Unit 3.4 Site Consideration

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

Standards

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.
HS-ETS1-4	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.
ED	Engineering Design
	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.
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.
8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
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.
	Engineering design evaluation, a process for determining how well a solution meets requirements, involves systematic comparisons between requirements, specifications, and constraints.
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).
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).

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

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit

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(Optonal).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