faults, fractures, folds, etc.). – Identify potential monitoring well locations.	Section 3.1.5.1. Section D.1. Figures 3-4, 3-10 through 3-16.
Aquifer test data.	– Assess hydraulic properties. – Calculate hydraulic conductivity. – Calculate groundwater flow velocities. – Future groundwater flow model calibration.	Section 3.1.5.2. Section 3.1.6.3. Section D.2.2.1. Figure 3-17. Tables D-2 and D-5.
Groundwater geochemistry data.	– Assess the potential presence of geologic controls of groundwater flow (separate hydrostratigraphic units, faults, fractures, folds, etc.).	Sections 3.1.5.1 and 3.1.6.1. Section D.1.2. Section D.1.3. Table D-3. Appendix B.

Step 6 – Evaluate Data Usability

Data Type	Data Generation and Reliability	Assessment Performed
Topographic data.	Data from published USGS maps of known and usable quality.	Data usable without further assessment.
Precipitation data.	Published LADPW data of known and usable quality.	Data usable without further assessment.
Recharge data: Total recharge at Eaton Basin.	Published LADPW data of known and usable quality.	Data usable without further assessment.
Surface water data: Surface water flow data for the Alhambra, Rubio, and Eaton Washes.	Published LADPW data of known and usable quality.	Data usable without further assessment.
Pumping data: Production well pumping rates.	Published Watermaster data of known and usable quality.	Data usable without further assessment.

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Step 6 – Evaluate Data Usability, continued

Data Type	Data Generation and Reliability	Assessment Performed
Well data: – Well locations and reference point elevations – Groundwater monitoring well and production well screened intervals	– Data set includes known locations and known reference point elevations of groundwater monitoring wells and production well based on land and elevation surveys of usable quality. – Data set includes data for monitoring wells screened intervals recorded at time of construction of known and usable quality. – Data set includes data for production wells screened intervals based on drillers' logs of usable quality.	Data set was reviewed. (See Section 2)
Lithologic logs.	– Logs for EPA and facility groundwater monitoring wells developed during the drilling process by an onsite geologist. – Facility monitoring well logs generated by many collectors. – Production well logs generally developed by well drillers.	– Geophysical logging confirmed lithologic information. – Evaluations based solely on data from monitoring well lithologic logs if inconsistencies between lithologic logs for monitoring wells and production wells identified.
Geophysical logs.	Geophysical logs generated by a licensed contractor of known and usable quality.	Geophysical log interpretations supplemented and confirmed by lithologic information collected during drilling at EPA monitoring wells.
Groundwater elevation data: Groundwater elevations at monitoring and production wells.	– Primary data includes groundwater elevation measurements collected using methods with ±0.01 ft accuracy. – Groundwater elevation measurements at production wells collected using methods with ± 1 foot accuracy. – Facilities generally collected groundwater elevation measurements using methods with comparable accuracy to EPA's methods.	– Measurements collected by water purveyors generally omitted. – Primary data collected at available production wells using methods with ±0.01 ft accuracy in 2004 and 2007. – EPA, in coordination with LARWQCB, periodically collected groundwater elevation measurements at facility monitoring wells to verify the accuracy of reported measurements.
Regional geologic data.	Data obtained from published sources of known and usable quality.	Data usable without further assessment.

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Step 6 – Evaluate Data Usability, continued

Data Type	Data Generation and Reliability	Assessment Performed
Aquifer test data.	– Data generated by water purveyors, power companies, and/or Watermaster and considered to be of variable quality. – Published values of hydraulic conductivity of known and usable quality used in lieu of actual field aquifer test data as needed.	None.
Groundwater geochemistry data.	– Data generated by EPA and facilities. – Based on the results of the Data Quality and Usability Assessment presented in Appendix C, analytical data collected by EPA considered of sufficient quality for use in the Area 3 RI. – Reliability of dissolved oxygen measurements collected by facilities questionable because samples may have been exposed to air prior to measurement.	– Appendix C presents the results of the Data Quality and Usability Assessment. – Dissolved oxygen measurements collected by facilities were not used to develop the hydrogeologic conceptual site model. – Appendix B presents the complete dataset in Tables B-1 through B-3.

Step 7 – Optimize the Design

Actions	Methods for Optimizing the Design
Revise the hydrogeologic conceptual site model during the feasibility study.	Assess potential groundwater flow across structural bedrock discontinuity as part of the feasibility study. Refer to Table 8-1 for assessment of next steps.

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