

Several physical constraints must be considered when siting GSI measures. These include subsurface conditions, such as underlying groundwater depth, soil types, and existing contamination; existing infrastructure, such as utilities and foundations; existing street trees; and other site uses. When selecting a GSI measure(s) for a project site, regional and City siting constraints and requirements must be considered. **Table C-1** provides a summary of these constraints. In addition to these constraints, best professional judgment should always be used when siting GSI.

Table C-1: GSI Measure Siting Constraints and Requirements

Constraint	GSI Measure Siting Requirement	Reference
Depth to groundwater	- The base of unlined infiltration measures must be at least 5 feet from seasonal high groundwater. - The measure must be lined if the bottom of the facility is less than 5 feet from seasonal high groundwater.	MRP C.3.d.iii, ACCWP C.3 Technical Guide Section 8
Underlying soil or groundwater contamination	- Unlined measures must be at least 1,500 horizontal feet from contaminated soils or groundwater. - Distance from subsurface contamination for lined measures should be determined based on the designer's best professional judgment.	SCVURPPP C.3, Appendix A, Table A-1
Drinking water wells	- Unlined measures must be at least 100 horizontal feet from known drinking water wells (or greater if the site has highly porous soils or there are other concerns for groundwater protection). - Distance from drinking water wells for lined measures should be determined based on the designer's best professional judgment.	ACCWP C.3 Technical Guide, Appendix F, Section F.2.2
Septic systems	- Unlined measures must be at least 100 horizontal feet from known septic systems (or greater if the site has highly porous soils or there are other concerns for groundwater protection). - Distance from drinking water wells for lined measures should be determined based on designer's best professional judgment.	ACCWP C.3 Technical Guide, Appendix F, Section F.2.2

Constraint	GSI Measure Siting Requirement	Reference
Underground storage tanks (USTs)	- Unlined measures must be at least 100 horizontal feet from known USTs (or greater if the site has highly porous soils or there are other concerns for groundwater protection). - Distance from drinking water wells for lined measures should be determined based on designer's best professional judgment.	ACCWP C.3 Technical Guide, Appendix F, Section F.2.2
Underlying soil infiltration rate ¹	It is recommended that GSI measures include an underdrain when existing subsurface soils have a saturated hydraulic conductivity less than 0.5 inches per hour.	ACCWP C.3 Technical Guide, Section 8.1.1
Geotechnical hazards	Measures may not be sited overlying mapped geotechnical hazards without geotechnical engineer approval.	SCVURPPP C.3 Stormwater Handbook, Section 5.3
Building setbacks	- Measures should be located at least 10 feet from structures or as required by a structural or geotechnical engineer. - For infiltration trench, a 100-foot setback from building foundations is recommended, unless a smaller setback is approved by a geotechnical engineer.	ACCWP C.3 Technical Guide, Section 8.1.1, 8.4.1
Trees	Protection of existing trees requires a tree protection perimeter that extends to the outer limits of the branches of such tree, or is a greater distance established by the Office of Parks and Recreation.	Oakland Municipal Code Chapter 12.36 – PROTECTED TREES
Street widths	Minimum street ROW widths (and pavement widths, if provided) must be maintained: - Arterial Street - 80 feet - Collector Street - 60 feet - Local Street - 50 feet (30 feet) - Alleys - 26 feet (20 feet)	Oakland Municipal Code Chapter 16.16 – DESIGN STANDARDS
Bike lanes	Minimum bike lane width of 5 feet must be maintained.	OakDOT Standard Detail CS-3: Curbside Bike Lane and Buffer Width

Constraint	GSI Measure Siting Requirement	Reference
Other multi-modal transportation requirements	Minimum bus lane widths must be maintained in accordance with City of Oakland requirements.	See OakDOT Design Details for Transportation Facilities: https://www.oaklandca.gov/Public-Safety-Streets/Transportation-Permits-Engineering/OakDOT-Design-Details-for-Transportation-Facilities
Sidewalk (ADA) requirements	Minimum sidewalk width of either the existing sidewalk width or 5.5 feet must be maintained, whichever is greater.	City Public Works Standard Detail S-1: Concrete Curb, Gutter, and Sidewalk
Turning radius	Follow turning radius requirements for waste management, street sweeping, fire trucks, and tractor trailers.	Coordinate with Waste Management, Oakland Public Works, and Oakland Fire Department for truck turning templates applicable and site review.
Higher speed limit street setbacks	Set back measures on streets with higher speeds. Use reference to determine specifics.	Consult California Manual of Uniform Traffic Control Devices (MUTCD) and the Caltrans Highway Design Manual or follow OakDOT guidance.
Site slopes	- Measures should not be constructed on slopes greater than 4% unless constructed as a series of cells using check dams. Check dams should be placed every 4 to 6 inches of elevation change. - A geotechnical engineer should be consulted when the slope of the total facility is over 6%.	ACCWP C.3 Technical Guide, Section 8.1.1
Utilities	Follow the most recent version of the City of Oakland's Storm Drainage Design Standards for horizontal separation from utilities requirements, including but not limited to: - Electrical vaults - Primary utility pipelines, including concrete-encased utility lines - Concrete foundations	City of Oakland Storm Drainage Design Standards: https://www.oaklandca.gov/Community/Community-Development/Sustainability-Environment/Creeks-Watershed-and-Stormwater/Storm-Drainage-Design-Standards

Constraint	GSI Measure Siting Requirement	Reference
Utilities (continued)	Follow most recent version of the City of Oakland's Storm Drainage Design Standards for minimum horizontal clearance between the edge of GSI measure and the outside wall of any electric, water, gas, and wastewater main/service pipes or electric duct banks, regardless of the elevation of the existing utility pipe or duct bank.	City of Oakland Storm Drainage Design Standards: https://www.oaklandca.gov/Community/Community-Development/Sustainability-Environment/Creeks-Watershed-and-Stormwater/Storm-Drainage-Design-Standards
	Confirm and comply with vertical clearance from overhead utilities requirements	
	Check with Oakland Watershed and Stormwater Management Division before including electric, water, gas, or wastewater valves, manholes, and main/service pipes, or electric duct banks and vaults within GSI measure footprint design.	Watersheds@oaklandca.gov
Maintenance needs	- Consider the use of rock mulch and very hardy plants that require minimal watering. - Consider the use of large, anchored rocks interspersed throughout the landscaping to prevent encampments.	

¹ Infiltration rate should be determined by available site-specific boring log or percolation test data, or through conducting a percolation test recommended by a geotechnical engineer (per SCVURPPP C.3 Stormwater Handbook section 5.3).