Influences on Site Design

AIAPDH255

2 LU/HSW Hours

PDH Academy
PO Box 449
Pewaukee, WI 53072
(888) 564-9098
support@pdhacademy.com

PDH Academy

Influences On Site Design Final Exam

1. Another goal for site design may be to apply _____ to the design.
   a. Historic detailing
   b. Sustainable principles
   c. Budget concerns
   d. Rapid resolution

2. One way to be a good neighbor is to try to blend in, instead of being an eyesore created by ____ .
   a. A lack of context
   b. Use of hazardous materials
   c. Excessive use of fossil fuels
   d. Slovenly occupants

3. Outside site-related consultants may be needed in areas of soil remediation, soil stabilization, _____ , zoning variance expeditors, etc.
   a. Acoustics
   b. HVAC design
   c. Security
   d. Erosion control

4. Graphics used to analyze sites can be of help in the defense of our choice of _____ on the site.
   a. Consultants
   b. Occupant density
   c. Excavation equipment
   d. The ideal location

5. Any area with a one percent chance of experiencing a flood in any given *year, is a* _____ .
   a. Risk too great to take
   b. 100-year flood plain
   c. Excellent place to locate rain gardens
   d. Good location for a detention pond

6. What is a means of regulating land development to achieve a specific urban form, using physical form, rather than use separation, as the organizing principle.
   a. Having form follow function
   b. Form based zoning
   c. Occupancy overlays
   d. Neighborhood approval

7. A narrow strip of transitional land between upland habitats and perennial or intermittent bodies of water, including creeks, streams, rivers, wetlands and lakes, is a _____ .
   a. Riparian zone
   b. Set-aside
   c. Recurring wetland
   d. Buffer strip

8. The biggest constraint of all in site design may be the _____ .
   a. Owner's project budget
   b. Neighborhood resistance to the project
   c. A sharp rise in the terrain
   d. A lack of fees to design it properly

9. The ADA established guidelines for model codes. When those model codes are adopted by jurisdictions, with or without amendments, they become _____ .
   a. Law
   b. Local guidelines to be considered
   c. Zoning concerns
   d. Enforceable if users are handicapped

10. Limiting the square footage of hard surfaces covering a piece of land, compared to the total size of that land, is usually related to limiting _____ coming off new impervious services.
   a. The reflected sunlight
   b. The total landscaping
   c. The increased amount of drainage
   d. The retained heat

11. Which of the following is NOT a reason for zoning regulations to include parking requirements?
   a. Make sure project users don't park in space reserved for others
   b. Make sure project users don't ignore historic district overlay concerns
   c. Make sure project users don't park in space reserved for easements
   d. Make sure project users don't park in areas for other land use restrictions

12. An owner must provide enough parking so that users of their facility will not be parking on the streets or _____ .
   a. In lots for other businesses
   b. In nearby city parks
   c. In metered parking spaces
   d. In lots reserved for mass transit users

13. With easements, _____ is not transferred, and it can be restricted based on the terms of the easement.
   a. Airspace
   b. Ownership of the property itself
   c. The right to minerals below
   d. Solar access

14. _____ can be used to deflect or reflect the sound coming from nearby objectionable sources.
   a. Nearby traffic sound
   b. Berms or walls
   c. Louder noise sources
   d. Water features

15. Specific examples of archeological concerns include_____ , protected wetlands, tribal burial markers, and ruins of archeological significance.
    a. Human remains
    b. Previous building foundations
    c. Early water sources like springs
    d. Buried fuel tanks

Influences on Site Design

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INTRODUCTION

In initial discussions with a client, it is easy to begin envisioning the type, and maybe even the appearance of the building that we can imagine will meet their needs. It is wise though, to not become too invested in possible solutions until we have been informed of, or the owner has decided upon, the site upon which their building will be located. The site for the project will influence almost every other choice being made during design.

The form the final project will take is based to a large degree on multiple parameters which must be met by the design for the site. These will include requirements found in the owner-supplied program, siting concerns in the building codes, zoning regulations which must be followed, recorded restrictions constraining the use of some areas, societal concerns, recognition of the neighborhood and context in which the project must sit, nearby and past improvements, and designing in accordance with the environment and the climate.

Before we explore these categories of site design parameters, let's take a quick look at what we want to achieve, using graphics for a quick analysis and some terms that might be of use.

PRINCIPLE GOALS OF SITE DESIGN

Why do we go through the process of site analysis? There are several primary goals we seek to accomplish.

Image by Siggy Nowak from Pixabay

We wish to determine the best location for building and site improvements, based on that analysis. We locate projects on site, based on views, wind, solar path, topography, adjacencies, planning concepts, etc. Usually, several choices for site location will present themselves, depending on the type of project. It may involve orientating one building in the most advantageous position. We may be arranging multiple buildings, in either one phase or in a layout for a master plan for site development. It could involve configuring an addition to an existing building in such a way that the result is still in compliance with code. Ultimately though, we want to plan site improvements in such a way that they will support future development on the site.

Another goal may be to apply sustainable principles to the design. This passive design approach involves using the sun, wind, temperature, precipitation, and other climate data to determine building orientation and shape, envelope design, site features and active and / or passive building systems. A passive design approach is first and foremost, the easiest way to minimize energy use in the project. Some research will be required to determine what building materials are easily obtained nearby. Using locally sourced components means less energy will be expended in transporting them to the site.

In a broad overview, we seek to determine the impact of neighborhood context on the project design. We consider neighborhood character including proximity to transit, nearby amenities and public services, utilities, noise pollution, adjacent buildings scale and façade materials, historic precedent and historic preservation requirements. One way to be a good neighbor is to try to blend in, instead of being an eyesore created by lack of context. This involves producing an appropriate design response for a given architectural context. Duplication is not a necessary part of this, but some recognition should be given to existing scale, prevalent architectural features, prevalent materials and massing.

We consider and assess the legal factors of a given site problem including legal description, setbacks, easements, covenants, rights-of-way, buildable area, height limits, and parking. All these constraints must be considered, and areas blocked out for them on a site plan, before proceeding too far down the road of investing time in a preliminary design. That could save a lot of time. A lot of progress can also be made toward a workable design, in the process of circumventing problems created by those site design parameters.

We consider how these site-scaled factors become part of the “basis of design” for the programming effort. Start with a whole site. Then eliminate areas unusable because of setbacks and easements, areas that must be reserved to meet parking requirements, areas needed for landscaping screens, for retention or detention areas and for green space to meet floor-area ratios. Then verify what is left for a building contains enough space for the desired structure, and if so, how many levels will be required within the available footprint to obtain the desired, and allowed, square footage. This will affect the building type needed to be utilized to get that number of levels and square footage for the desired occupancy.

We need to decide how these factors will all contribute to the development of an architectural program, serving as guidance to problem seeking and solving. The more we learn, and the more parameters discovered beforehand that affect the design of the project, the less time spent backtracking to resolve constraints which were not addressed up front. As is often stated, most problems are also possibilities. Before we get very far in addressing those constraints, we will find that we have fixed the size and the massing of the project.

We also conduct such exploration of site issues affecting design, to determine which site related consultants will be needed to contribute their expertise to the successful execution of the project. Such experts may be needed in areas of soil remediation, soil stabilization, erosion control, zoning variance expeditors, etc.

GRAPHIC REPRESENTATIONS IN SITE ANALYSIS

A necessary skill will be the ability to evaluate and understand diagrammatic graphics and how they are used to represent and communicate site conditions, relationships and program requirements. At any point, when there is an element on a site plan, survey, engineering report, etc., that is unfamiliar, ask someone else what it represents. The idea is to be able to translate written and graphic data on a site plan or survey, into a mental image and understanding of that tangible piece of property.

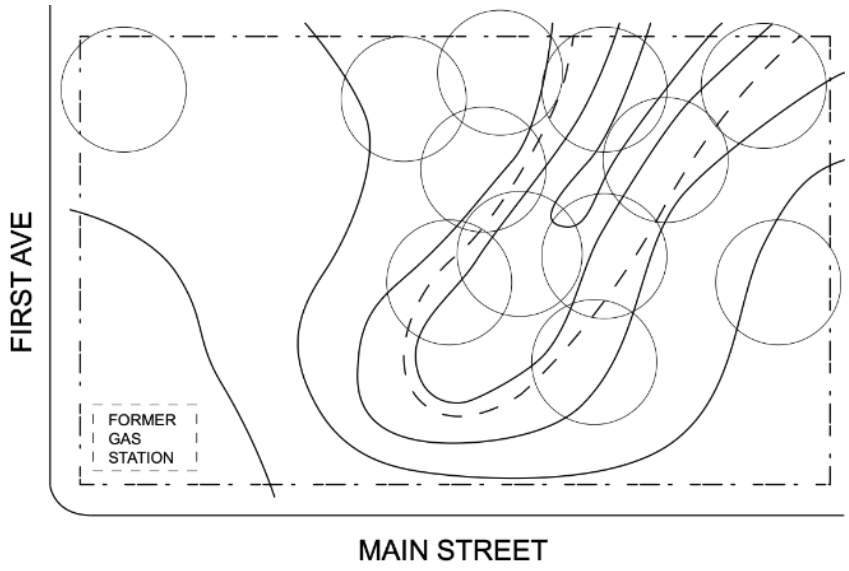
These graphics include topographic, programming, circulation, adjacency, environmental, view, and vegetation diagrams. They are all used to communicate site information and relationships. Review examples, ask questions and if necessary, take a surveyor out to dinner and ask questions.

Graphics can be used to compare the features of multiple sites, in order to select the most appropriate one to meet programmatic needs. They can also help identify the ideal part of a particular site to build upon. They might also help in the defense of our choice of the ideal location on the site, should an owner or governing authorities seek justification.

Graphics are used to precisely indicate locations on site, where soil borings are being requested. This eliminates any questions or confusion. The idea behind these requested samples is obtaining information of use to the architect and structural engineer. The intent is to eliminate nasty underground surprises, like accidentally building on top of an underground stream. It a more personal example, they might uncover that half of the building site was actually a small amount of soil over the top of a large rock shelf. The minimum suggested soil boring locations for a small building footprint would be one in each corner and two in the middle, somewhat in from the sides. In one actual project, borings were taken in each corner, missing the fact that the dome of an underground cave rose to just below the middle of the proposed building location. The decision to omit taking any samples from the center of the project cost a backhoe operator their life.

A Site Analysis Example

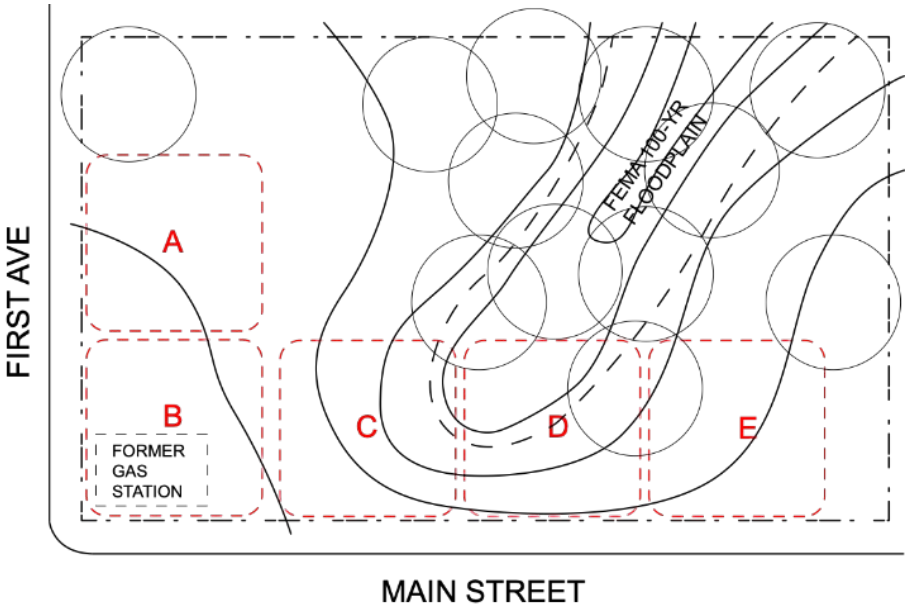
The following sample site plan represents a project being proposed for development.



In this example, it became important to pay attention to slopes, the location of existing mature trees, where street access would have to occur, and the existence of a former gas station which almost certainly had underground fuel tanks.

Given that information and informed that the program did not call for a walk-out plan for a lower level, the designer was asked to determine which location on the site would be “best” for developing the project. He was also requested to avoid location B, since using it might require the removal of prior fuel tanks and expensive soil remediation. He was also requested to avoid using locations D and E, as the amount of

drop in the land would require engineered fill and / or the use of piers to ensure there would be no future uneven settlement of foundations or slabs.



The process of elimination removed B, D, and E, leaving A or possibly C as the best locations to further explore. When that was presented to the owner, despite the concerns and potential problems involved, the owner insisted on using location B, since they wanted the best visual exposure from both streets.

At that point, the rationale for not choosing that location was presented in writing, with a paper trail created for documentation. That paper trail was created as justification for additional services for a redesign, when the owner would receive an estimated cost for tank removal and soil remediation.

SITE ANALYSIS VOCABULARY

100-year flood plain – This is any area that has a one percent chance of experiencing a flood in any given year.

2004 ADAAG – The ADA Accessibility Guidelines, which impose requirements for different types of construction: new construction, alterations and architectural barrier removal.

Accessible site approach – The refers to the goal of removing all impediments for the handicapped to access a site.

ADA Title II – This act extends the prohibition of discrimination to include all services, programs, and activities provided or made available by state and local governments.

ADA Title III – This regulation implements title III of the Americans with Disabilities Act (ADA), relating to nondiscrimination, based on disability, by public accommodations and in commercial facilities.

Adaptive Reuse – This is the process of repurposing existing buildings for viable new uses and modern functions.

Army Corp of Engineers - This engineering division of the United States Army has three primary mission areas: engineer regiment, military construction, and civil works.

Aquifer – This is a body of porous rock or sediment saturated with groundwater.

Arterial and Collectors - Arterial roads are high-capacity roads delivering traffic from collector roads to freeways and between urban centers. Collector roads are low-to-moderate capacity roads moving traffic from local streets to arterial roads.

BMP's (Best Management Practices) - These are methods used to prevent or control stormwater runoff and the discharge of pollutants, including sediment, into local bodies of water.

Circulation – This refers to orderly movement through a defined path.

Citizen review board – This municipal body is composed of citizen representatives, charged with the investigation of complaints by members of the public against public officials.

Climate - The long-term pattern of weather in an area is typically averaged over a period of 30 years.

Comprehensive plan – Such a plan includes recommendations on land use, housing, and other areas described and enforced by that city's zoning ordinance.

Contour – This is an outline especially of a curving or irregular figure. In site plans, they are the curving lines representing points along a site, all of which are at the same height above sea level.

Curb Ramps – This sloped surface is a transition between a pedestrian walkway and a vehicular roadway.

Degree days – A measure of how cold or warm a location is, by comparing the mean (the average of the high and low) outdoor temperatures recorded for a location to a standard temperature, usually 65° F.

Easement – This is a given or purchased right to cross or otherwise use someone else's land for a specified purpose.

Environmental plan – This encompasses areas of concern in land use like socioeconomics, transportation, housing characteristics, air pollution, noise pollution, the wetlands, habitats of any endangered species, flood zones and susceptibility, coastal zones erosion, and visual studies among others.

Erosion – This describes the gradual destruction or diminution of something, in this case soil, by wind or water.

FEMA – The "Federal Emergency Management Agency" is an agency of the United States Department of Homeland Security.

Floor-area ratio – Also denoted as FAR, this is the measurement of a building's floor area in relation to the size of the lot / parcel that the building is located upon.

Form based zoning – This is a means of regulating land development to achieve a specific urban form, using physical form (rather than separation of uses) as the organizing principle.

Infill – This refers to the dedication of land in an urban environment, usually open space, to new construction.

Land use plan – This document defines the process of regulating land use by a central authority.

Mounting height – This the distance from finished grade or finished floor to a specified portion of a fixture or mounted item, usually ending with 'AFF,' referring to "above finished floor."

Neighborhood – This is a geographic location, lived in by multiple residents and usually having distinguishing characteristics.

Parking calculations – This is usually a table in a zoning ordinance, listing the minimum required off-street parking spaces for a given zoning use.

Path of travel – This describes a continuous, unobstructed means of pedestrian passage by which an area may be approached, entered, and exited.

Preservation – This is the maintenance and repair of existing historic materials and retention of a property's form as it has evolved up to that point.

Public review – These public meetings are for purposes of transparency and to allow public input into decisions being made or considered.

Pull side access – This refers to approaching from the side of a swinging door, within the space taken up by the swing.

Push side access – This refers to approaching from the side of a swinging door, opposite of the space taken up by the swing.

Reconstruction – This re-creates vanished or non-surviving portions of a property.

Rehabilitation – This describes the process used to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character.

Restoration – This effort restores a property back to a particular period of time in its history, while removing evidence of other periods.

Riparian zone – It is essentially the narrow strip of transitional land between upland habitats and perennial or intermittent bodies of water, including creeks, streams, rivers, wetlands and lakes.

Seismic – Actions of, subject to, or caused by an earthquake or other sources of earth movement.

Setback – This is the minimum open space required around any building or structure, usually given as a distance required to be maintained from a property line.

Smart code – This describes a model transect-based planning and zoning document, based on environmental analysis.

Soil type – This is a term describing soil classifications, which include soils that share a certain set of well-defined properties.

Stormwater – It is water that originates from rain and snow and ice melting.

Transportation – This refers to the movement of goods and people from place to place and the various means by which such movement is accomplished.

Transit oriented development – These are walkable, compact, mixed-use, higher-density developments within walking distance of a mass transit facility.

Transportation plan – This document is a common framework for guiding transportation decisions and investments by all levels of government and the private sector.

Turning radius – This circular arc is formed by the turning path of the front outside tire of a vehicle.

Urban transect - This system places all the elements of the built environment in useful order, from most rural to most urban.

Variance – This is a legal grant of relief from the requirements of a zoning ordinance, which permits construction to take place in a manner otherwise prohibited.

Views – This describes what is seen when looking in a particular direction.

Wetlands – These areas are where water covers the soil or is present either at or near the surface of the soil, all year or for varying periods of time.

Zoning board of appeals – This is a citizen board, enabled through state statute, to grant variances from development standards.

OWNER PROGRAM REQUIREMENTS

The goal in this aspect of site analysis is to assess a project site, relative to the requirements in the program of the owner, to determine if it is appropriate and feasible for desired development. Will the site support the project envisioned by the owner or does it contain constraints that may prove problematic?

Suppose your client envisions an all-glass building, you're locating it in a frozen wasteland, and you still must meet enforceable energy codes. Is this a good location for that building? If it's the only location being proposed, will the client be willing to compromise on the expected exterior appearance of the building? Will glazed spandrel panels become necessary?

Can a building of the size requested by the owner be placed on the site? This will need to be determined by eliminating any restricted areas like easements, setbacks, line-of-site requirements, etc. from the available land, in addition to the surprising large amounts of area on site that will be consumed by required parking. If enough space will not be left to meet owner needs, it may become necessary to stack floor levels to allowable heights, lease parking from adjacent owners if possible, or initiate variance proceedings to seek relief from regulations, which might gain more usable space. It may also become necessary for the owner to downsize their project.

An example as to whether the desired square footage is possible may hinge on whether the owner envisions multiple stories, or will allow the use of multiple stories, to obtain needed space.

The owner may have envisioned outdoor spaces for use by the building occupants and neighboring properties. Those will need to be located based on climate considerations, to maximize their season of possible use.

The owners may have expressed desire for a project which is either closed in appearance, or open and inviting. Meeting whichever goal will affect how the project and its footprint will be placed on the site.

Graphically determine the best location on a given site for improvements to take place, given existing constraints. Such constraints can be seen as informing the decision, placing the project in the best location possible on that site. Slopes, available views, nearby sources of water, nearby transportation hubs and so on, will all matter. Create or respond to bubble diagrams at the site development scale, based upon programming requirements and given site research information. Such diagrams are a quick, logical and economical way to determine whether a site can accommodate all known constraints and all improvements needed for the project.

Computer drawing programs make it a bit easier to drag and drop various parts of site programming requirements into the best locations on a given site plan diagram. Use blocks of the appropriate size to determine visually the amount of the site that will be needed or used up in order to accommodate those elements. A valuable tool for the owner will be a rapid assessment of different site plan options for the best "fit" of site programmatic requirements. Time spent doing this is better than time spent redesigning, should it turn out that the proposed building, parking and other desired improvements won't fit. It is also cheaper than discovering that elevators and a sprinkler system will be required, because the footprint had to shrink, requiring the number of levels to increase, to obtain the required amount of square footage to meet program requirements and make the project economically feasible. But money was saved by not spending the minimal hours needed to explore other site plan options.

Budget enough design time in the initial phases to do the necessary work to best serve the client. Site analysis can be a bit of a puzzle, especially when combined with constraints imposed by building codes and zoning ordinances.

Image by moise gh-marian from Pixabay

It almost goes without saying, but the owner's project budget may be the biggest constraint of all. A quick calculation must also be done to remove from that budget, costs for permits, professional fees, excavating, site amenities like required landscaping, required parking, any improvements to nearby amenities, modifications to neighboring streets, and any other costs not directly related to the building. The remaining amount will be the actual budget for the building.

Part 1 Review Questions

16. In a site analysis example shown, the designer was asked to avoid using one location since it might involve which two of the following?
    a. The removal of prior fuel tanks
    b. Cutting trees to increase wind access
    c. A lawsuit with neighbors
    d. Expensive soil remediation

17. These areas are where water covers the soil or is present either at or near the surface of the soil, all year or for varying periods of time.
    a. Invasive animal species
    b. Nearby regulatory agencies
    c. Constraints
    d. Large areas of rock

18. One answer to whether the desired square footage is possible may hinge on whether the owner envisions_____ , or will allow their use, to obtain needed space.
    a. Structures on piers
    b. Ascending terraces
    c. Levels below grade
    d. Multiple stories

BUILDING CODES

This may seem like an odd subject to include in a course on site design, but building codes have a direct effect on project size. The proposed occupancy of the project and the building type intended to be used, will play a very large part is determining the footprint the building will occupy on the land. Square footage allowed by the code, divided by the number of stories permitted by the code, will equal the smallest possible footprint of the lowest level. That in turn will determine how much space will be left on the land in which to satisfy any additional site improvements required by other stakeholders in the project.

Building codes will also determine how much distance will have to be maintained between the proposed project and neighboring buildings. That will directly affect the placement of the project.

Whether or not the installation of a fire suppression system is possible, plays a big part in how many stories and how much square footage will be allowed in a project. If the available water supply to the site from the local municipal supply is inadequate to support such a system, the building will need to be smaller, increasing the area of the site available for other amenities. A lack of a sprinkler system will also affect the distance required to be maintained from neighboring buildings.

ZONING REGULATIONS

With just a few exceptions, building codes concern themselves very little with what will be done on project sites. But the same cannot be said of zoning regulations. These guidelines and laws are passed specifically to regulate for what reason and how land in their community can be used. It therefore becomes very necessary in site analysis, to determine and understand the specific regulations in zoning ordinances which apply to a particular site. Building codes are concerned with building use. Planning and zoning codes are concerned with use of the land.

Finding all the parameters affecting both site design and the project design will require consideration of local municipal building codes and amendments, if different from, or in addition to, the model building codes which were adopted. In many locales, additional codes have been generated in response to local problems in the past. In most cases, these added building requirements are more stringent than the adopted model code. When that occurs, the most stringent must be followed.

Successful project execution will also require addressing accessibility concerns related to the 2010 ADA Standards for Accessible Design. Whenever possible, even if not required by code, the playing field

should be leveled for all potential users. The ADA established guidelines for model codes. When those model codes are adopted by jurisdictions, with or without amendments, they become law.

If designated as such in the past, or if a property is included in a historic district, there will be additional regulations establishing parameters to be met in both building and site design. The Department of Interior Standards and Guidelines about historic buildings and their improvement may need to be researched. There may also be state or local entities having jurisdiction over such projects, from whom approvals must be sought. In many cases, if a historic designation has been sought and received, or if grant money has been used for historic preservation purposes, a historic agency may have jurisdiction over further alterations to that building.

For this section though, we will focus on the zoning regulations affecting land use.

Relevant Zoning and Land Use Requirements

These regulations are specific to a municipality or regulatory jurisdiction and are separate and distinct from building code requirements. They must still be adhered to, before project approvals can be obtained.

Almost universally, there will be zoning requirements that limit the extent of site and building development. These may be based on issues as specific as aircraft landing patterns, or simply on a desire to keep all the buildings in a particular area of similar size and density.

Zoning laws may limit the amount of lot coverage. Limiting the square footage of hard surfaces covering a piece of land, compared to the total size of that land, is usually related to limiting the increased amount of drainage coming off new impervious services. They want to ensure that additional loads remain within the capacity of the existing storm drainage system. Most municipalities are not interested in upgrading their available infrastructure in an area, to benefit one project owner. While a project can be a catalyst for improvements, those on a municipal level are generally intended to serve a greater long term good than one building project.

Zoning regulations include restrictions like setbacks. These are the distances that buildings are required to be set back away from property lines. Sometimes these setbacks are to the building edge, sometimes to the edges of the foundations below the building, and sometimes to the edges of any eaves protruding from the building. What can be built inside setback areas is specific to each jurisdiction. Sometimes parking is allowed within them, sometimes it is not. Sometime signage is allowed, or not. A little research will be needed.

Zoning regulations might include restrictions on the size of a building footprint on a site. This is somewhat unusual, as those types of limitations are often addressed in regulations for lot coverage and for floor-to-area ratios, but they are on the books in some localities.

Image by Hans from Pixabay

Zoning regulations almost always include restrictions on maximum building heights. This prevents a project from towering over its neighbors, completely out of context with the neighborhood around it. Height restrictions may also be in place because of flight path concerns from a nearby airport. If building codes allow a higher building, the most stringent code will prevail.

Many zoning regulations now include restrictions on FAR (floor area ratio). This describes how many square feet can be developed on a property, in proportion to the area of the property parcel. This effectively limits the density, or the number of occupants who can effectively use a project. This translates directly to how much additional burden will be placed on existing infrastructure and amenities, and how much additional traffic will be generated by a project.

Zoning regulations almost always include parking requirements. This is to make sure there are enough planned on site, so project users don't park in space reserved for other citizens or building owners, easements or areas reserved for other zoning and land use restrictions.

In some cases, zoning overlays may be in place that control the exterior appearance of the buildings in a project. The zoning code may literally dictate parameters like which materials may be used, having the façade broken up to reduce the mass, the amount and size of glazing that can be incorporated, how storefront windows must address an adjoining pedestrian walk, and so forth.

Find and study zoning regulations carefully, before beginning preliminary design. It is possible to get some relief from such regulations, especially if it is a project desired by the city, but processes must be followed to obtain such variances. The principle of “It's better to seek forgiveness, than permission,” does not apply here.

Recognize situations where a special exception or variance is suitable. The time, cost and effort to go through those processes, may or may not be worth it to an owner. Extra time spent unsuccessfully chasing them is time added to the length of time to get a completed project. That time loss can be directly tied to revenue lost from shortened use of the completed project.

Understanding the processes for obtaining site and zoning approvals or exemptions is an important service to offer to clients. You must be able to accurately advise the owner as to how to do so, the steps, and the expected duration.

Requested variances can include requesting more space to accommodate required facility square footage or required parking, within an allowable floor-area ratio. Will underground parking or a first-floor parking garage be a possible alternative to other types of on-site parking? If not, would a permanent agreement that is reached with neighboring properties for use of their excess parking be acceptable? Could a neighboring parcel owner agree to development of a parking lot on his land, if it's available for them in alternate hours?

Plan on calculating and factoring the answers to quantitative requirements of a given site and program. Requests like that above regarding alternative parking may require proof of calculations to support requests. This is especially true when advice is being given to an owner to consider an alternate site.

Another possible question can be asked when requesting variances. Could a mixed occupancy project be proposed that might require less parking on site? Requests made to meet deviate from zoning requirements through the issuance of a variance must be defendable.

Regional Planning

Some zoning regulations have been put into place to address regional and community planning concerns. What regulations will affect your design work for the project? In addition to zoning designations, many communities have specific overlays in place, directing the efforts of designers and developers in order to gradually obtain a different look and use for a specific area or neighborhood within a city.

Those regulations often stem from the efforts of land use planning. This is where architects can mesh their efforts with those of urban planners, to create a better community for everyone. Urban or city planners focus their efforts on an overview of land use within a municipality. Architects should try to acknowledge and strengthen those efforts in the design of individual buildings within that municipality.

It is advantageous to ask questions from regulatory agencies. Pursue a level of understanding that will allow you to convey how to navigate typical zoning requirements to the project owner. These parameters can sometimes simplify the process of arriving at a solution meeting all requirements. Seeking to deviate from the known requirements will consume more time and effort and may not succeed. The owner will be relying on the designer for expert advice on how, or even if, to do so. Know the expected time frames, costs, likelihood of success, etc. Are there ways to make a project requiring some variance from the rules more acceptable to those charged with maintaining the common good through zoning? We will be searching for a win-win solution, on which all players can sign off.

Land Use Planning

Some zoning requirements are based on land use planning. If these are available for review, understand the purpose of land use planning, the typical types of information contained in land use plans, and their applicability to a typical project. These may be simple zoning maps or may include requirements for designated districts (like redevelopment, brownfield, historic, etc.) within a more general zoning designation. Such designated districts contain additional requirements or exemptions from regulations for the general zoning designation.

Planned Unit Development (PUD) Districts, once approved, also carry their own set of regulations. If a project is in one of those, additional regulations will apply.

Mixed use developments are becoming more common. Allowing the use of these is somewhat of a throwback to an earlier means of regulating city growth. These developments use less land space than separating occupancy types and often generate increased pedestrian use and citizen presence to deter criminal activity.

The general purposes and tools in zoning administration include navigating permitted land uses, conditional uses, planned unit developments and variance approaches. Such specialized use designations can be of benefit to owners, if properly utilized.

Zoning regulations may differ based upon whether they are traditional zoning or form-based zoning. This is a means of regulating land development to achieve a specific urban form. Form-based zoning fosters predictable built results and a high-quality public realm, by using physical form (rather than separation of uses) as the organizing principle. The buildings in a designated area will share certain physical characteristics in appearance. There is less focus on land use through municipal regulations.

Image by NoName_13 from Pixabay

Zoning Calculations

It will save time if zoning review meetings are attended, already prepared with answers to potential questions. Since it is generally of concern to review boards, perform calculations for your project, to answer questions regarding floor-area ratios. These are especially pertinent to calculating increased drainage that may come off hard surfaces on your project site, like roofs, walks, courtyards, parking and drives. Note that the same amount of water will need to be carried away from the same size roof, regardless of whether that roof sits on two stories, or on twenty. That does not mean a city will allow a building twenty stories high, just so we will be within the limits for allowable site drainage.

There will also be a need to prove compliance with setbacks, easements and other known restrictions that limit site us. We will want to determine these parameters anyway, before beginning building design. Complete redesign is terribly expensive and frustrating, and most clients won't consider an initial failure to comply with established regulations, as justifying a charge for additional services.

The required parking will need to be calculated and provided, to meet a set of given zoning ordinance conditions. Your owner must provide enough parking so that users of their facility will not be parking on the streets or in lots for other businesses. Some municipalities will allow business owners to satisfy these requirements by obtaining legal and lasting permission to use parking areas of adjacent businesses that do not operate within the same business hours. Those arrangements, made on a permanent basis, are hard to accomplish and subsequently, rare. In many cases, it is the required number of parking spaces on a lot of a fixed size that will determine the real number of users a building will be allowed to serve.

If we intend to request a variance from, or an appeal of, zoning ordinances, we can expect to have to answer questions about the set of zoning ordinances which our project owner finds to be problematic. Before beginning the variance process, learn about expected time frames, costs, likelihood of success, etc. Are there ways to make a project requiring some variance from the rules, more acceptable to those officials who have been charged to maintain the common good using zoning? Without such information, it will be difficult to properly advise the owner.

Discussion beforehand with planning or zoning officials is usually beneficial in answering such questions. They also have a job to do and acknowledging their responsibility will go a long way toward obtaining their help and cooperation.

Besides the general requirements often found, specialized regulations will address concerns for properties found in special designated districts. These may include requirements regarding brownfield designations,

hazardous materials previously found on site, wetlands, flood plains, design overlay districts or areas designated as eligible for historic preservation. Many of these special areas of concern involved dealing with, and meeting the regulations of, additional regulatory groups. As the project owner will be a member of a community, community concerns in these areas will need to be addressed.

RECORDED RESTRICTIONS

There are certain restrictions that are placed upon the use of the land, more with permission from previous owners than from acts of the government. When these are recorded as having become attached to the property, they will affect the use of the property unless otherwise removed and that decision recorded as well.

One common restriction, found to some degree on almost all property, is what is termed as 'easements.' These are strips of land, often but not always, bordering property lines. Ownership of the property itself is not transferred, and it can be restricted based on the terms of the easement. Rights to the use of these swaths of land are often purchased by utility companies, and used to place their water, sewer, storm drains, gas lines, etc. under them. Other companies doing the same can include power companies and those offering communication services like cable television or the Internet. Some run their systems above grade, some are below the ground. At any point within the easement, they can bring in machinery to maintain their assets located in or above it. Note that some easements, especially those from power companies, are purchased and cut across properties. Once an easement is in place, the property owner is likely prohibited from certain activities within that easement, like digging, placing buildings upon it, planting trees over it and possibly even paving over it. Property owners do maintain the land, since it still belongs to them.

Other easements often purchased from property owners are access easements. These swaths of land, also typically along property lines, are reserved for the use of others to cross someone else's land to get access to their own, otherwise blocked-off property. Usually, a drive of some type is placed in the area of the easement for use by its buyer.

Covenants are sometimes recorded when large parcels of land are subdivided into smaller pieces to offer for sale. Covenants are essentially a series of rules and restrictions, placed on the use of the land and what will be built upon it, by the developer. In many ways they are like zoning laws, just put in place by the entity subdividing the land. When someone purchases a piece of land with these in place, they agree ahead of time to abide by the covenants which are legally attached to the parcel. Covenants are recorded with a plat drawing used to subdivide the land. Both are recorded at the local municipality, often in a recorder's office.

Special tax assessments may also be attached to a piece of land for a set period. These are special additions to the normal yearly taxes that must be paid, often to reimburse a governing agency for improvements which were made, raising the value of the property. One example would be an assessment made to repay the installation of a drainage ditch, to help dry up adjoining parcels. In that case, it is probable that all parcels adjoining the drain would be so assessed.

Some restrictions are placed on properties near airports. This often happens when an airport is expanded or improved to be able to accommodate a bigger class of aircraft. Extended runways will mandate the establishment of height restrictions for new improvements in the landing path. These will also apply to items like wind turbines and communication towers.

Finally, in this type of design restriction, can also be found what is termed as rights-of-way. These strips of land are established to protect public roads and highways from incursion by neighboring landowners.

Most of these, usually expressed in feet, also double as property lines for what adjoins them. There are still a few rights-of-way, established earlier, where the center line of that restricted lane is also used as a property line for what adjoins it. In either case, no activities are really permitted to take place in the right-of-way by private property owners. Public entities will sometimes locate utility lines along their sides or below road surfaces. If expansion of a roadway is needed, this may still be able to be accomplished within the existing right-of-way. If not, more land must be purchased from adjoining landowners to widen it.

SOCIETAL CONCERNS

Just as what is around your site will affect your project, so too will what you design, affect others. To some degree, you will be blocking their previous access to solar and wind exposure, altering traffic patterns passing their locations and possibly altering drainage patterns on surrounding properties. Being a good neighbor requires that you consider your impact and try to minimize it.

How much of a concern will traffic coming to the site be to your neighbors? A new office structure that will also accommodate multiple visitors throughout the day will not be terribly welcome in a residential neighborhood with heavy pedestrian activity and where kids are used to playing in the streets. Seeking input from neighbors into how the project can coexist with them will go a long way toward smoothing tension. Would a new light help? Improved crosswalks? A park area where children can play, rather than the streets? Ask!

Consider social, historical, and cultural factors. Will your project stick out like a sore thumb in an existing neighborhood, or will you incorporate features in it to make it blend in? Will a decision to thumb one's nose at existing context make it more difficult to obtain local building approvals or obtain variances? It must be kept in mind that most projects will be part of an already existing community. And that community will have strong opinions about what should be built on your client's site. Not being a good neighbor may likely result in expensive and time-consuming litigation.

Image by Marci Marc from Pixabay

Consider that nuisance lawsuits, other than being a nuisance, can also stop a project in its tracks. The wheels of justice grind slowly and it may take months to resolve a case, even one where it seems like it should have been thrown out of court for lack of merit. In the meantime, if someone is seeking to develop a site to meet and capitalize on a time-sensitive market demand, that irritating lawsuit impeding progress may soon make building the project a moot point. It would have been better to seek the approval of neighbors beforehand. Was there a way the project could have been designed, more in keeping with what they hoped to see on that site?

If special exceptions are needed from a governing authority, and its members are elected, neighborhood or societal opposition may stop a project without the use of a lawsuit. This is especially true if the developer of the proposed project is not part of the community. Regardless of how much economic sense a project might make, the people complaining cast votes each election. Legislators are aware of that fact, and their approval is needed before any exceptions can be granted.

NEIGHBORHOOD AND HISTORIC CONTEXT

Will a proposed project fit into a surrounding neighborhood in terms of appearance, size, scale, massing and use? It is easy to take the approach of simply not caring, of designing the project as though it will be a stand-alone entity. But project owners will soon discover that placing a beauty salon downwind from a hog farm presents immediate concerns.

Look critically at the existing environment around a proposed site use, to see if any such concerns exist. For example, what views will the project occupants see when they are in spaces where glazing is being proposed? If site acoustics are not considered, what will they hear while they seek to concentrate on their work?

Many concerns regarding context are mentioned elsewhere in this course. Another needing touched upon here, is that of the historic context surrounding a project site.

Historic Significance

There will always be four basic approaches to the treatment of buildings or projects acknowledging the context of history. This is especially true of projects incorporating existing buildings on the site.

There are general characteristics for improvement with each design approach. Preservation focuses on the maintenance and repair of existing historic materials and retention of a property's form, as it has evolved to date. Rehabilitation acknowledges the need to alter or add to a historic property to meet continuing or changing uses, while still retaining the property's historic character. Restoration restores a property back to a particular period in its history, while removing evidence of other periods. Reconstruction re-creates vanished or non-surviving portions of a property, based on other period examples.

Historic Preservation Tax

It might be useful to a project owner to understand the basic tenets of the Historic Preservation Tax Incentives Program, and its application to the work of the architect. The Federal Historic Preservation Tax Incentives Program, a 20% tax credit, began in 1976. Since that time, the National Park Service (NPS) has administered it in partnership with the Internal Revenue Service (IRS) and with State Historic Preservation Offices (SHPOs).

One of the federal government’s most successful and cost-effective community revitalization programs, the Preservation Tax Incentives Program rewards private investment in rehabilitating historic properties like offices, rental housing, and retail stores. Abandoned or underused schools, warehouses, factories, churches, retail stores, apartments, hotels, houses, and offices in many cities have been restored to life in a manner that retains their historic character. The Preservation Tax Incentives have also helped to create moderate and low-income housing in historic buildings.

NEARBY AND PAST IMPROVEMENTS

The extent to which sites near a proposed project have already been developed will affect what can be done with the project. The regulatory agencies having jurisdiction will likely feel they need to protect the interest of those neighboring the site. If being a good neighbor is not already of interest to new project owners, that desire may have already been regulated into existence.

Nearby infrastructure to support new development will be of concern. There will only be so many seats available in nearby schools of all levels. Existing streets and roads have only so much capacity to handle traffic before their use becomes hazardous. Nearby parks were designed to accommodate certain levels of population. A project which adds to any of the above will get the attention of local government. The

possibility of overloading infrastructure near a proposed site location may generate requests from zoning boards to lower things like density.

Serious research is needed into any past uses of a project site. Those uses may have created problems that must be overcome or somehow mitigated. As an example, there may have been a paint factory located on that site in the past. Or it may have been the previous location of a gas or service station. Those uses, along with many others that may prove problematic, may point to the existence of hazardous waste or contaminated soil on site, or underground tanks which have never been removed. Considerable expense and effort will be needed to lessen the potential risks posed by those. Likewise, if previous structures were removed to just below grade, and foundations are still there, but merely buried, those will present significant problems. They will not only need to be removed, but doing so will disturb the site to the extent where a different foundation system may need to be designed.

Traffic patterns will need some attention. Adjacent streets which are one-way or contain boulevards may create concern. Driveway locations will need to take those into account and a way must be determined for how the expected users of the building will be able to enter the site. I once worked on a project in Florida where the best way to enter the site was the construction of a very expensive bridge from a highway, over a deep canal. The only other access point for the site, for a high volume of traffic, was through a higher-end neighborhood on a residential street. For some odd reason, they strongly objected, and the council agreed with them. The traffic expected to come to the new project site will also matter to the neighbors.

It might be possible to partially serve intended users with public transportation systems. This is especially true if there are access points to those systems near the site, of easy use to communities. Given the investment they have in such systems, most municipalities tend to look favorably on development that can utilize them.

There may be sidewalks on the properties adjacent to a project site. If so, a small portion of the site will need to be used to connect those walks. No one will appreciate the idea that the new project will cut pedestrians off from using their walks and expect them to walk in the road to bypass the project site. That concept is most unlikely to be approved.

There may be a certain homogenous aspect to the landscaping around a proposed project. It may have happened by design, by overlay regulations, or simply because time tends to weed out species unfavorable to a geographic location. Whatever the root cause, since landscaping requirements are probable anyways, it will be desirable to somewhat match the surrounding species of landscape plants. Standing out conspicuously is not the most favorable way to introduce oneself to neighbors. Moreover, it is also not a great idea to install landscaping sure to attract pests like stinging bees, emit obnoxious odors, or drop seed pods that create slippery conditions underfoot.

The locations of existing area improvements, especially utility connections, should play a part in site planning. It is much cheaper to utilize an existing curb cut in its current location than to go through the process of getting approval for a new one and paying for the road closure and improvements to install a new drive. If sanitary sewer is available on two sides of a property, offering differing elevations for the inverts, the proper choice for where to route the sewer from the project may save the owner the cost of a lift station. Any possible reuse of existing water taps, sewer taps, gas taps, transformers and so forth, is much preferred to digging up property and possibly streets to install new ones.

Is data available for the site as it exists? A survey of the property was likely required as a condition of the purchase, if the site was recently sold. A local surveyor’s office will probably have dated aerial photographs of the site available for review and possible purchase. I once located a former town dump while looking at dated aerial pictures of some acreage of possible use for a scout camp site. There was no

trace of it on the surface and no one had remembered it being there forty years earlier. But the pictures did. A little time spent on research can save a lot of grief later.

Image by Hong daewoong from Pixabay

This sounds peculiar, but a night-time visit can confirm lighting levels from nearby streets and building lights. This will help determine additional levels of light which may be needed for security purposes on the exterior of the new project. It will also highlight sources of light creating glare, which will need to be blocked.

Buildings near and around the project site will have an obvious effect on the microclimate of the project location. Some municipalities have ordinances protecting solar access, but even in those locations, nearby buildings which predated the ordinances may still block sunlight, leaving adjacent areas in perpetual shade, unless the new project is built high enough to reach the sunlight. Wind cannot be counted upon for natural cooling or ventilation, if prevailing winds cannot reach the project. Views on the other side of surrounding structures may be as beautiful as can be imagined, but they may not be accessible to occupants of the project site.

Noise is always an interesting addition to project concerns, especially coming from sources which are loud, obnoxious, or intermittent. It is a great idea to find these sounds and directions from which they will be arriving, either in a direct line or as a reflection. If known ahead of time, and determined that steps will be needed for mitigation, planning for the new building can take that into consideration. Berms or walls can deflect or reflect the sound. Vegetation of the right kind can absorb some to a slight degree. Perhaps even more important, the design of the building plan may be adjusted to place spaces which will sensitive to sound, away from the sources of noise, with buffer elements and spaces between them.

The area of the project may have been included in a transportation plan, created to allocate city resources to improve circulation routes over time. If the project site was part of such a study and plan, access points and proposed traffic flow in and out will need to conform with those intended improvements. A simple question can ascertain whether existing transportation plans include your project site.

ENVIRONMENT AND CLIMATE

Mineral Rights

In many locations across our country, the right to use a piece of ground can be sold separately from the right to harvest minerals below the ground. I have truthfully never understood how those two rights could exist independently, since access to minerals below is typically from the top of the ground, but apparently, they do. I am assuming that a mine can come in from the side of a site and operations continue below a piece of land.

If mineral rights exist separate from the title to a project site, that would be good to know before planning foundations.

Archeological Concerns

In a special circumstance, ongoing work or research may uncover various conditions on site that are recognized by governmental agencies, as being under their jurisdiction. Specific examples include human

remains, protected wetlands, tribal burial markers, and ruins of archeological significance. If such is discovered, the contractor must immediately stop any work that would further disturb what was discovered and notify the architect and the owner. It will then be the responsibility of the owner to obtain any required governmental agency authorization needed, to resume the work. The same will also be true if research beforehand uncovers any of these possible conditions.

Other Typical Areas of Concern

The climate and microclimate of the site will dictate certain design choices for the project. It may be advantageous for natural ventilation and cooling, to orient open areas of the building plan to the prevailing direction of summer winds, or winds coming in from nearby bodies of water. If winters winds are cold and come in from a prevailing direction, the building design may present a more closed face in that direction, with buffer elements placed between faces impacted by that wind and spaces with heavier use being placed deeper inside.

There may be large areas of paving on nearby sites. These will create somewhat of an urban heat island and winds coming over them will carry extra heat to the project site. If the solar orientation is right, those paved areas may also bounce sunlight back up and into the project site. The building design at that point may need to consider glazing to accommodate or reject sunlight coming in from two directions. In a similar fashion, a neighboring building may have reflective glazing, bouncing sunlight back against the new project from an entirely unexpected direction.

The natural terrain of the site, as shown in topographical surveys, will need to be assessed to determine how, or even if, slopes on the existing land will affect the design of the project. If significant slopes exist or there are high or low spots on site, those can affect exposure to the sun and wind, drainage issues to be resolved, whether allowable slopes of drives and parking are possible, and where structural retaining walls will need to be placed to protect the new project and surrounding sites. Note that moving earth with heavy equipment is a relatively inexpensive task, should that need to be done.

The existing drainage patterns on a site will need to be considered relative to what will exist once the project has been completed. Water on site can be moved by sheet flow or by new storm structures to existing storm drains, natural water features like ponds, lakes, and rivers. It can also be conveyed to ditches, new retention or detention ponds, rain gardens, or underground storage trenches. Products like permeable paving can allow water through into such underground storage structures or just into soil below with high drainage capacity. Failing to take the anticipated flow of the water in mind will lead to multiple problems when the project is complete. Erosion during construction and afterwards will be a minor issue compared to the costs of remediation, when the neighbors insist on protection.

The bottom line of dealing with water flow on a site is one based on common sense. God ordained that a certain amount of water would naturally flow from one location to another. The amount of water doing so after a project has been completed cannot be more than the amount of water which was flowing onto neighboring properties before the new project began. Improvements on the site, dumping extra water on neighbors, is not allowed. Calculations for before and after conditions will have to be provided to governing agencies. Extra water coming from impervious services in the project will need to be captured, diverted, held, and possibly later released to acceptable waterways or storm structures.

It will be important to consider the climate / environmental impacts of given site concerns, like temperature, precipitation, humidity, wind, and solar geometry. If these created issues for the last use of the site, they will be problems for the new use as well. Conversations with neighbors or previous owners might reveal such information. As mentioned previously, some issues may be caused by neighbors whose

projects block the sun, wind, views, and possibly even natural drainage patterns. If the new project does the same, neighbors may have a legitimate cause for complaints.

Are there other occupancies near the site that generate objectional odors? Are dumpsters upwind of the project? Is the exhaust from the bathrooms or the kitchen of a nearby restaurant coming from upwind? Is anyone upwind of the site raising chickens? That sounds somewhat facetious, but I was in a zoning commission meeting where a new homeowner had come to demand that her neighbor, who had a farm where the family had been commercially raising chickens for thirty years, cease operations because the smell where she had built her new home was bothering her.

Image by Alexander Fox | PlaNet Fox from Pixabay

Review and interpret any available site documentation. This can include geotechnical reports, landscape reports, archaeological studies, utility surveys, topographic maps, demographics, traffic studies, environmental data, historic reports and other site related reports. From these, establish parameters that will affect the design of the project. Any information already available for review and use is an asset to the project.

A little research and discussion with the neighbors can also identify another possible problem. They will likely know if previous uses of the site would have been likely to generate hazardous waste. A quick check with the local municipality will also determine if the site was ever designated as a brownfield site. This is just an easy precaution to take.

Reuse of existing vegetation on site should be considered. Old growth is much easier to maintain than new landscaping and is sometimes magnificent. Vegetation saved will sit well with the neighbors. Unnecessarily removing it may be removing shade from a building nearby, requiring rebalancing of their HVAC systems to compensate. It will also be important that placing of new building foundations or paving does not require cutting significant portions of the roots of a tree that is desired to remain in place.

Use all data that has been made available to determine the feasibility of a project. Base this decision on determined site parameters, compared to the project program, as originally presented by the owner for implementation. Will special stormwater retention need to be designed? Will extensive retaining walls be needed on site to create level parking areas or a large enough building pad? If part of the site is rock and part is not, will special footings need to be designed to prevent differential settlement? These are the types of questions that need come to light during analysis of definitive data on the site.

Research is important for site evaluation. Questions might unearth constraints like the presence of hazardous materials, discovery of a past grant for historic renovation, presence of an underground cave system and so forth, Then the owner and designer may need to decide what changes to the project will be required by such discoveries. I mention these few examples, because I have encountered these in real projects.

The Earth Beneath

The type of soil on which a project will sit will have a direct bearing on what must be done on site to properly support both proposed structures and proposed parking and drives. Determining the composition of the earth upon which the project will rest requires having soil borings taken, analyzed, and engineering

recommendations generated from that analysis. The results of these tests may also strongly indicate that placing the building in an alternate, more suitable place on site would be advantageous. Hopefully, this will be determined before time and effort is expended on an unsuitable site plan.

As a point of interest, a significant expense involved in having soil borings done is the cost of having the rig brought to the site. Double the amount of soil borings does not double the price of obtaining them. If experts are being called in for this, test any place that might be a possibility for the building location. It is not a bad idea to also take a few spot borings where parking will be intended.

Based on the geotechnical report from the borings, the company providing it may be able to suggest proper remediation processes for problematic soils. Bad reports are not necessarily showstoppers. At the owner's insistence that no other location would suffice, I once designed a project on a site containing ninety feet of quicksand under two feet of fill. The building's one-hundred-foot-deep pier foundation ate up about a fourth of the building budget. Even the parking areas were expensive. A geotextile mat and a graduated stone layer were needed to span over the junk below.

Sometimes, what might be considered deleterious soil that should be removed and replaced, may become an asset. In one unusual case I personally encountered, an owner was able to remove and replace a six-foot layer of sphagnum peat moss and sell the moss for far more than the cost to remove and replace it. I have heard of similar situations where clay suitable for modeling purposes was discovered. Oil reserves or precious metals are of course, the ultimate jackpot discoveries.

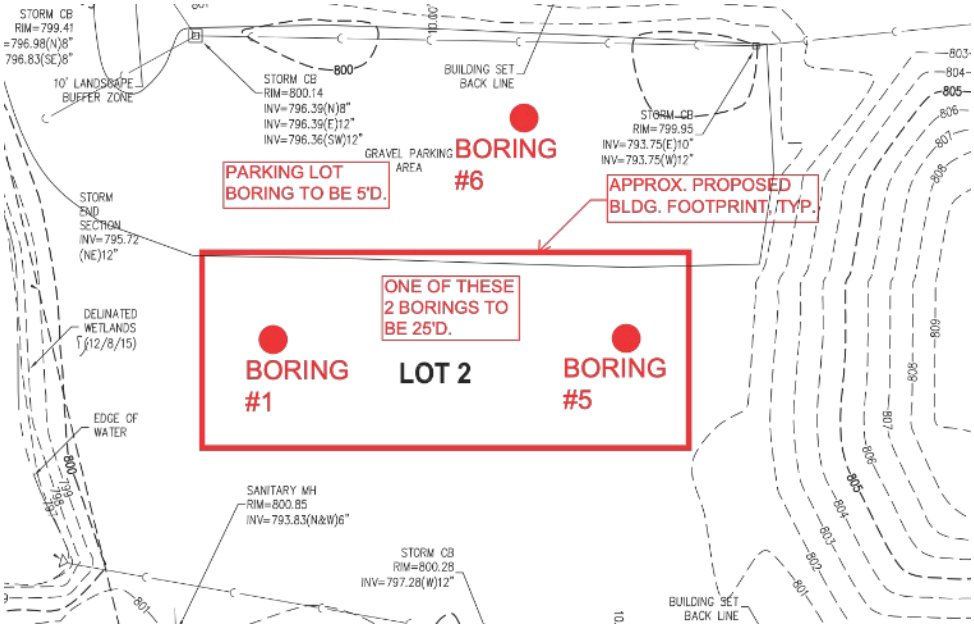
Before committing to the use of a site, it may become necessary to properly address site-specific regulations related to environmental concerns. These may be the presence or location on the site of coastal ways, wetlands, and those under the jurisdiction of FEMA and the Army Core of Engineers. Those introduce an entirely separate layer of regulatory hurdles. Again, hopefully, this can be determined before time and effort is expended on an unsuitable site plan.

Even if a local jurisdiction will allow it, which is improbable, it is expensive to place projects over areas that flood. Parking is especially problematic as water moving below it will wash out substrates. To quickly determine whether this will be of concern, flood plain maps are readily available on the Internet for most areas. These are often provided by FEMA and similar agencies.

Restrictions on the height of a project come from several sources. Building codes dictate them and vary based on the inclusion of a fire suppression system and the type of construction being used. Zoning restrictions suppress building heights, although these can change depending on how far back from the property line a building is placed. The height of neighboring buildings may need to be acknowledged to keep the new project conducive to surrounding context. If the project is in an airport flight path, there will be a limit on height based on distance from the starting or ending point of a runway. All of this is a roundabout way to say that the height of a building can be somewhat flexible, based on how the building will be built and where it can be located on site.

An Example of Requested Borings

The borings requested to be taken under the parking area on this site will be instrumental in determining if soil stabilization (geotextile mats) may be needed to create a firm base for the parking surface.



One might request more borings than those shown on this plan, since the main cost of such borings lies in getting the drilling rig there in the first place. Additional borings are relatively inexpensive and should at least be priced. They tend to be cheap insurance. Another suggestion would be that more than one should be 25' deep.

On a different subject, there is a separate type of boring that is taken and used to determine site suitability for on-site sewage disposal systems, if a municipal system is not available for sewer discharge.

What is shown below is a typical report / log of borings that can be expected from a company hired to conduct geotechnical investigations.

Boring	Surface Elevation (feet)	Depth Range Below Existing Surface (feet)	Soil Strength (lbs./sq.ft.)	Recorded Water Levels, W.D./A.D. (feet)
1	800.5	1.5 to 4.0	3000	dry/dry
		4.0 to 6.0	8000	
		6.0 to 12.0	6000	
2	801	4.0 to 9.0	3000	11.0/12.5
		9.0 to 11.0	4000	
		11.0 to 12.0	6000	
3	801	1.5 to 6.5	2000	3.0/dry
		6.5 to 12.0	4000	
4	800.5	3.0 to 6.5	4000	17.0/9.0
		6.5 to 10.0	8000	
		10.0 to 14.0	6000	
		14.0 to 22.0	3000	
5	800.5	0.0 to 7.5	*NONE	dry/dry
		7.5 to 9.0	3000	
		9.0 to 12.0	6000	

Sample Boring Report Conclusions

The above boring logs indicate the soil conditions encountered at each location. Site surface conditions include the existing structures, pavement materials, vegetation, natural topsoil and fill conditions. The topsoil, classified as black silt / clay mixtures with traces of roots, was found extending from depths of 15 inches to 3.5 feet.

Underlying natural soil conditions below the topsoil, consist primarily of cohesive soils. These are classified as soft to hard clay / silt mixtures with lesser portions of sand and gravel. The upper portions of these soils are sometimes high in moisture content, with values in excess of 27% determined.

A saturated seam of sand & gravel was also encountered at boring B-4. Cobbles and boulders may be present within the site soils at any elevation, although none were encountered while drilling.

A significant high moisture content and low-strength soil condition is indicated at boring 5, extending to a depth of 7.5 feet below the surface. These conditions are likely present in other areas of the site but were not discovered within the scope of this investigation. The table shown above summarizes depth ranges below existing grade, the magnitude of soil strength within these ranges and other information:

This information will form the basis for recommendations regarding the most appropriate foundation types to propose for the project and whether special measures must be taken to stabilize parking areas.

RESPONDING TO DISABILITIES IN GENERAL

The 1990 Americans with Disabilities Act and how the guidance changed with 28 CFR part 35.151 and 2004 ADAAG, should be considered during site design. This is a comprehensive topic, best addressed by research. Remember that these were suggested guidelines, not law, unless adopted by governing agencies. Most did adopt some form of these suggestions and some adopting agencies implemented laws even stricter than suggested guidelines. As one possible source of motivation for compliance, there are also advocacy groups that visit projects, looking for a reason to sue project owners and designers for noncompliance with these regulations.

It is important to understand that ADA Title II refers to state and local governmental facilities. These regulations are stricter than those proposed in Title III, because these buildings are funded by taxpayers. All taxpayers, including the disabled, should be able to use what they participated in funding. ADA Title III offers guidelines for public and commercial facilities.

The 2010 ADA Standards can be used to address accessibility problems. These guidelines are readily available online. Graphic illustrations of many pertinent regulations are contained therein. A few of these which pertain to accessibility on a site are included below as examples. More are available.

Site Design for Access

In the ADA “Building Blocks,” a depiction is given of curb cut dimensions, designed so curbs do not impede the progress of users in wheelchairs.

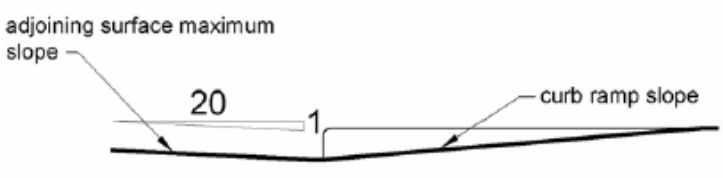


Figure 406.2 Counter Slope of Surfaces Adjacent to Curb Ramps

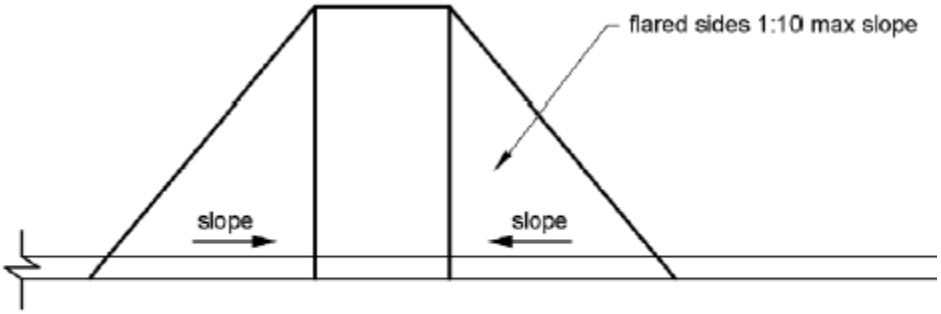


Figure 406.3 Sides of Curb Ramps

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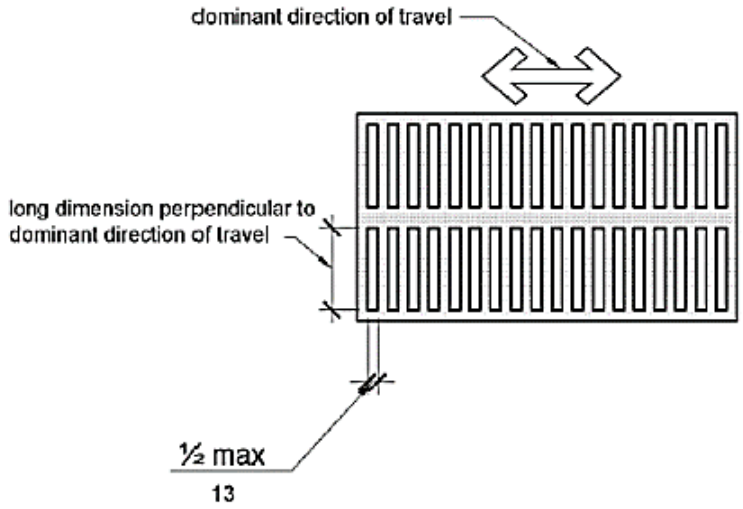
On Foot:

Evaluation of any walking route should include checking each step along the way. Are curb cuts in place on a chosen route to eliminate possibly painful step downs and step ups? If not, is a different route an option without adding excessive additional length? Are slopes in the route easily navigated? Steep slopes are painful to hips and knees. Is there comfortable separation or landscape barriers between the walk and fast-moving traffic? Is the path one the city maintains as snow and ice free? Are there any grates with openings along the way that could present a hazard to canes, walkers or even mobility-assist devices with thin wheels?



Grate Openings with Potential Harm

Walking paths should be easy to navigate. Simple routes between destinations are the easiest to follow. The entire path should always be well lit. Gravel pathways are a poor choice, as they are difficult to walk through and impossible to roll through. Sidewalks should connect along the whole route. No detours into streets, or walking in streets, should be necessary.

The width of sidewalks controls the traffic on them, especially when wheelchairs are involved.

- 3 Feet: This will accommodate a single user.
- 4 Feet: Two people can walk side by side.
- 5 Feet: Two wheelchairs can pass one another from opposite directions.
- 6 Feet: Two wheelchairs can travel together.

If possible, choose a walking route where the need to navigate steps can be absolutely avoided. But if stairs are in the route, they must have handrails. They should also have rounded edges instead of metal grate surfaces that easily create injuries in falls. Slip-resistant strips in contrasting colors on the edge of each stair tread is a bonus. It is always a good idea to provide weather protection for exterior stairs, if you have that capability. Exterior stairs should have risers no greater than six inches tall and treads no less than twelve inches deep.

COMPETING REGULATIONS AND DATA

Situations may arise in which site requirements from two different sources may be in conflict. An easy example is the different height requirements imposed on a project by building codes and by zoning regulations. In such a case, which regulation should be given priority for compliance? The safest answer will always be whichever code requirement is the most restrictive.

Consider some rules of thumb that could help determine the governing regulation on a given topic. Note that no local entity can waive regulations that have been generated at a state or national level, unless the local entity has specifically been given that right by the larger issuing authority. On a personal level, it is interesting to see national authoritarian oversight being challenged in multiple arenas, based on state rights.

Consider the social, political and economic forces at play in a planning commission or zoning board decision making processes. Proving the existence of conflicts of interest may still have no effect at all on the legitimacy of rulings that were tainted thereby.

Do some groundwork to understand the presentation, review and revision workflow of most planning and zoning processes at the municipal level, to better assess time and effort involved in obtaining variances or relief from regulations. Otherwise, prepare to deal with some level of frustration.

Consider the impacts of multiple reports upon a given project. This becomes intriguing when reports by different consultants yield different results. That might be time to get a third opinion and let the owner decide how they want you to proceed. For example, one soil scientist might find evidence of the presence of water in the past, 5 feet below grade. Obtaining a second opinion from another soil scientist might mean that no traces of a high-water table were found. Where do you go from there, to determine what type of foundation to design?

It is not always easy to distinguish which reports from which agencies are relevant to a given problem. There are many testing agencies. A little research and seeking advice will go a long way in determining potential available expertise. Some such agencies, like soil scientists, must be registered to work in a jurisdiction and names of all such recognized experts are readily available on the websites of such agencies. Recommendations from peers are also invaluable.

Be prepared to consider site limitations due to environmental reports, compared to given programmatic needs and determine possible solutions for any conflicts. Almost all site limitations can be considered as assets, once initial disappointments are overcome.

CONCLUSION

After an initial meeting with a client, it is easy for designers to leap ahead of themselves in the process. We begin creating solutions to the programmatic needs of the building in our heads. We might even go so far as to begin sketching building solutions on paper, in preparation for the initial phases of design.

Becoming too invested in our early, speedy, and possibly great solution for the building decision is poor judgement. We should probably conserve our creative energies until we have information on the exact location the owner has acquired for the project. This is because the parameters affecting the use of that site will surely influence almost every other choice being made during design.

There are multiple sources for restrictions which must be met by the design for use of the site. These will include requirements found in the owner-supplied program, siting concerns in the building codes, zoning regulations which must be followed, recorded restrictions constraining the use of some areas, societal concerns, recognition of the neighborhood and context in which the project must sit, nearby and past improvements, and designing in accordance with the local environment and the site's microclimate.

The good news is that the process of deciding how to meet all those restrictions will quickly narrow our choices for the building design, down to those which are the most viable.

Part 2 Review Questions

19. Which of the following is NOT a basic approach to the treatment of buildings or projects acknowledging the context of history?
    a. Preservation
    b. Resurfacing
    c. Rehabilitation
    d. Restoration

20. If there is certain homogenous aspect to the landscaping around a proposed project, it will be desirable to somewhat _____ .
    a. Not cut through existing root structures
    b. Leave a clear path for sunlight to reach it
    c. Use grey water to irrigate neighboring plants
    d. Match the surrounding species

Review Question Answers

1. In a site analysis example shown, the designer was asked to avoid using one location since it might involve which two of the following?
   a. The removal of prior fuel tanks
   b. Cutting trees to increase wind access
   c. A lawsuit with neighbors
   d. Expensive soil remediation
   The correct answer is A and D. In the example given under the Site Analysis Example section of the course the following was stated: Given that information and informed that the program did not call for a walk-out plan for a lower level, the designer was asked to determine which location on the site would be "best" for developing the project. He was also requested to avoid location B, since using it might require the removal of prior fuel tanks and expensive soil remediation. He was also requested to avoid using locations D and E, as the amount of drop in the land would require engineered fill and / or the use of piers to ensure there would be no future uneven settlement of foundations or slabs.

2. These areas are where water covers the soil or is present eiter at or near the surface of the soil, all year or for varying periods of time.
   a. Views
   b. Stormwater
   c. Wetlands
   d. Large areas of rock
   C is the correct answer: See definition section.
   Views – This describes what is seen when looking in a particular direction.
   Stormwater – It is water that originates from rain and snow and ice melting.
   Wetlands – These areas are where water covers the soil or is present either at or near the surface of the soil, all year or for varying periods of time.

3. One answer to whether the desired square footage is possible may hinge on whether the owner envisions_____ , or will allow their use, to obtain needed space.
   a. Structures on piers
   b. Ascending terraces
   c. Levels below grade
   d. Multiple stories
   The correct answer is D. Can a building of the size requested by the owner be placed on the site? This will need to be determined by eliminating any restricted areas like easements, setbacks, line-of-site requirements, etc. from the available land, in addition to the surprising large amounts of area on site that will be consumed by required parking. If enough space will not be left to meet owner needs, it may become necessary to stack floor levels to allowable heights, lease parking from adjacent owners if possible, or initiate variance proceedings to seek relief from regulations, which might gain more usable space. It may also become necessary for the owner to downsize their project.

   An example as to whether the desired square footage is possible may hinge on whether the owner envisions multiple stories, or will allow the use of multiple stories, to obtain needed space.

The owner may have envisioned outdoor spaces for use by the building occupants and neighboring properties. Those will need to be located based on climate considerations, to maximize their season of possible use.

The owners may have expressed desire for a project which is either closed in appearance, or open and inviting. Meeting whichever goal will affect how the project and its footprint will be placed on the site.

4. Which of the following is NOT a basic approach to the treatment of buildings or projects acknowledging the context of history?
   a. Preservation
   b. Resurfacing
   c. Rehabilitation
   d. Restoration

   B is the correct answer. The four basic approaches to the treatment of buildings or projects acknowledging the context of history are as follows: **Preservation** focuses on the maintenance and repair of existing historic materials and retention of a property's form, as it has evolved to date. **Rehabilitation** acknowledges the need to alter or add to a historic property to meet continuing or changing uses, while still retaining the property's historic character. **Restoration** restores a property back to a particular period in its history, while removing evidence of other periods. **Reconstruction** re-creates vanished or non-surviving portions of a property, based on other period examples.

5. If there is certain homogenous aspect to the landscaping around a proposed project, it will be desirable to somewhat _____ .
   a. Not cut through existing root structures
   b. Leave a clear path for sunlight to reach it
   c. Use grey water to irrigate neighboring plants
   d. Match the surrounding species

   D is the correct answer. There may be a certain homogenous aspect to the landscaping around a proposed project. It may have happened by design, by overlay regulations, or simply because time tends to weed out species unfavorable to a geographic location. Whatever the root cause, since landscaping requirements are probable anyways, it will be desirable to somewhat match the surrounding species of landscape plants. Moreover, its also a great idea not to install landscaping sure to attract pests like stinging bees, emit obnoxious odors, or drop seed pods that create slippery conditions underfoot.

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How could these courses be improved?

_____

_____

_____

What other topics would be of interest?

_____

_____

_____

Additional Comments:

_____

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