

Unit 3.4 Site Consideration

Content Area: **Science**
Course(s): **Civil Eng & Arc**
Time Period: **Semester 2**
Length: **3 weeks**
Status: **Published**

Standards

CS.9-12.8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
CS.9-12.8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
CS.9-12.8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
CS.9-12.8.2.12.ED.5	Evaluate the effectiveness of a product or system based on factors that are related to its requirements, specifications, and constraints (e.g., safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, ergonomics).
CS.9-12.8.2.12.ED.6	Analyze the effects of changing resources when designing a specific product or system (e.g., materials, energy, tools, capital, labor).
CS.9-12.ED	Engineering Design
SCI.9-12.HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
SCI.9-12.HS-ETS1-4	<p>Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.</p> <p>Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization.</p> <p>Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.</p>

Enduring Understandings

- Land surveying is used for many purposes during the design and construction of a project, including establishing the topography of a site, setting control points, and establishing the location of project features.
- Engineers must consider parking requirements, pedestrian access, ingress and egress, landscaping, storm water management, and site grading when creating a site design.
- Ingress and egress, parking, pedestrian, and handicapped access must be planned to efficiently and safely move traffic, goods, and people.
- The characteristics of soils present on a site impact the design and construction of improvements to a property.
- Codes determine the type, sizing, and placement of site features such as parking lots, entrance and exit

roads, pedestrian and handicapped access, and storm water facilities.

- The surface conditions and topography of a site affect the quantity and quality of storm water runoff and the design of the storm water management system.
- A soil can be classified according to its grain size and plasticity which impact the characteristics the soil will exhibit.

Essential Questions

- How is land surveying used in the development of a building project?
- What information is important to consider when planning the placement of driveways, parking spaces, and pedestrian access?
- How are the needs of a site user and the circulation patterns for the site interrelated?
- Why is it important to know the soil characteristics of a site when planning a building project?
- How does development change the characteristics of a site?
- What steps must be taken to ensure that the improvements made on a property will not adversely affect users or neighboring properties?

Knowledge and Skills

- Use differential leveling to complete a control survey to establish a point of known elevation for a project.
- Design appropriate pedestrian access, vehicular access, and a parking lot for a commercial facility.
- Analyze a site soil sample to determine the United Soil Classification System designation and predict soil characteristics important to the design and construction of a building on the site.
- Explain the impact of site development on storm water runoff.
- Estimate the increase in storm water runoff from a commercial site and create a preliminary design for a storm water storage facility.
- Identify and explain the purpose of Low Impact Development techniques in site development.
- Apply Low Impact Development techniques to a commercial site design reduce the impact of development on storm water runoff quantity and quality.
- Follow specifications and codes during a design process.
- Given 3D architectural design software, document a commercial site design.

Assessments

Modifications

<https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fIT8XsUIe3K1VSG7nxuc4CpCec/edit>

Resources

- 3.4.KT SiteConsiderations.doc
- 3.4.1a.A DifferentialLeveling.doc
- 3.4.1a.A LandSurveying.ppt
- 3.4.1a.A.SR SurveyFieldNotesBlank.xls
- 3.4.1b.P ControlSurvey.doc
- 3.4.1b.P SurveyingLevelLoop.ppt
- 3.4.1b.P.SR ControlDataSheet.xls
- 3.4.1h.A SurveyProblemHomework.xls
- 3.4.2.A ParkingLotDesign.doc
- 3.4.2.A ParkingLotDesign.ppt
- 3.4.3.A SoilsTesting.doc
- 3.4.3.A SoilsInvestigation.ppt
- 3.4.4.A WebSoilSurvey.doc
- 3.4.4.A.SR UnifiedSoilClassificationSystem.doc
- 3.4.5.A StormWaterManagement.doc
- 3.4.5.A LowImpactDevelopment.ppt
- 3.4.6.A Landscaping(Optional).doc
- 3.4.6.A LandscapeDesign.pptx
- 3.4.7.A CutandFill(Optional).doc
- 3.4.7a.A HillsideCutFillDrawing(Optional).doc
- 3.4.7.A SiteGrading.ppt
- 3.4.8.A RoadDesign(Optional).doc
- 3.4.8a.A RoadChart(Optional).doc
- 3.4.8.A RoadDesign.ppt