

# LARE 2023 Blueprint Review

## Inventory, Analysis & Project Management



Sarah Gronquist, ASLA  
SGLA Technical Training  
[www.SGLATECHNICALTRAINING.COM](http://www.SGLATECHNICALTRAINING.COM)



# Inventory and Analysis Topics

## Inventory, Analysis & Project Management – Updated 09.2023

90 scored items & 10 [pretest](#) items consisting of [multiple-choice](#), [multiple-response](#) and advanced [item type](#) questions; 3 ½ hours seat time, 3 hours for exam.



Project Management: 7%	Inventory and Data Collection: 21%	Stakeholder Engagement Process: 14%	Physical Analysis: 39%	Contextual Analysis: 19%
<ul style="list-style-type: none"> <li>Develop and Manage Design Contracts</li> <li>Select and Manage Design Team</li> <li>Determine and Manage Design Scope, Schedule, and Budget</li> </ul>	<ul style="list-style-type: none"> <li>Collect Related Policy Documents (e.g., municipal planning documents, proposed and existing land use maps, FEMA, EPA, stormwater management policies)</li> <li>Assimilate Information from Previous Planning Processes</li> <li>Conduct Onsite Investigation and Fieldwork</li> <li>Document Site Data</li> <li>Identify Adjacent Land Use</li> <li>Collect Contextual Data (e.g., natural systems, road networks, demographics, cultural and historical)</li> <li>Research Codes, Ordinances, and Permitting Requirements (e.g., site/project specific requirements)</li> </ul>	<ul style="list-style-type: none"> <li>Identify Stakeholders</li> <li>Coordinate with Governing Bodies</li> <li>Support Public Participation Process (e.g., consult with clients, summarize feedback, communicate deliverables)</li> <li>Evaluate Design Based on Feedback</li> <li>Obtain Public and Private Approvals</li> </ul>	<ul style="list-style-type: none"> <li>Determine Appropriate Types of Analyses</li> <li>Perform Vegetation Analysis</li> <li>Interpret and Review Soils and Geology (e.g., geotechnical, geology, soil map, soil characteristics)</li> <li>Perform Topographical Analysis (e.g., slope analysis)</li> <li>Identify Physical Opportunities and Constraints</li> <li>Perform Utility Analysis (e.g., capacity, availability, proximity, suitability)</li> <li>Analyze Existing Environmental Variables (e.g., contamination, erosion, air quality, water quality, micro-climate)</li> <li>Perform Circulation Analysis (e.g., multi-modal, access, non-motorized, connectivity)</li> <li>Perform Visual Resource Analysis (e.g., view sheds, view corridors, aesthetics)</li> <li>Perform Hydrological Analysis (e.g., floodplain, site drainage, water shed, surface, sub-surface)</li> <li>Review Ecological Analysis (e.g., habitat, biodiversity, ecosystems)</li> </ul>	<ul style="list-style-type: none"> <li>Anticipate Impacts of Future Developments</li> <li>Identify Contextual Constraints and Opportunities</li> <li>Confirm Appropriate Use</li> <li>Conduct Code Compliance Review</li> </ul>

# 1.1 Develop and Manage Design Contracts

## **General Contract Method**

Owner will execute two separate contracts – one with the design team and one with the construction team. Prime Consultant manages the design work, and Prime Contractor/General Contractor manages the construction work. This is the most common form for project contracts in the public sector. Also referred to as Design-Bid-Build. Gives the Owner a clear idea of the final cost of the total project before construction begins but may take longer to complete.

## **Separate Contracts Method**

Owner serves as General Contractor and has many separate contracts with designers and construction specialists. Owner is responsible for scheduling and managing the teams. Owner assumes more risk.

## **Self-Performance Method**

The owner may perform some of all of the work in-house, using their own designers and installers.

## **Design-Build Method**

Owner executes a single contract that includes both design and construction, to be performed by the same company. Also known as design-construct or turnkey. This format is often selected to minimize design costs and accelerate the project schedule. Hinze says these contracts may be 20-30% faster than the General Contract method.

## **Professional Construction Management Method**

Owner hires a firm with construction expertise to act as their agent in managing design and construction. Construction manager may expedite scheduling by fast-tracking the project through skillful management of the various design and construction team members.

## **Construction Management At Risk**

Variation on the Professional Construction Management Method that puts responsibility for completing the project on time and within budget on the Construction Manager.

# Arrangements for Payment

- **Percentage of Cost Agreement:** A contract where the fee for services is based on percent of construction cost.
- **Time and Materials/Hourly/Multiple of Direct Personal Expense Agreement:** A contract where the fee for services is a direct multiple of actual costs. Best for projects that are hard to scope or may be unpredictable. Most common in private residential work, or during the initial iterative phases of Schematic Design and Planning Review. Invoices generally include backup, or a record of how each hour was spent, for client review.
- **Flat Fee Agreement, Fixed Price or Lump Sum:** A contract where the fee is fixed in advance of beginning work. Payment must be linked to contract-defined deliverables. Due to the somewhat uncertain nature of the design and construction process, this type of contract must be accompanied by a very tightly written scope of work. Best for very well defined projects. Invoicing can be simple.
- **Time and Materials with a Maximum Not to Exceed/Cap/Guaranteed Maximum Price (GMP):** Provides Owners with more security. Removes much of the potential for profit.
- **Cost Plus Fixed Fee:** Hourly costs plus a negotiated fixed “Profit” amount that does not vary with actual costs. Uncommon.











# Prepare RFP>proposal / RFQ>SOQ

## RFQ or SOQ (Request for Qualifications or Statement of Qualifications)

- Prepared by an agency or client and published or distributed to design professionals. Only requires general qualifications/experience.
- May not be project specific, or might be the first round of a project process. Can be used to develop a list of consultants who are pre-qualified for project work for a fixed amount of time (one to three years is typical) – sometimes referred to as a bench.

## RFP (Request for Proposals)

- Prepared by an agency or client and published or distributed to invite design professionals to submit proposals for their services.
- Describes the location and scope of work for the project.
- Requires detailed scope and fee.

RFQ	VS.	RFP
 An RFQ is a qualifications-based selection process; it is NOT a bid.		 An RFP is a qualifications-and-value-based selection process; it includes a bid.
 My city or county is not required to take a competitive bid for professional services.		 My city or county is required to solicit competitive bids for goods and construction.
 I want to select a provider who is most qualified to meet my functional and design goals AND not be swayed by fee.		 I want to select a provider who is most qualified to meet my functional and design goals while staying within my budget.
 I want the opportunity to negotiate the fee with my final selection. If I can't come to terms with them, then I want the option to go to my second or third choice.		 I want to know the final cost of construction upfront with my final selection/lowest qualified bidder.
 I am not required to advertise as part of the RFQ process.		 I will need to advertise as part of the RFP process.

# 1.2 Select and Manage Design Team

Often a specific project will be pursued competitively by several firms. Each team will try to assemble the most compelling package of qualifications.

- Local experience
- Experience with similar project type, scale, or budget
- Certifications required for the specific project, such as LEED
- Special Qualifications/Equal Opportunity Requirements and Certifications: These are generally set by local governments or agencies as goals for the Contract.
  - LBE (Local Business Enterprise)
  - MBE (Minority Business Enterprise),
  - WBE (Woman-owned), and DBE (Disabled or Disadvantaged).

# 1.3 Determine and Manage Design Scope, Schedule, and Budget

Based on the Client's goals, it is the responsibility of the Landscape Architect to identify the following:

- **Scope** (Services that will be needed or might be desired)
- **Fee** (Associated cost, based on the firm's staffing and billable rates)

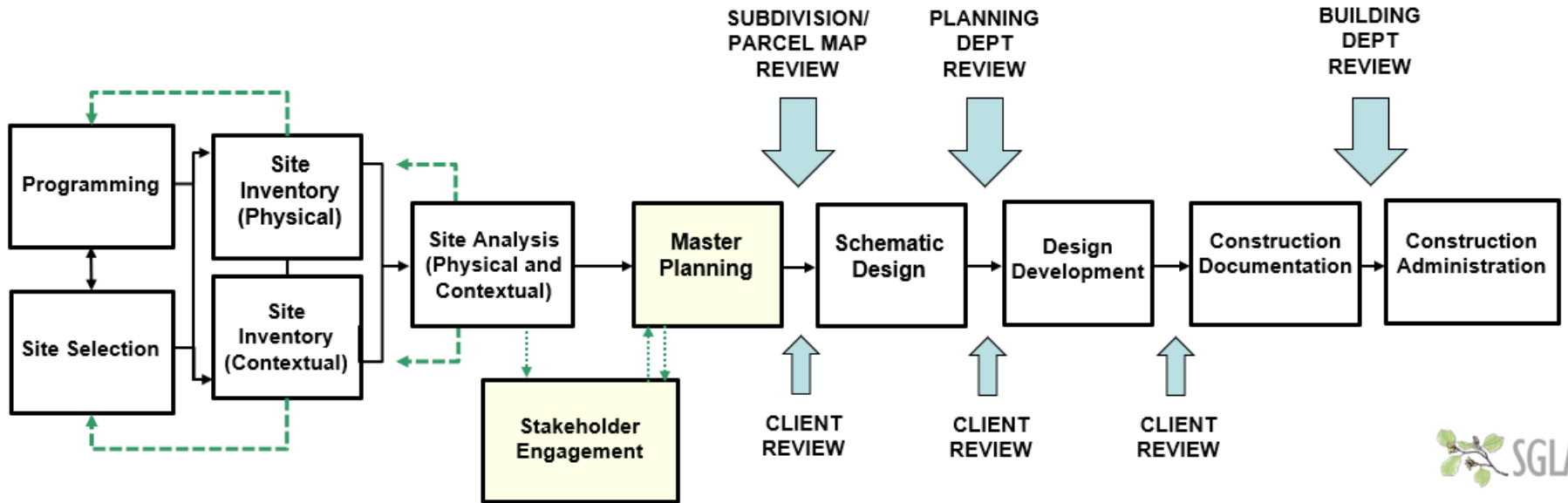
Once this has been roughed out with the Client and the team, you can develop:

- **Schedule** (How long will it take? Also depends on staffing, but also on critical path milestones, City board meeting dates, funding deadlines, etc).

*Scope and Fee are two sides of the same coin.*

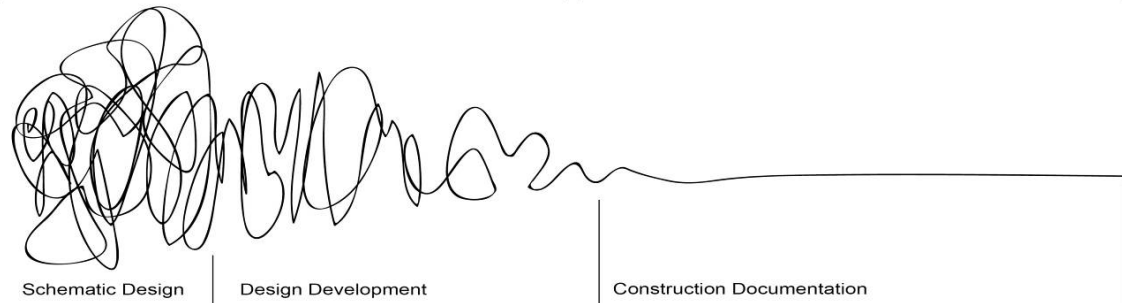
*If one changes, the other should change.*

# LARE Steps in the Design Process?



Uncertainty / patterns / insights

Clarity / Focus



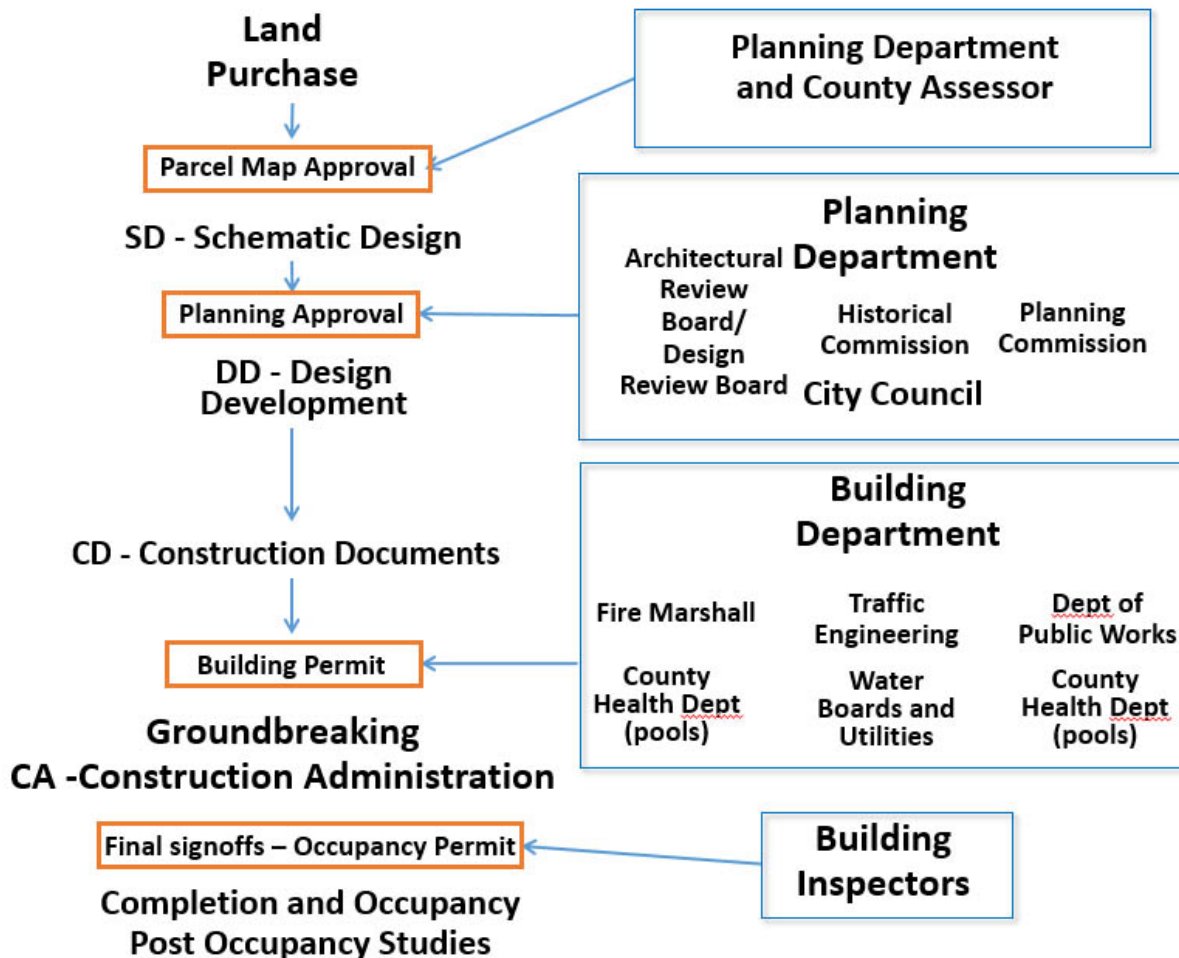


# Scope and Fee

The PlaceWorks Team							10.5.2020	
Hayward La Vista Park Rescape Rating								
<b>COST PROPOSAL</b>								
		<b>PLACEWORKS</b>						
		<b>Gronquist</b>	<b>Koehler</b>					
		<b>PM</b>	<b>Project Designer</b>	<b>PlaceWorks</b>	<b>PlaceWorks</b>	<b>PlaceWorks</b>	<b>Total Task</b>	
<b>Hourly Rate:</b>		<b>\$190</b>	<b>\$115</b>	<b>Hours</b>	<b>2% Office</b>	<b>Total</b>	<b>Budget</b>	
					<b>Expenses</b>			
1	Review 100% PS&E and identify items for verification	4	5	9	\$27	\$1,362	\$1,362	
2	Review addenda, one round PS&E and update scorecard	4	5	9	\$27	\$1,362	\$1,362	
<b>Task C. Subtotal</b>		<b>8</b>	<b>10</b>	<b>18</b>	<b>\$54</b>	<b>\$2,724</b>	<b>\$2,724</b>	
<b>TASK D. PRE-CONSTRUCTION SITE INSPECTION</b>								
1	Site walk and organize collected documentation	6		6	\$23	\$1,163	\$1,163	
<b>Task D. Subtotal</b>		<b>6</b>	<b>0</b>	<b>6</b>	<b>\$23</b>	<b>\$1,163</b>	<b>\$1,163</b>	
<b>TASK E. Post Construction Inspection</b>								
1	Site walk and organize collected documentation	6		6	\$23	\$1,163	\$1,163	
<b>Task E. Subtotal</b>		<b>6</b>	<b>0</b>	<b>6</b>	<b>\$23</b>	<b>\$1,163</b>	<b>\$1,163</b>	
<b>TASK F. Final Rating Results</b>								
1	Compile results for Rescape submittal	8		8	\$30	\$1,550	\$1,550	
<b>Task F. Subtotal</b>		<b>8</b>	<b>0</b>	<b>8</b>	<b>\$30</b>	<b>\$1,550</b>	<b>\$1,550</b>	
<b>Labor Hours Total</b>		<b>33</b>	<b>12.5</b>	<b>45.5</b>				
<b>Labor Dollars Total</b>		<b>\$6,270</b>	<b>\$1,438</b>		<b>\$155</b>	<b>\$7,863</b>	<b>\$7,863</b>	
<b>PlaceWorks Percent of Total Labor</b>		<b>73%</b>	<b>27%</b>					
<b>EXPENSES</b>								
PlaceWorks Reimbursable Expenses: ReScope Fees (refer to Exhibit A)							\$1,900	
							\$0	
<b>EXPENSES TOTAL</b>							<b>\$1,900</b>	
<b>GRAND TOTAL</b>							<b>\$9,763</b>	

# 2.1 Collect Related Policy Documents

(eg municipal planning documents, proposed and existing land use maps, FEMA, EPA, stormwater management policies)



A partial list of permits and approvals you might be required to secure:

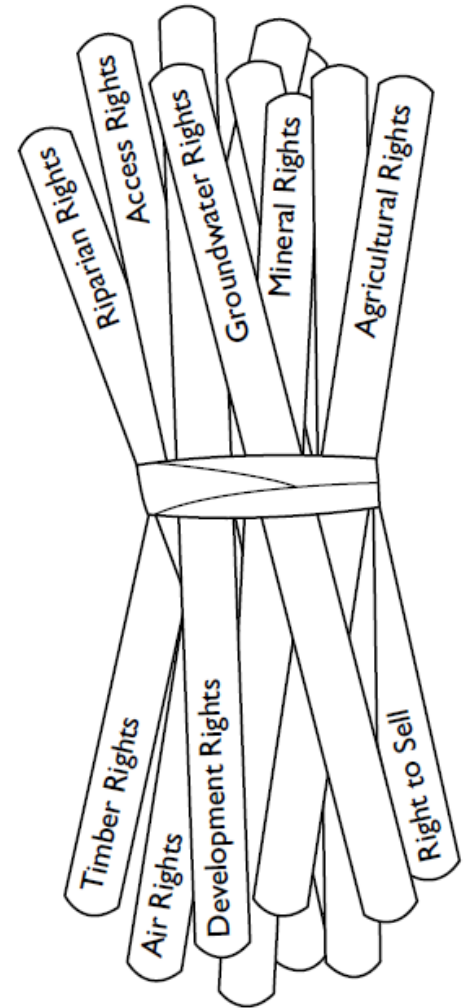
- **Environmental Impact Report (EIR)** – any project requiring Federal review
- **Parcel Map Approval:** For new subdivisions only. Does the new plat map meet City planning and engineering standards? Density standards in Zoning code?
- **Planning/Design Review:** Does this project meet the city’s zoning and planning standards? Will it look nice from the street? Parking, signage, architectural style, fence heights and style, tree removal/replacement, emergency and trash access, stormwater filtration, setbacks/density
- **Building Permit:** Ensures compliance with the Building Code
- **SWPPP Permits:** Required before construction. Control erosion/sedimentation during construction.
- **Occupancy Permit:** Required at the end of construction before the Owner can occupy the site. All code issues resolved to get this permit.

# Planning 101

- **Police Power** – The right of government to establish laws to preserve order and promote public health, safety, morals and general welfare. Examples: Stop signs, zoning regulations
- **Corporate Power** – The right of the government to act as a person in making plans and spending money for the common good

Landowner rights, within the local planning legal framework. The rights typically granted to landowners are sometimes called ‘a bundle of rights’.

- Quiet enjoyment of the property
- Occupy the property and exclude others
- Sell, lease, donate or bequeath the property
- Subdivide or build or remove improvements
- Control the property’s use within the law
- Other rights that can be kept or sold such as mineral rights or development rights



---

## BUNDLE OF RIGHTS

Source: American Planning Association.

# Comprehensive Plans

A Comprehensive Plan consists of a statement of development policies for a city or region and includes diagrams and text setting forth objectives, principles, standards, and plan proposals. The Comprehensive Plan sets the general direction, and then over time, the City's staff translates this direction into the zoning and building codes that govern our work as designers.

This concept has led to a lot of confusion among test candidates because while every state has a version of Comprehensive Planning, the legal requirements and terminology vary greatly from state to state.

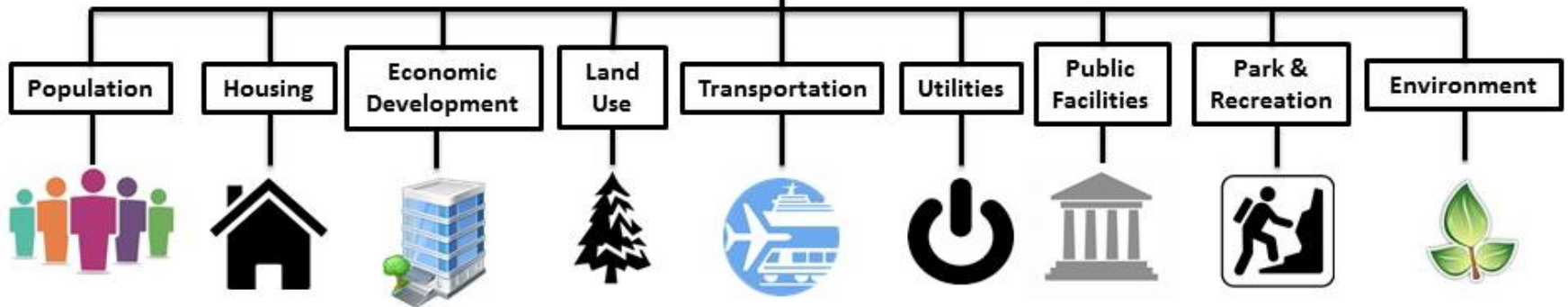
- California state law requires a **General Plan**.
- New Hampshire requires a **Comprehensive Plan** at the regional level and a **Master Plan** at the municipality level.
- South Carolina and Louisiana do not require **Comprehensive Plans** at all, but provide model language and assistance for municipalities that want to develop them.
- In Canada, you may be familiar with **Official Community Plans (OCP)** or **Municipal Development Plans**.

# COMPREHENSIVE PLAN

## CITY OF BLAINE

*Planning for 20 years of growth*

### ELEMENTS OF 2016 PLAN



Each municipality is required by the Growth Management Act to create a Comprehensive Plan. The Comprehensive Plan directs how growth will be accommodated for, over the next 20 years.

The Comprehensive Plan is comprised of different “elements” or chapters. Each element addresses a different topic needed to maintain a high quality of life. Above are the elements included in Blaine’s 2016 Comprehensive Plan update.

Each element addresses existing conditions, and using growth projections, creates a plan to accommodate that growth so there are enough public and private facilities for future use.

For example, the plan identifies where new residences should be built, which roads need improvement, and where public parks and trails are planned to be built. The Comprehensive Plan is our guide to help ensure current development is mindful of future needs.

# Neighborhood Plan for the Near Northwest Neighborhood, South Bend, Indiana

## Near Northwest Neighborhood Plan Workshop

You are invited to help develop a plan for the Near Northwest Neighborhood. Please join us at a community workshop where you will learn more about the project and be able to share your ideas.

This is the first in a series of engagement opportunities to create a community vision for your neighborhood. Get the word out and share event information with your friends and neighbors.

**WHEN:**

Wednesday, February 6th at 5:30pm

**WHERE:**

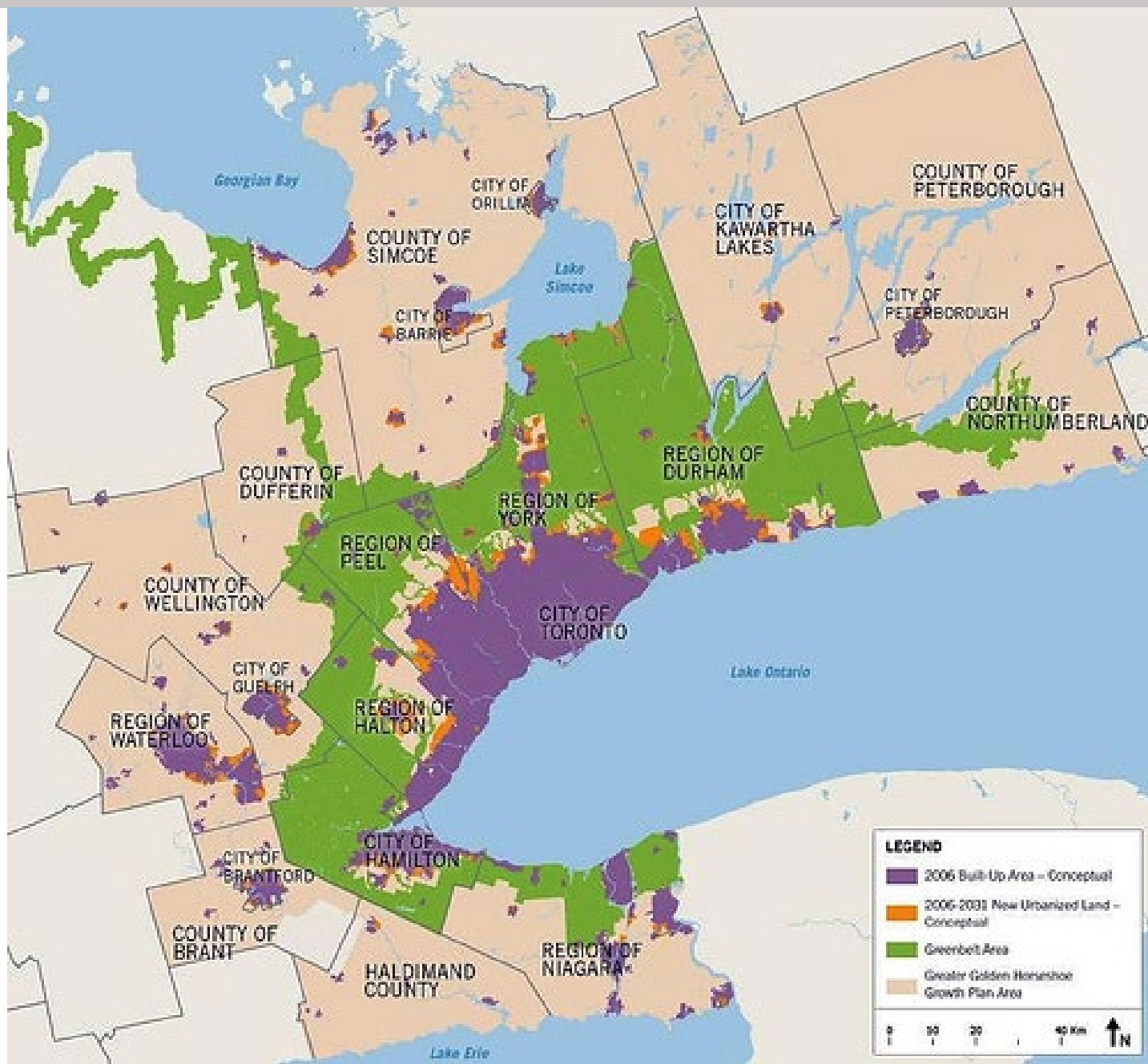
Near Northwest Neighborhood  
Community Space, 1013 Portage  
Avenue

**CONTACT:**

For more information please contact the  
Department of Community Investment  
at 574.235.5821 or visit  
[www.southbendin.gov/planning-community-resources/](http://www.southbendin.gov/planning-community-resources/)



# Regional Plan for the Golden Horseshoe, Ontario

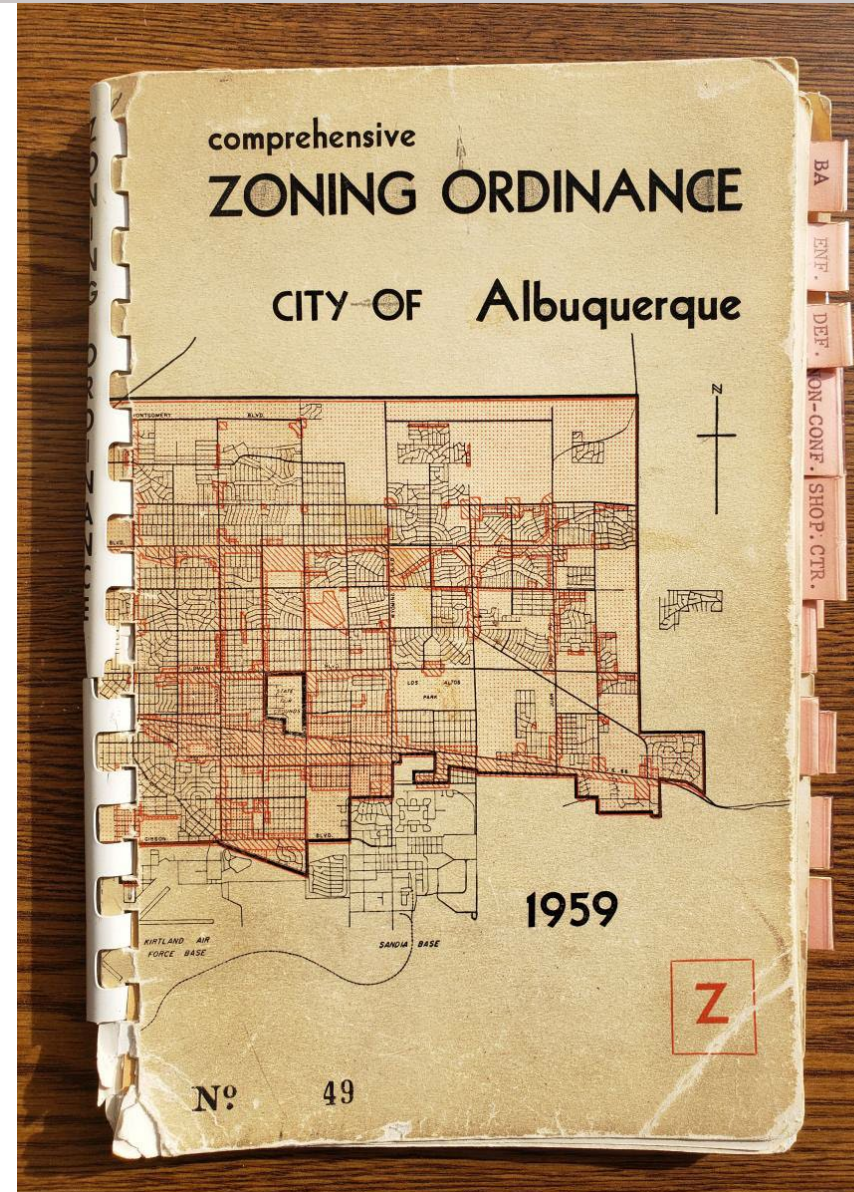


*Places to Grow* regional plan  
("provincial plan") for  
the region of Ontario  
around Toronto and  
Hamilton

# Local Development Restrictions

The Comprehensive Plan guides the exercise of police power through zoning and subdivision regulation and the exercise of corporate power through the provision of capital facilities and improvements.

*Land Use Planning, Zoning, Subdivision, and Building Regulations* are developed from the Comprehensive Plan.

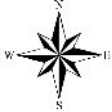




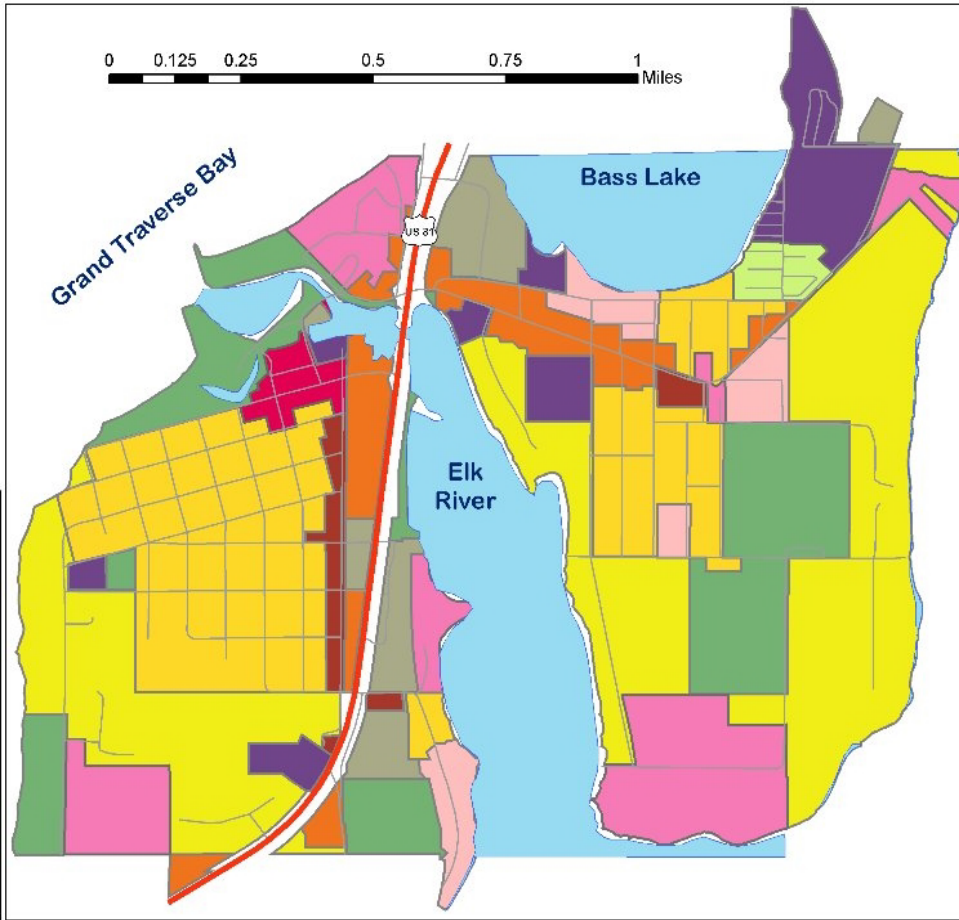
# Zoning Map

## Village of Elk Rapids, MI

Base GIS Data:  
Michigan Framework Data  
Land Information Access Association  
Michigan GeoRef, NAD 83



0 0.125 0.25 0.5 0.75 1 Miles



### Zoning Districts

- B-1 Lo Impact Trans. Comm.
- B-2 Central Bus. District
- B-3 Community Commercial
- I-1 Light Industrial
- P Public Land
- R-1 Residential
- R-2 Residential
- R-3 Residential
- RM-H Hi-dens. Mult. Res.
- RM-L Lo-dens. Mult. Res.
- RM-MH Mobile Homes

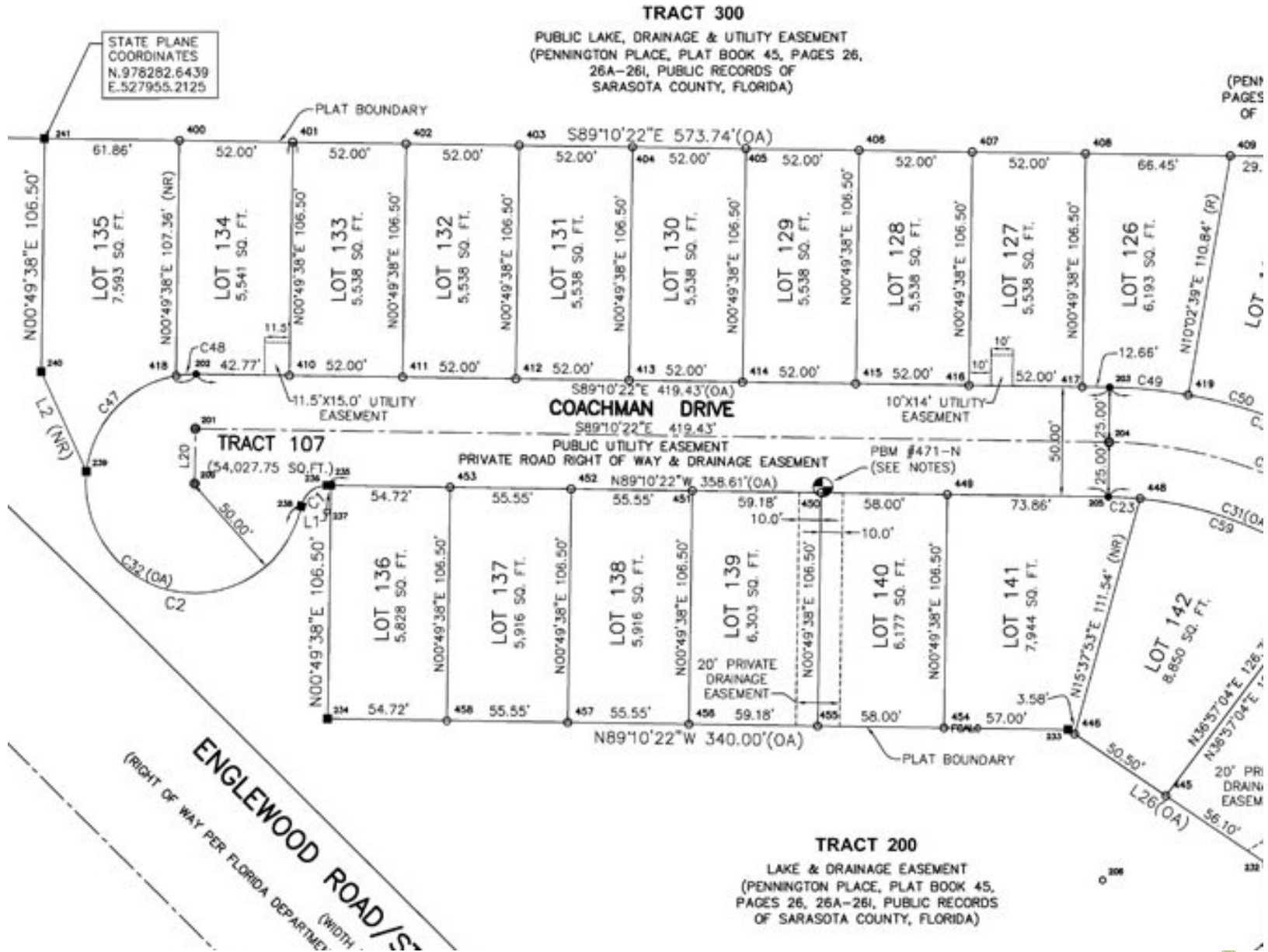
R=Use allowed by Right  
C=Use allowed by Right with Conditions  
S=Use allowed with Special Use Permit

### §405 DISTRICT TABLE OF PERMITTED USE SUMMARY (cont.)

PRINCIPAL LAND USE ACTIVITY		R-1	R-2	R-3	RM	B-1	B-2	B-3	I-1	P	OTHER DEVELOPMENT STANDARDS
<b>Sector 99 – Uses Not Elsewhere Classified (cont.)</b>											
99510	Public & Private Utilities	R	R	R	R	R	R	R	R	R	
99520	Solar Collectors	R	R	R	R	R	R	R	R	R	
99530	Wind Energy Systems	C	C	C	C	C	C	C	C	C	<a href="#">§428</a>
99540	Planned Unit Developments	S	S	S	S	S	S	S	S	S	<a href="#">§606</a>

Zoning Map

# Part of a Subdivision Plat Map



# Building Codes, Regulations & Permits

- Building Code
- Plumbing Code
- Mechanical Code
- Electrical Code
- Fire Code

Most of the US and Canada has adopted the **International Building Code (IBC)**. It was a merger of several existing codes. Each state has the power to determine their prevailing building code. As of 2021, all 50 states had finally adopted the IBC.

For Landscape Architects, Building Codes typically set standards for the design and construction of:

- Walls and Steps
- Decks, Patios and Walkways
- Swimming Pools and Spas
- Fences, Arbors and Trellises
- Drainage Systems and Structures
- Fountains and Water Features
- Irrigation Systems
- Site Lighting
- Vehicular and Pedestrian Circulation Systems

Fascinating: [https://www.iccsafe.org/wp-content/uploads/Code\\_Adoption\\_Maps.pdf](https://www.iccsafe.org/wp-content/uploads/Code_Adoption_Maps.pdf)

# Local Codes, Regulations and Permits

Regional Entities may have regulatory systems. Usually more related to planning than construction.

Cities: Cities set their own more demanding codes that are responsive to local conditions.

- Municipal Code
- Zoning Code

[< 14.04.290 - Violations and penalties.](#)

[Title 16 - SUBDIVISIONS >](#)

Title 15 - BUILDINGS AND CONSTRUCTION



Chapter 15.04 - OAKLAND AMENDMENTS TO CALIFORNIA MODEL BUILDING CONSTRUCTION CODES

Article I - General Administrative Amendments

15.04.1.100 - Title.

15.04.1.110 - Scope.

15.04.1.115 - General standards.

15.04.1.120 - Effect of adoption and repeals.

15.04.1.125 - Administrative hearings.

15.04.1.130 - Violations.

15.04.1.135 - Application for permit.

15.04.1.140 - Information on submittals.

15.04.1.145 - Signing and sealing of plans and other submittal documents.

15.04.1.150 - Persons who may prepare plans.

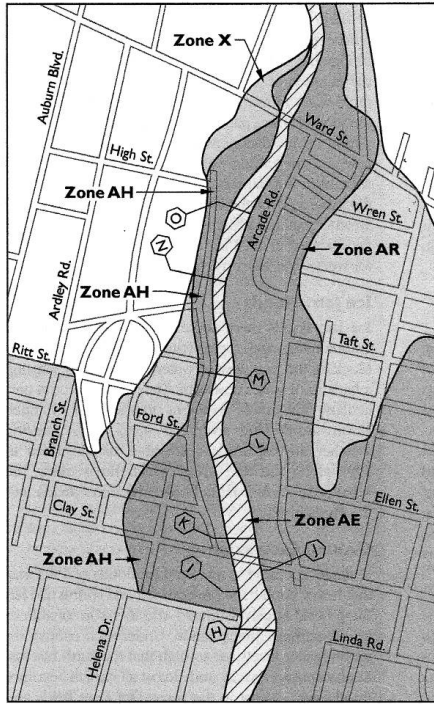
15.04.1.155 - Expiration or Extension of Issued Permit.




15.04.1.160 - Suspension or Revocation of Issued Permit.

15.04.1.165 - Fees.

15.04.1.170 - Sanitary accommodations for construction workers.

# FEMA and the EPA



-  Special Flood Hazard Areas Inundated by 100-Year Flood
  - Zone A No base flood elevations determined.
  - Zone AE Base flood elevations determined.
  - Zone AH Flood depths of 1 to 3 feet (usually areas of ponding). Base flood elevations determined.
  - Zone AR Area of special flood hazard, which results from the decertification of a previously accredited flood protection system which is determined to be in the process of being restored to provide a 100-year or greater level of flood protection.
-  Floodway Areas in Zone AE
-  Other Flood Areas
  - Zone X Areas of 500-year flood: areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 100-year flood.

**SAMPLE FLOOD INSURANCE RATE MAP**

Source: FEMA National Flood Insurance Program 1998.








FEMA maintains flood hazard maps. There may also be more detailed state maps but for insurance purposes (and site inventory purposes) this is a good starting place.

The EPA sets standards for clean air and clean water. The US Army Corps is charged with managing 'navigable waters' which includes coastlines and wetlands as well as major engineering projects like levees and dams.



**Symbology**

**Wetland Delineation Regions of the U.S. Army Corps of Engineers**

-  Arid West
-  Atlantic and Gulf Coastal Plain
-  Eastern Mountains and Piedmont
-  Great Plains
-  Midwest
-  Northcentral and Northeast
-  Western Mountains, Valleys, and Coast

# 2.2 Assimilate Information from Previous Planning Processes

Review the Comprehensive Plan, any relevant Neighborhood or Regional Plans, and other documents that the city may maintain.

- Design Guidelines/Urban Plans
- Street Tree Planting Plans or Preferred Tree List
- Bicycle Planning
- Regional Transit Plans
- Standards for Public Schools



## Urban Design Guidelines

S1	Recognize and Respond to Urban Patterns	14
S2	Harmonize Relationships between Buildings, Streets, and Open Spaces	35
S3	Recognize and Enhance Unique Conditions	38
S4	Create, Protect, and Support View Corridors	20
S5	Create a Defined and Active Streetwall	22
S6	Organize Uses to Complement the Public Environment	24
S7	Integrate Common Open Space and Landscape with Architecture	26
S8	Respect and Exhibit Natural Systems and Features	28
A1	Express a Clear Organizing Architectural Idea	34
A2	Modulate Buildings Vertically and Horizontally	36
A3	Harmonize Building Designs with Neighboring Scale and Materials	38
A4	Design Buildings from Multiple Vantage Points	40
A5	Shape the Roofs of Buildings	42
A6	Render Building Facades with Texture and Depth	44
A7	Coordinate Building Elements	46
A8	Design Active Building Fronts	48
A9	Employ Sustainable Principles and Practices in Building Design	50
P1	Design Public Open Spaces to Connect with and Complement the Streetscape	58
P2	Locate and Design Open Spaces to Maximize Physical Comfort and Visual Access	58
P3	Express Neighborhood Character in Open Space Designs	60
P4	Support Public Transportation and Cycling	62
P5	Design Sidewalks to Enhance the Pedestrian Experience	64
P6	Program Public Open Spaces to Encourage Social Activity, Play, and Rest	66
P7	Integrate Sustainable Practices into the Landscape	68

## DISTRICT of COLUMBIA BICYCLE MASTER PLAN



# 2.3. Conduct Onsite Investigation and Fieldwork

## Primary Data Collection

- Interviews
- Observation: windshield survey, transect, etc.
- Visit site and similar locations
- Other specialized field techniques

Some reasons for a Landscape Architect to visit a site in order to collect data that is not readily available from maps, air photos or other remote information sources might include:

- Views
- Tree species identification and assessment of tree or vegetation health
- Identifying safe access points to the site
- Verifying the presence of unstable or poorly drained soils
- Identifying the presence of or rough limits of wetlands
- Evidence of shallow bedrock in some locations
- Individual details of hardscape conditions that may not show up on a survey
- Spirit of place



# 2.4 Document Site Data

Base maps generally show the following fundamental features:

- Legal conditions: property lines, easements, other
- Topography: contour lines, significant spot elevations
- Existing buildings, other structures to remain
- Proposed structures
- Existing hardscape (sidewalks, driveways, etc.)
- Significant subsurface features – underground lines, common trenches
- Utility poles, boxes
- Existing trees to remain
- Other significant site features that should be protected – drainage swales, any areas to be off limits for wildlife, vegetation, or cultural protection
- If there is a common layout structure that provides coordination between the trades, that may be shown as well, ie. coordinate grid systems, station points or benchmarks.

A City or Agency client might require a ‘Basis of Design’ phase before design work begins to ensure that all site information needed has been gathered and included in the base maps.



# 2.5 Identify Adjacent Land Use

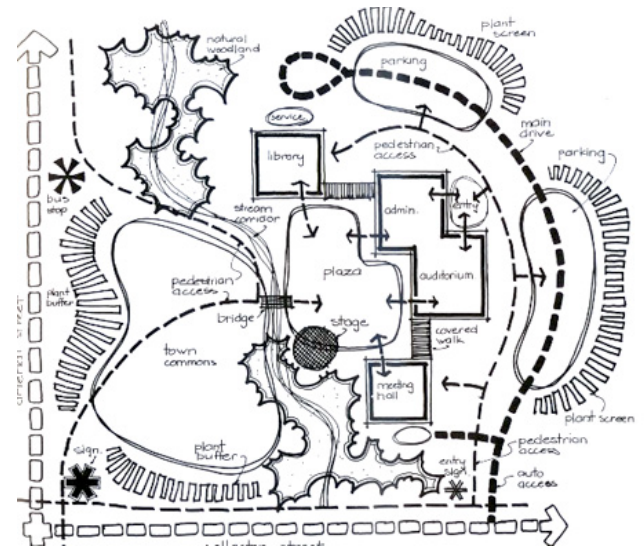
CLARB's approach to designing relies heavily on the planning concept of adjacencies. Adjacency relationships among program elements will usually fall into these categories:

- Adjacency is essential
- Adjacency is unimportant
- Adjacency is desirable but not essential
- Adjacency should be avoided

At the single family home scale, you can consider program element adjacencies with a simple functional analysis bubble diagram. Common sense will get you through this process.

At the city scale, these considerations are usually regulated through zoning maps. We want to put compatible uses together and separate incompatible uses.

Functional Analysis/Bubble Diagrams from *Basic Elements of Landscape Architectural Design*, Booth



# 2.6 Collect Contextual Data

(eg natural systems, road networks, demographics, cultural and historical)

## Use / Legal Land Descriptions

- Land use, zoning maps – City/County planning department  
May show existing conditions, or allowable uses and densities
- Tax Maps – Assessor's Office
- Land Survey  
Property lines  
Utilities  
Buildings, roads, and structures  
Trees and major vegetation masses  
Topography and spot elevations
- Aerial Survey: Topo, vegetation, etc. \_ less accurate than that obtained via ground survey.
- Aerial Photography
- LIDAR surveys

## Population Density and Distribution

- US Census Bureau: Census Tract Data
- Public Health Department
- State, county, and local planning agencies
- Utility companies
- Crime statistics

## Urban Form

- Plat map
- Aerial Photo
- USGS
- City Map / Road Map
- Figure Ground Drawing: A map showing building vs open space.  
Roads are not shown

## Streets, Highways, Traffic, Parking

- Police Department accident files
- Other Transportation Agencies
- Parking Counts
- Traffic Counts, Traffic Modeling

## Infrastructure

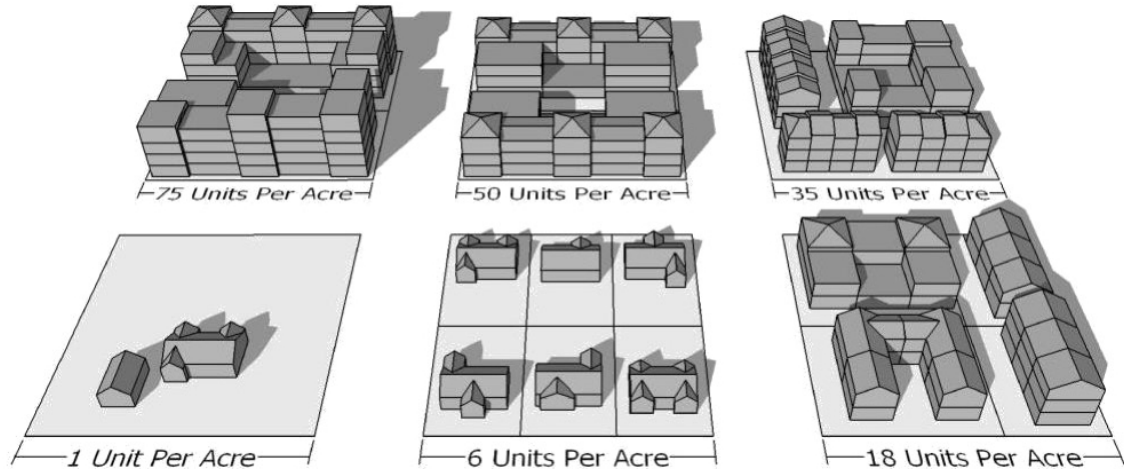
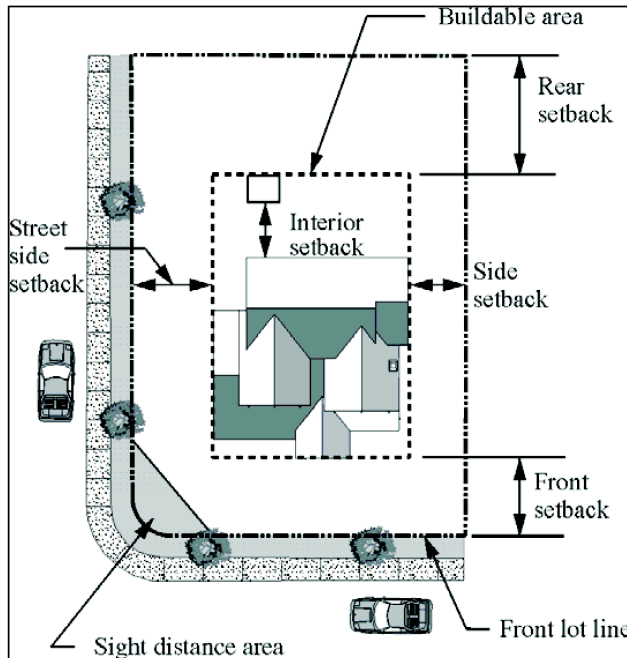
- Local Department of Public Works mapping
- Site Surveys
- Aerial Photos
- Historical or Archeological Surveys
- Sanborn Insurance Maps- found at city libraries and archives microfiche
- Historic USGS or other maps
- Temporal Changes in land use, environmental conditions
- Utility Company and Utility Agency Mapping

## Tax and Land Value

- Assessor's Parcel Maps
- Lincoln Institute of Land Policy (price indexes for land and structures)

# 2.7 Research Codes, Ordinances & Permitting Requirements

(eg site/project specific requirements)

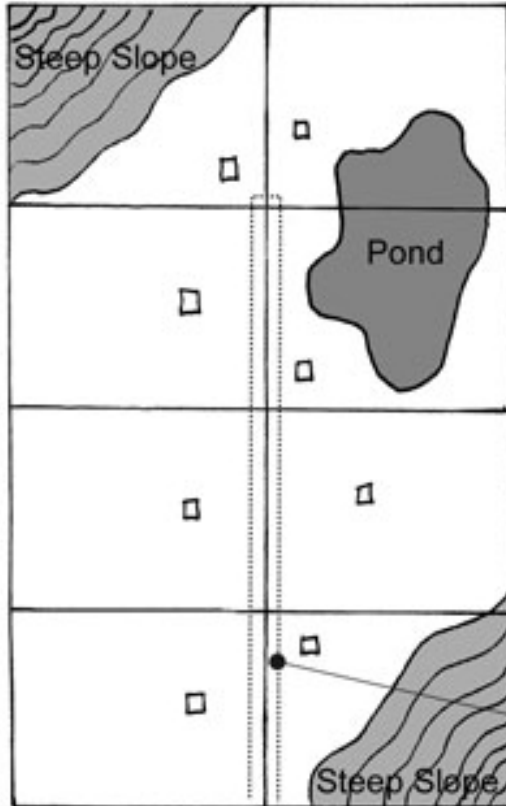


Cities have many tools for controlling density, through minimum lot sizes and setback requirements. Measurements like dwelling unit/acre (DU/acre) allow cities to permit more flexible patterns of development. Note that the DU measurement does not include information about building form – just density.

# Alternate Patterns of Development

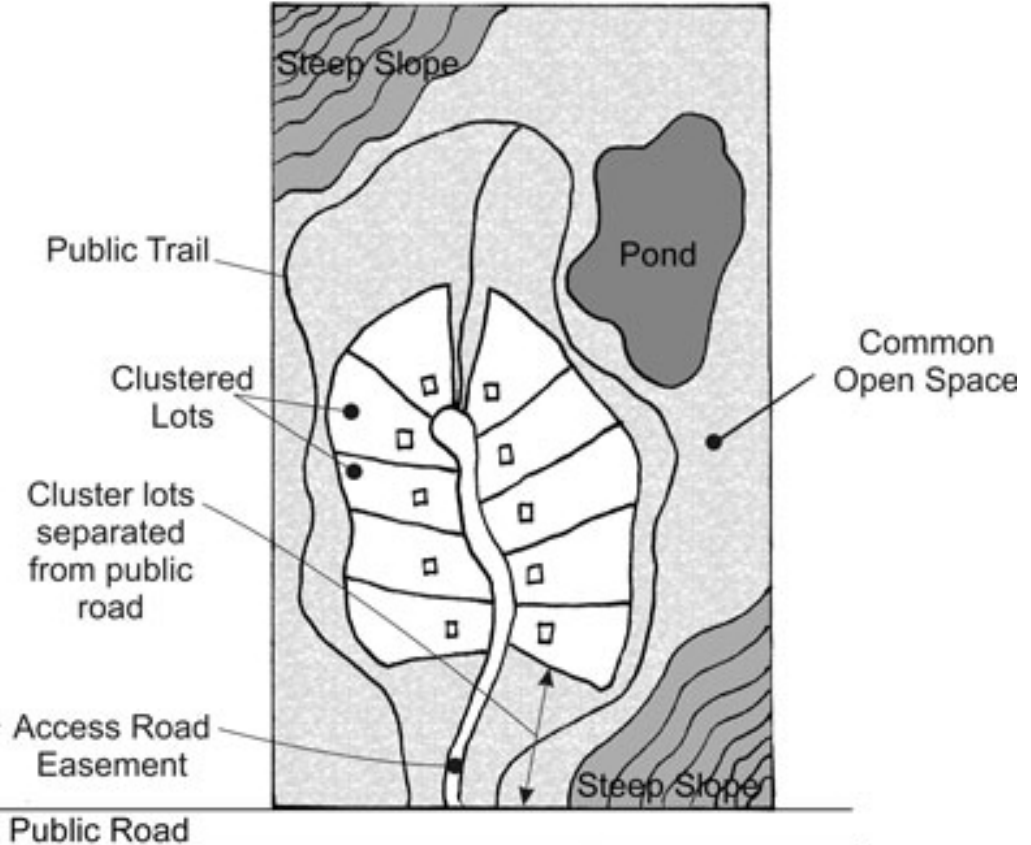
## Standard Subdivision

40 acres with eight 5-acre lots



## Conservation Subdivision

40 acres with ten 1-acre lots\* and 30 acres of common open space



(\*2 bonus lots based on % of common open space and trail with general public access)

These site plans have the same DU/acre (0.2 DU/acre) but are arranged differently. In fact, the one on the right has been granted 2 bonus lots due to the amount of open space that is being put under permanent protection.

# 3.1 Identify Stakeholders

There are several categories of stakeholders, each with a different contribution to make to the outcome of the project. You will work with your client to decide who to reach out to – and how to reach out.

**Technical Advisory Committees (TACs):** may include City staff, organizations that will be servicing the project like trash, public transit, social workers, docents. These folks know the details that will make your project work or not work. They can also provide an early warning if there is a problem that will delay later permit review and approval.

**Specialists and Advisors:** Historians, local Chamber of Commerce, organized interest groups like bicycle advocacy, neighborhood watch, etc. provide advisory context. This group will need to be managed carefully so no one perspective dominates the project, but all have a chance to inform and participate in the process.

**General Public:** While a big part of outreach to the public is aimed at keeping them informed, for many projects you can gain valuable insight into activities and amenities that will be most valued. In extreme cases, if there is strong, organized public opposition to a project, the team should discuss finding ways to negotiate or reassure the public in order to avoid a long, drawn-out battle that may result in a failed project.

# 3.2 Coordinate with Governing Bodies

5 common forms of government in the US:

- **Council - Manager** An elected City Council oversees administration, makes policy and sets budget. A professional City Manager executes policy under direction of the Council. A Mayor is chosen from the council on a rotating basis.
- **Mayor – Council** Mayor is elected separately from the council and is often full-time and paid, with significant authority. The charter will define the mayor's powers.
- **Commission** Voters elect individual commissioners to a small governing board. Each commissioner is responsible for one specific aspect of government, such as fire, police, public works, health, finance. One commissioner is designated as chairman or mayor and presides over meetings.
- **Town Meeting** All voters meet to decide basic policy and elect officials to carry out the policies. Suited to small cities. About 5% of US cities. Marblehead, MA
- **Representative Town Meeting** Voters select a large number of citizens to represent them at town meetings (selectmen), where only they can vote.

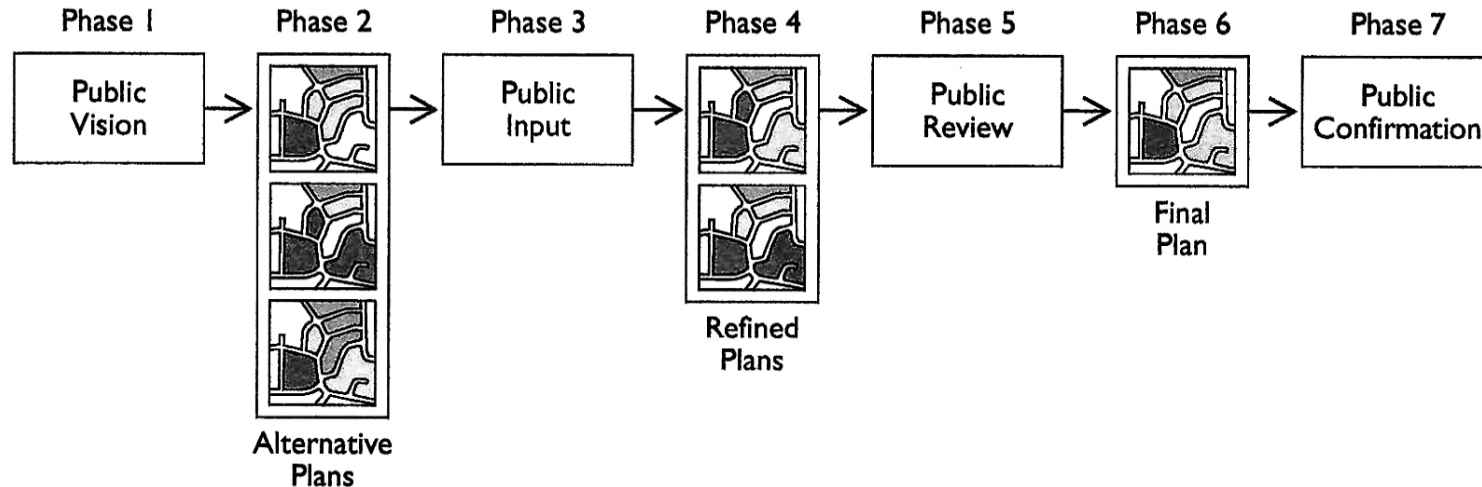
# 3.3 Support Public Participation Process

(eg consult with clients, summarize feedback, communicate deliverables)

Who will use, maintain, and regulate the finished product?

- Neighbors
- Community groups
- Fire, Police departments
- Maintenance staff
- Elected officials

What are some ways you could collect their input?

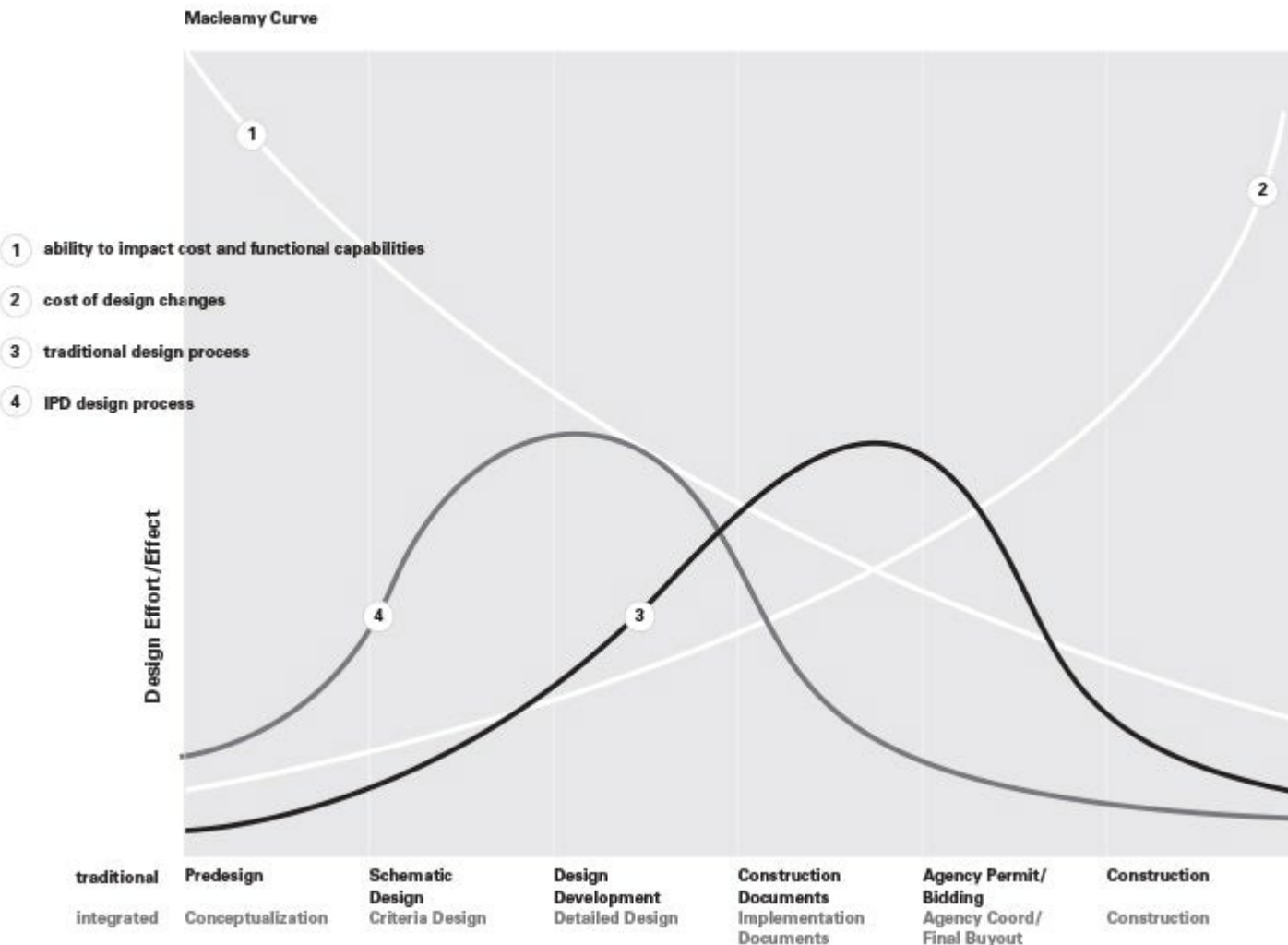


## CHARRETTE WORK CYCLE

Source: National Charrette Institute, 2003.

# 3.4 Evaluate Design based on Feedback

**Integrated Project Delivery** is a collaborative approach to design and construction that involves stakeholders from the very beginning of a project.





# 3.5 Obtain Public and Private Approvals

**Area variance** -most common type of variance

*Example:* Client wants to build a house on an oddly-shaped lot, that does not have a sufficient buildable envelope due to the lot configuration. A variance might be granted that permits the building to be closer to the property line than the standard setbacks would require, especially if the Comprehensive Plan is promoting infill development in that area.

**Use variance/special-use permit/conditional use** - an owner wishes to build something that is not formally permitted in the zoning code, but it is found to be an acceptable exception.

*Example:* A church wishes to build in a residential neighborhood. This may be allowed as a special use in the zoning code, but would require a review process to confirm that it will not negatively impact the neighborhood.

The financial or personal situation of the applicant cannot be taken into consideration. When a variance is granted, any other property owner with similar site conditions should be able to obtain a similar variance; this criterion is often addressed by citing **precedent**.

If an owner is prevented from making full use of their property without just compensation, it results in a **'regulatory taking'**, or a financial loss to the owner caused by poor public policy.

# 4.01 Determine Appropriate Types of Analysis

We are now shifting from data collection (Inventory) and moving into combining those facts into a story about our specific site, and our client's specific goals for the site (Analysis).

You cannot perform an analysis without a point of view. Our inventory sets will be assigned values based on the program.

Example: You have a client who owns a steep, forested, north facing site. Is it a good site or a bad site? It depends on the program.

## **Suitable for:**

Ski resort

Hiking

Nature preserve

## **Unsuitable for:**

Big-box retail

Housing

# 4.2 Perform Vegetation Analysis

## Sampling Techniques:

Relevé: 'Sample stand'- soils and plants within representative stands are inventoried by a specialist



Transect sampling:  
Sampling along a transect line (similar to a section)



Aerial photography:  
Useful for establishing cover but will not provide much more information



Quadrat sampling:  
Sampling within grids that represent the larger site

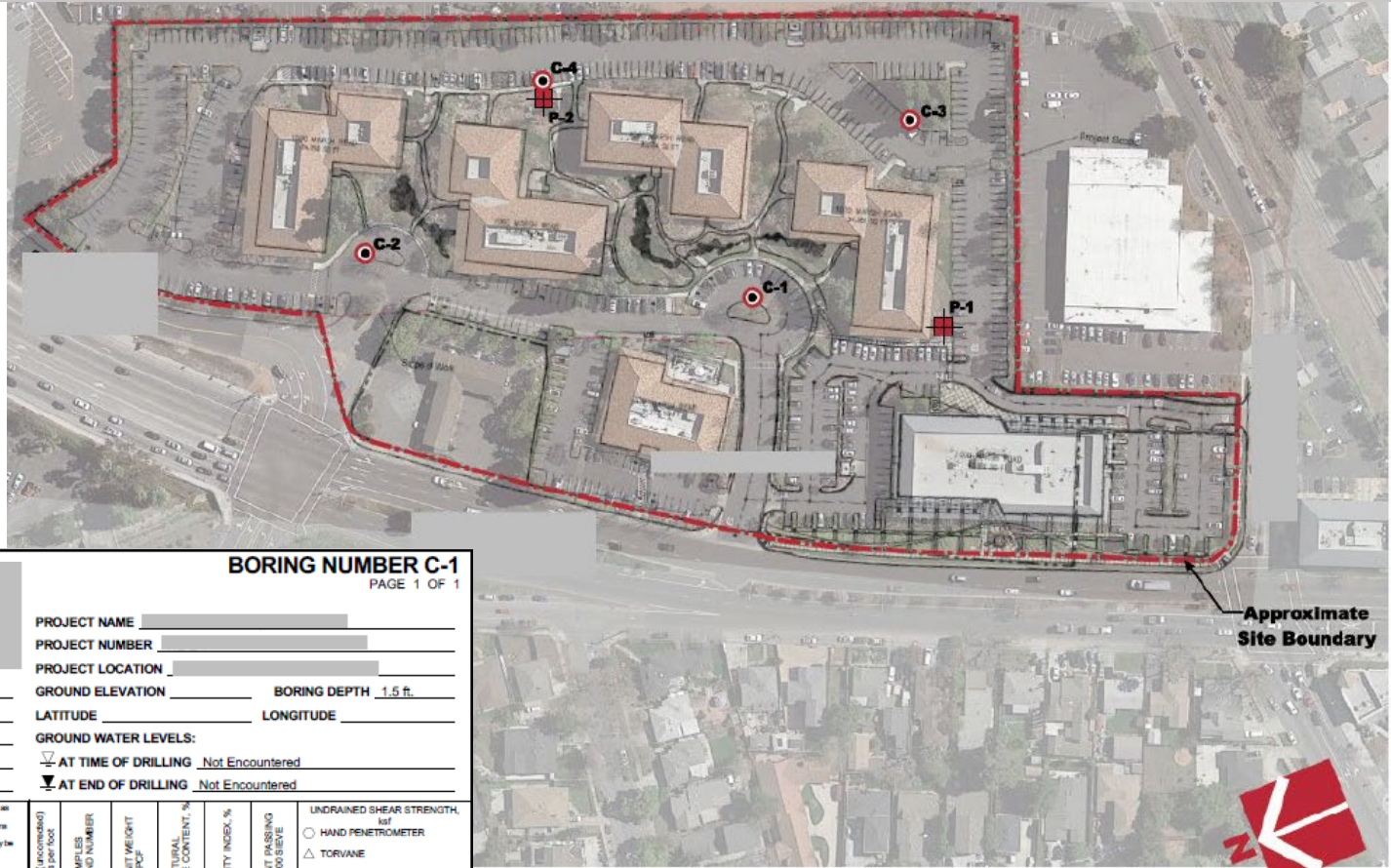


Infrared photography: areas where plants are producing chlorophyll show up as dark red



# 4.3 Interpret and Review Soils and Geology

(eg geotechnical, geology, soil map, soil characteristics)



**BORING NUMBER C-1**  
PAGE 1 OF 1

PROJECT NAME \_\_\_\_\_  
PROJECT NUMBER \_\_\_\_\_  
PROJECT LOCATION \_\_\_\_\_

DATE STARTED 3/13/15 DATE COMPLETED 3/13/15  
DRILLING CONTRACTOR \_\_\_\_\_  
LOGGED BY CK

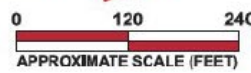
GROUND ELEVATION \_\_\_\_\_ BORING DEPTH 1.5 ft.  
LATITUDE \_\_\_\_\_ LONGITUDE \_\_\_\_\_

GROUND WATER LEVELS:  
 AT TIME OF DRILLING Not Encountered  
 AT END OF DRILLING Not Encountered

NOTES

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-MATERIAL (percent/total)	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, $k_{sf}$
0.0	0.0	▀	3 1/2 inches asphalt concrete over 8 1/2 inches aggregate base							
		▨	Fat Clay (CH) moist, dark gray, some fine sand, high plasticity Liquid Limit = 52, Plastic Limit = 17 Bottom of Boring at 1.5 feet.		CH 08		17	35		

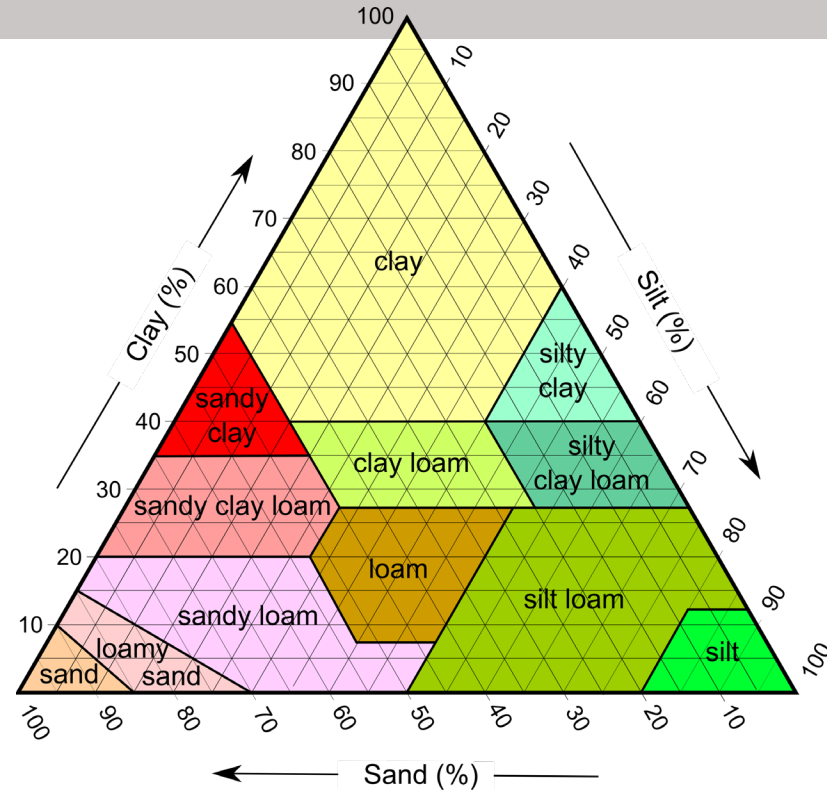
- Legend**
- Approximate coring location (C)
  - Approximate location of percolation test (P)



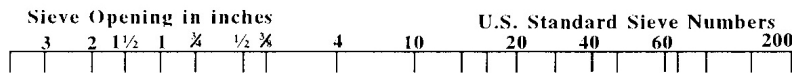
# Soils Inventory – Particle Size

Read all three axes – they should add up to 100%.

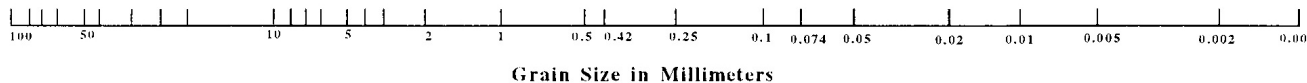
- A soil test indicates you have 40% clay, 10% silt, and 50% sand. What kind of soil do you have?



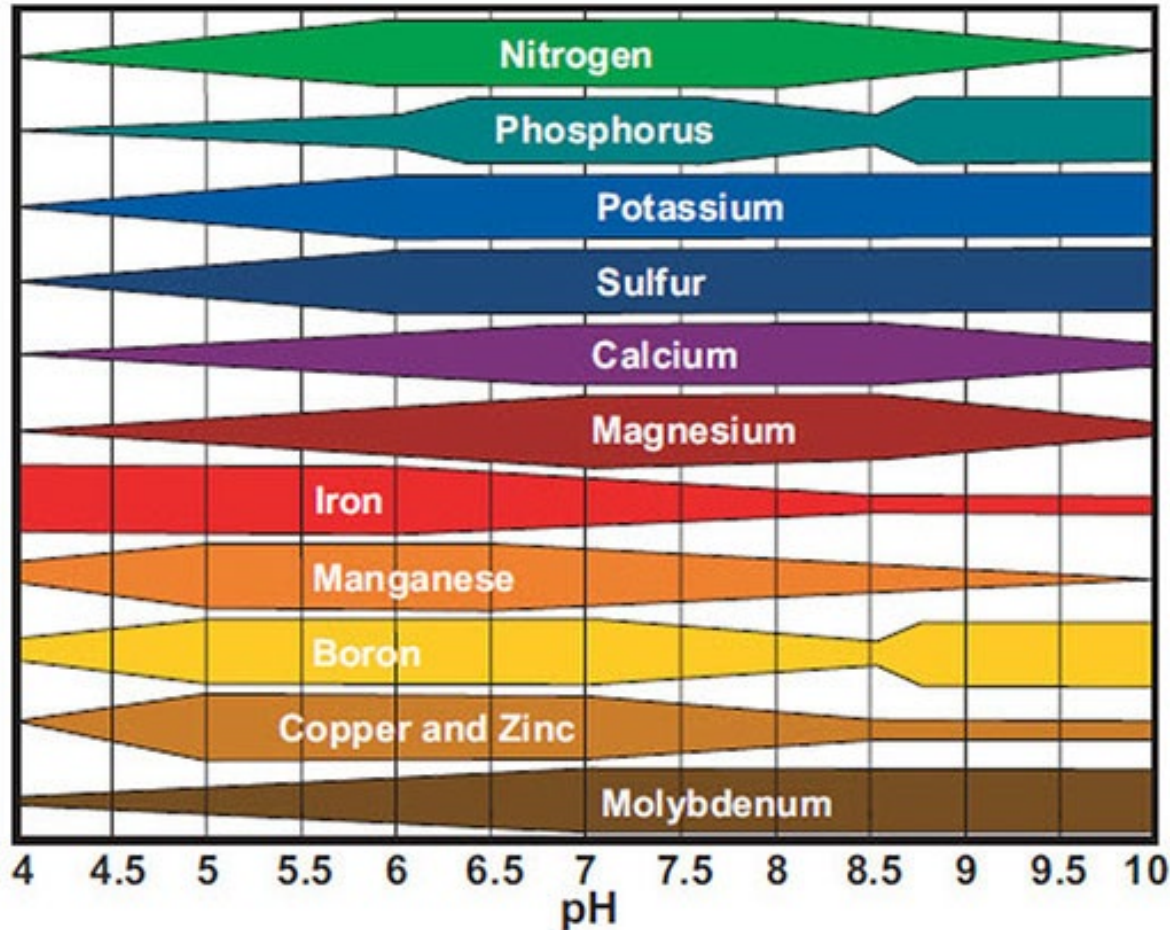
COMPARISON OF PARTICLE SIZE SCALES



USDA	GRAVEL			SAND					SILT	CLAY
				Very Coarse	Coarse	Medium	Fine	Very Fine		
UNIFIED	GRAVEL		SAND			SILT OR CLAY				
	Coarse	Fine	Coarse	Medium	Fine					
AASHO	GRAVEL OR STONE			SAND		SILT - CLAY				
	Coarse	Medium	Fine	Coarse	Fine	Silt		Clay		



# Interpret Soils Test - Fertility



Minerals may be present in the soil but be unavailable to plants due to the soil's pH.

Low pH = acidic

High pH = alkaline

The widest range of nutrients is available to plants at a neutral pH of 7.

- N= Nitrogen
- P= Phosphorus
- K= Potassium

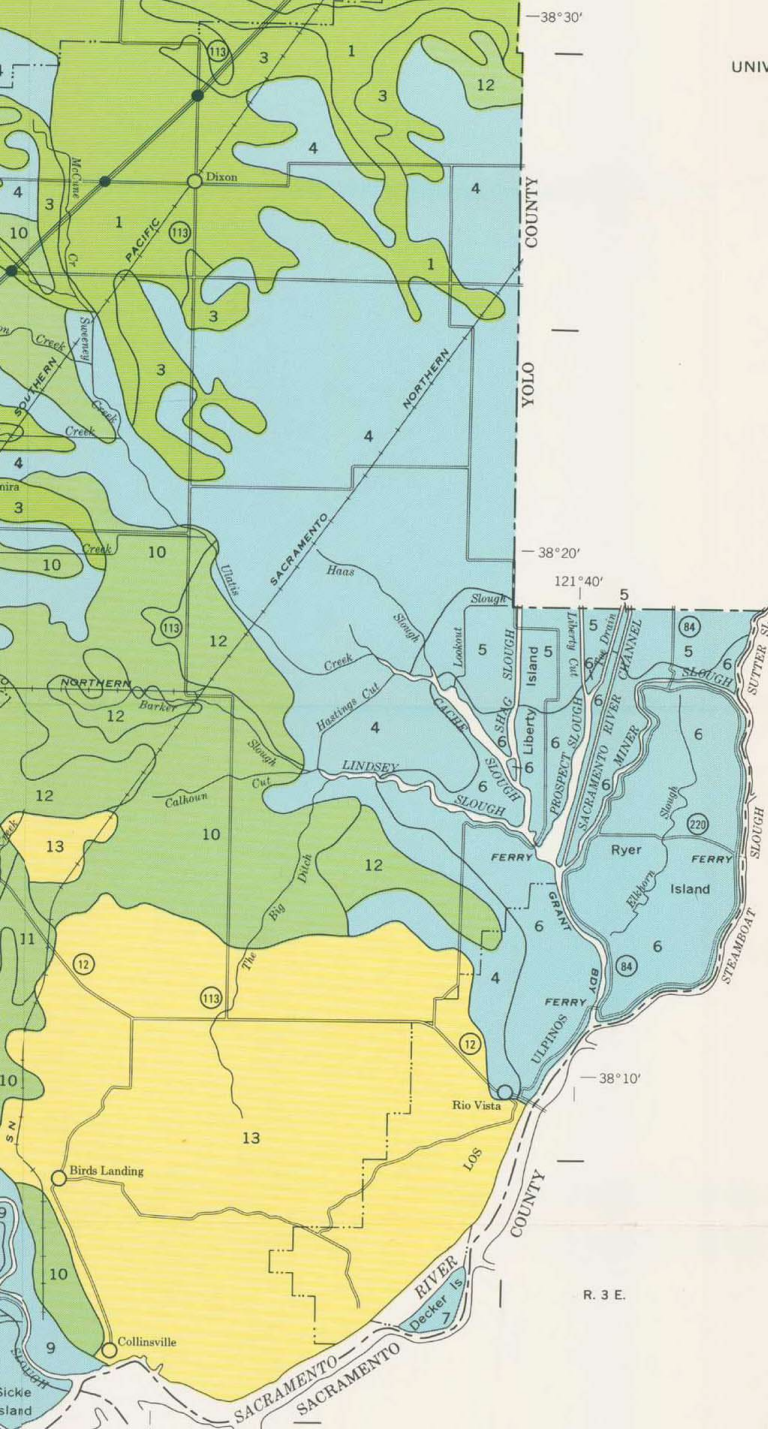
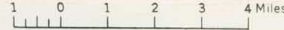
5-10-15 fertilizer has 5% N by weight, 10% P, and 15% K.

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE  
 UNIVERSITY OF CALIFORNIA AGRICULTURAL EXPERIMENT STATION

# GENERAL SOIL MAP

## SOLANO COUNTY, CALIFORNIA

Scale 1:126,720



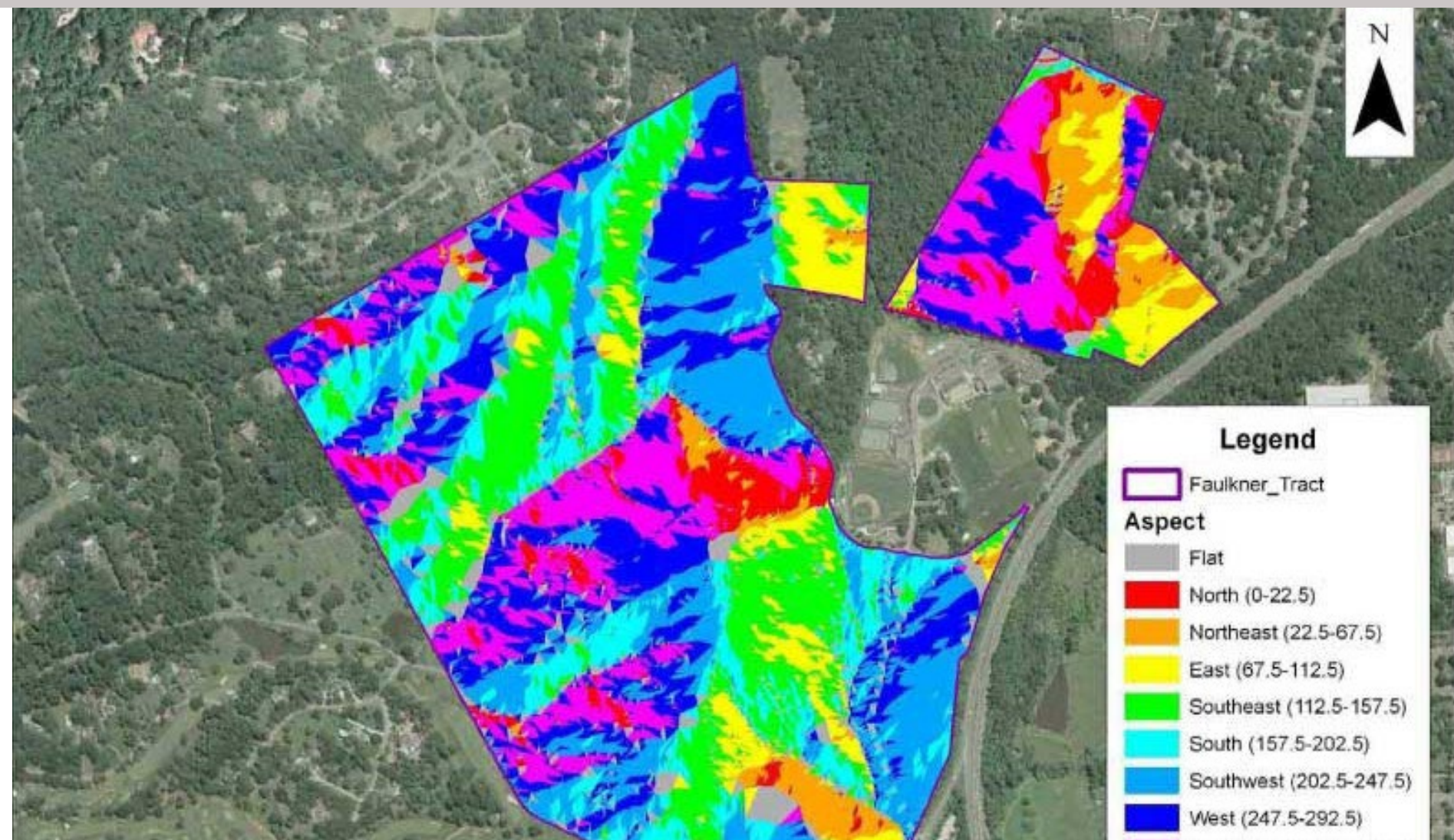
### SOIL ASSOCIATIONS

- NEARLY LEVEL TO MODERATELY SLOPING, WELL-DRAINED TO SOMEWHAT POORLY DRAINED SOILS ON ALLUVIAL FANS
- 1 Yolo-Bronwood association: Nearly level to moderately sloping, well-drained loams to silty clay loams; on alluvial fans
  - 2 Yolo-Sycamore association: Nearly level, well-drained and somewhat poorly drained silty clay loams; on alluvial fans
  - 3 Rincon-Yolo association: Nearly level to moderately sloping, well-drained loams and clay loams; on alluvial fans
- NEARLY LEVEL TO GENTLY SLOPING, MODERATELY WELL DRAINED TO VERY POORLY DRAINED SOILS ON BASIN FANS, ALLUVIAL FANS, AND DELTAS, AND IN BASINS, DREDGE SPOIL AREAS, AND SALT WATER MARSHES
- 4 Capay-Clear Lake association: Nearly level to gently sloping, moderately well drained and poorly drained silty clay loams to clays; on basin fans and in basins
  - 5 Sacramento association: Nearly level, poorly drained silty clay loams and clays; in basins
  - 6 Egbert-Ryde association: Nearly level, poorly drained silty clay loams and clay loams that are high in organic matter; in basins and on deltas
  - 7 Valdez association: Nearly level, somewhat poorly drained silt loams and silty clay loams; on alluvial fans and in dredge spoil areas
  - 8 Joice-Suisun association: Nearly level, very poorly drained mucks and peaty mucks; in salt water marshes
  - 9 Reyes-Tamba association: Nearly level, poorly drained and very poorly drained silty clay loams, silty clays, and mucky clays; in salt water marshes
- NEARLY LEVEL TO MODERATELY STEEP, WELL-DRAINED TO SOMEWHAT POORLY DRAINED SOILS ON TERRACES AND IN BASINS
- 10 San Ysidro-Antioch association: Nearly level to moderately sloping, moderately well drained sandy loams and loams; on terraces
  - 11 Corning association: Gently sloping to moderately steep, well-drained gravelly loams; on terraces
  - 12 Solano-Pescadero association: Nearly level, somewhat poorly drained loams to clays; on terraces and in basins
- GENTLY SLOPING TO VERY STEEP, WELL-DRAINED AND SOMEWHAT EXCESSIVELY DRAINED SOILS ON DISSECTED TERRACES AND MOUNTAINOUS UPLANDS
- 13 Altamont-Diablo association: Gently sloping to steep, well-drained clays formed from weakly consolidated sediments; on dissected terraces
  - 14 Dibble-Los Osos association: Gently sloping to steep, well-drained loams and clay loams formed from sandstone; on mountainous uplands
  - 15 Millishalm association: Moderately steep to very steep, well-drained loams formed from sandstone; on mountainous uplands
  - 16 Maymen-Los Gatos association: Moderately steep to very steep, somewhat excessively drained and well-drained loams formed from sandstone; on mountainous uplands
  - 17 Hambricht-Toomes association: Strongly sloping to very steep, well-drained and somewhat excessively drained loams and stony loams formed from basic igneous rocks; on mountainous uplands

\* The terms for texture used in the descriptive heading of the association apply to the surface layer.



# 4.4 Perform Topographical Analysis (eg slope analysis)



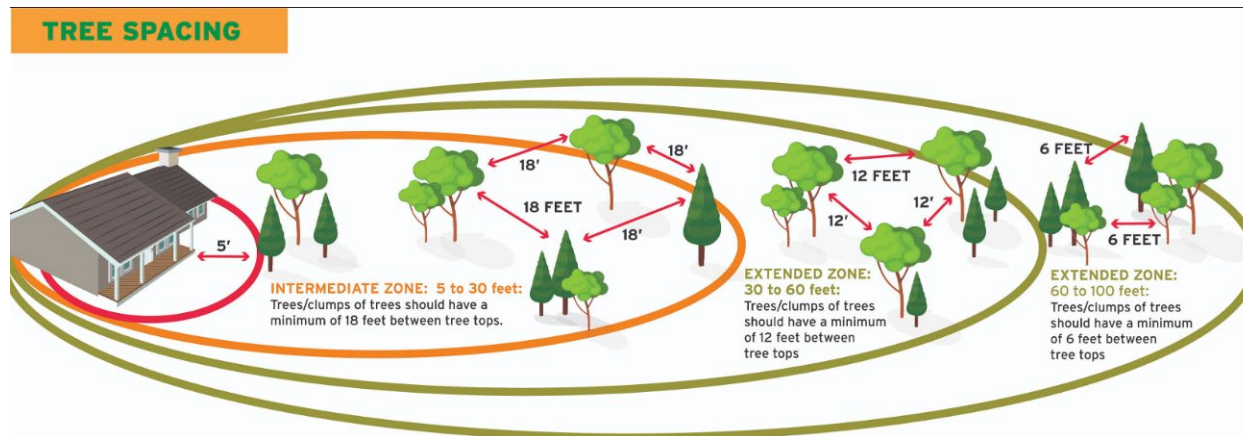
A Slope-Aspect Map



# 4.5 Identify Physical Opportunities and Constraints

Site Factors that contribute to risk of fire:

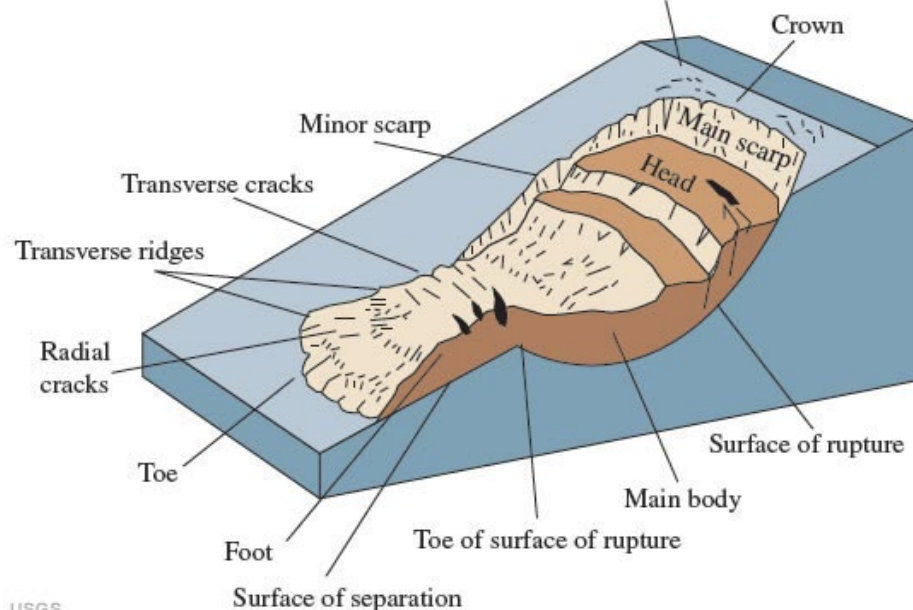
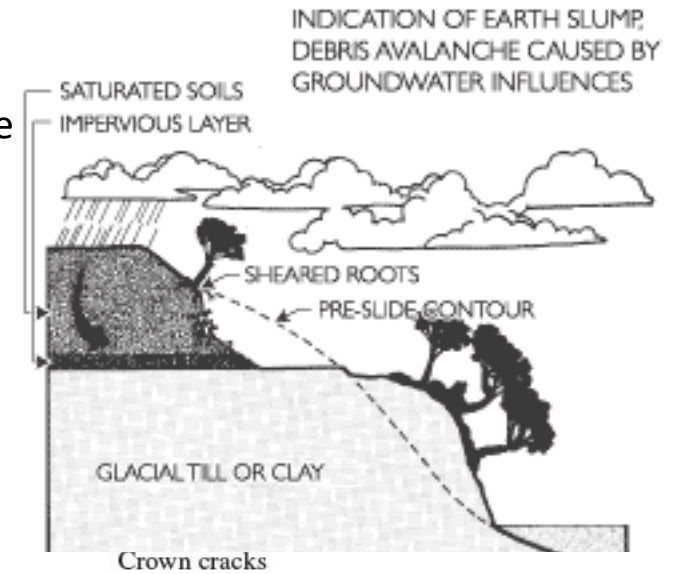
- Degree of development.
- Fuel loading (type and condition of vegetative cover, forest/understory structure)
- Seasonal weather patterns – rain, wind.
- Slope. Steep slopes are much higher risk due to wind acceleration and also much harder to access for fire crews.
- Aspect. Slopes that are dry, due to southern or western exposure, or that are exposed to heavy dry winds, are high risk, especially if assets are found upslope.
- Accessibility to fire protection assistance (i.e., response time, availability of helispots, proximity of air tanker attack bases, availability of woods workers, etc.).
- Proximity to communities or assets at risk.
- Historic fire data. State agencies keep detailed records of burn dates and areas.



# Assessing Site Risks: Landslides

## Estimation of Landslide Hazards – clues to look for on site

- Angle of repose – has the hillside been cut back, or natural slope
- Type of material: most hazardous is loose granular materials
- Angle of parent material (bedrock) to slope
- Seepage of water along hill
- Colluvial soils: indicates past history of slides
- History of slope activity (recent slides)
- Structural Damage – cracks in walls and foundations
- Hummocky Topography
- Scarps and Cracks
- Incongruent Vegetation: Patches of Younger, Very Different Vegetation
- Broken Trees (pistol handled, jackstrawed)
- Accumulation of Debris At Toe of Slope
- Light Tones Along Upper Edges of Stone Cliffs
- Changes in drainage patterns from upslope neighbors
- Undercutting (streams, highways)

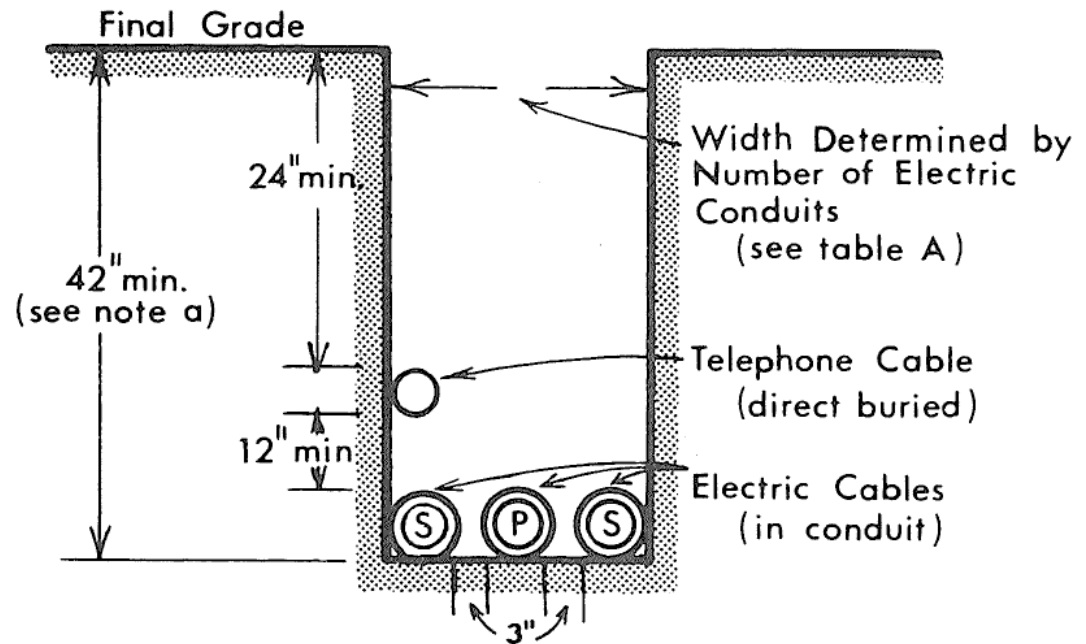


# 4.6 Perform Utility Analysis

(eg capacity, availability, proximity, suitability)

Different utilities have different connection and layout requirements. Wet and dry utilities are kept separate. Most wet utilities (except potable water) require positive drainage and get precedence if a conflict exists.

A Joint Trench consultant will help the design team lay out all the utilities by researching the vertical/horizontal separation requirements for each utility with the local utility companies and agencies.



Typical Joint Trench analysis section

# 4.7 Analyze Existing Environmental Variables

(eg contamination, erosion, air quality, water quality, microclimate)

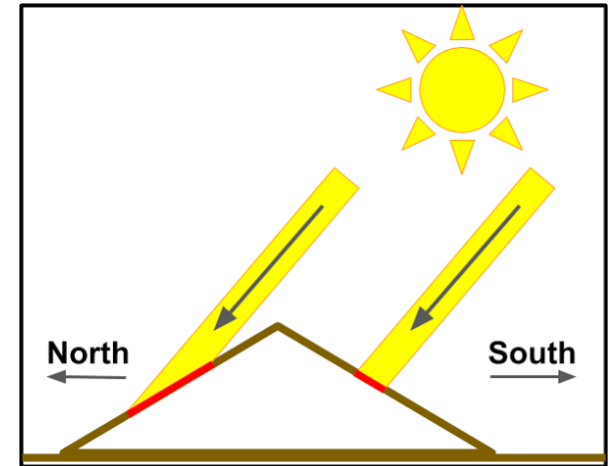
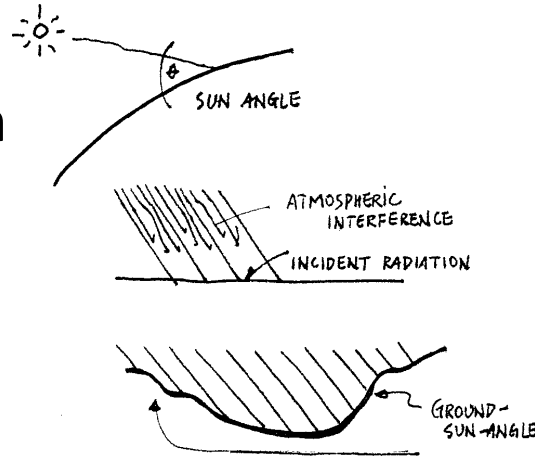
How to do an Environmental Site Assessment per ASTM E-1528

- Transaction Screen
  - Site walkthrough with checklist
- Phase I Environmental Assessment
  - A more intensive assessment of contamination hazard
- Phase II Environmental Assessment
  - Includes sampling and testing of soils, suspect liquids and groundwater



# Topography and Sun

- **Sun Angle:** The angle formed between sun and the earth's surface.
- **Ground-sun angle:** Takes local topography into account.
- **Incidence/Insolation:** The density of light hitting the surface; amount of radiation per area



# Solar Factors: SRI

The Solar Reflectance Index (SRI) is a more modern measure of a surface's ability to reject solar heat.. Materials with the highest SRI values are the coolest choices for surfacing materials.

Don't memorize numbers other than maybe the SRI limit of 29 for LEED/SITES credit. Know that **low numbers are bad**.

<u>Material Surface</u>	<u>Solar Reflectance</u>	<u>Emittance</u>	<u>SRI</u>
New asphalt	0.05	0.9	0
"White" asphalt shingle	0.21	0.91	21
Red Clay Tile	0.33	0.9	36
Lt Colored Honed Limestone	0.53	0.89	62
Aged concrete	0.2-0.3	0.9	19-32
New concrete (ordinary)	0.35-0.45	0.9	38-52
Colored Concrete	0.08-0.59	0.9	1-71
New white PCC*	0.7-0.8	0.9	86-100
Masonry 0.9	1-65		

# 4.8 Perform Circulation Analysis

(eg multimodal, access, non-motorized, connectivity)

## TYPICAL TRIP GENERATION RATES

USE	UNIT	TRIP RATE PER UNIT	FOR PERIOD <sup>(1)</sup>
<b>Office</b>			
Office Building	Employee	0.49	Weekday—AM Peak Hour
Office Building	Employee	0.46	Weekday—PM Peak Hour
Office Building	1,000 ft <sup>2</sup> GFA <sup>(2)</sup>	1.55	Weekday—AM Peak Hour
Office Building	1,000 ft <sup>2</sup> GFA	1.49	Weekday—PM Peak Hour
Medical-Dental Office	1,000 ft <sup>2</sup> GFA	3.62	Weekday—AM Peak Hour
Medical-Dental Office	1,000 ft <sup>2</sup> GFA	4.45	Weekday—PM Peak Hour
<b>Residential</b>			
Single-Family Detached	Dwelling Unit	0.77	Weekday—AM Peak Hour
Single-Family Detached	Dwelling Unit	1.02	Weekday—PM Peak Hour
Apartment	Dwelling Unit	0.55	Weekday—AM Peak Hour
Apartment	Dwelling Unit	0.67	Weekday—PM Peak Hour
<b>Retail</b>			
Shopping Center	1,000 ft <sup>2</sup> GLA <sup>(3)</sup>	1.03	Weekday—AM Peak Hour
Shopping Center	1,000 ft <sup>2</sup> GLA	3.75	Weekday—PM Peak Hour
Shopping Center	1,000 ft <sup>2</sup> GLA	4.90	Saturday—Peak Hour
24-Hour Market	1,000 ft <sup>2</sup> GFA <sup>(2)</sup>	73.10	Weekday—AM Peak Hour
24-Hour Market	1,000 ft <sup>2</sup> GFA	53.42	Weekday—PM Peak Hour
Supermarket	1,000 ft <sup>2</sup> GFA	12.02	Weekday—PM Peak Hour
<b>Restaurant</b>			
Quality Restaurant	Seat	0.33	Saturday—Peak Hour
Sit-Down Restaurant	Seat	0.88	Saturday—Peak Hour
Bagel Shop	Seat	6.33	Saturday—Peak Hour
Church	Seat	0.63	Sunday—Peak Hour

### Notes:

1. Peak hours vary by use.
2. GFA = Gross Floor Area
3. GLA = Gross Leasable Area

Source: ITE Trip Generation, 7th Edition, 2003.

Standards used for traffic studies, *Planning and Urban Design Standards*

	Level of Service
A	
B	
C	
D	
E	
F	

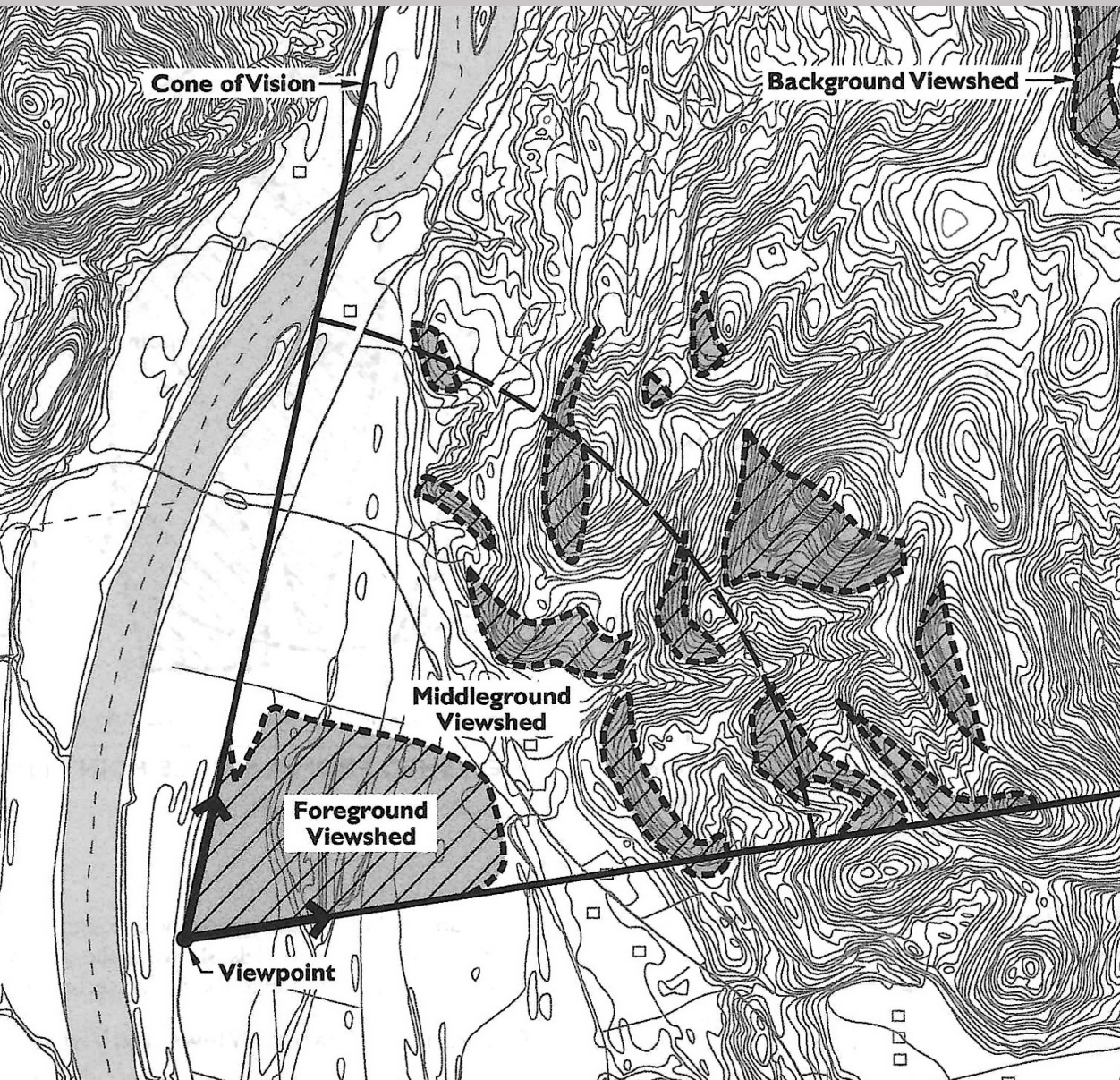
### LEVEL OF SERVICE

Source: Bucher, Willis & Ratliff Corporation.



# 4.9 Perform Visual Resource Analysis

(eg view sheds, view corridors, aesthetics)



More recently this type of analysis has been performed using Cone of Vision and Foreground/ Middleground/ Background viewshed analysis.

Planning and Urban Design Standards



# Visual Resource Analysis

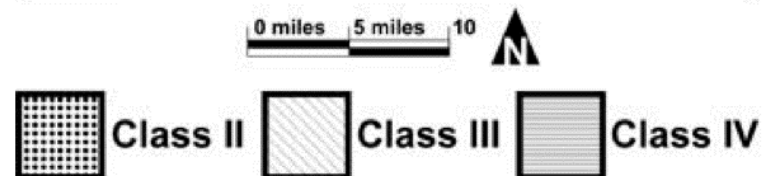
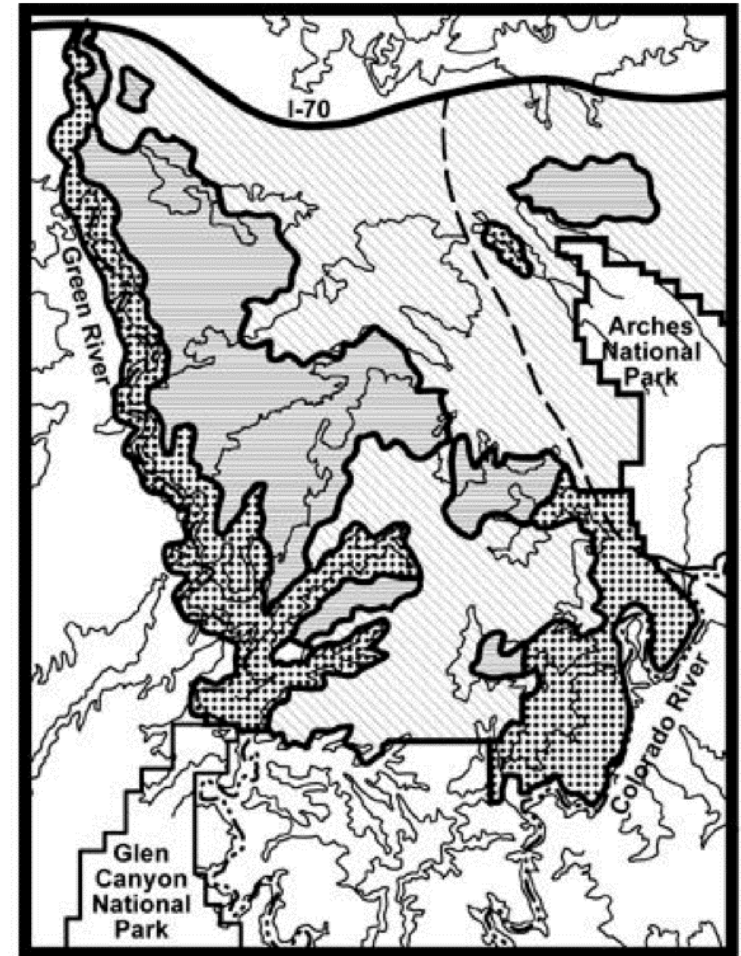
**Class I Objective:** To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.

**Class II Objective:** To retain the existing character of the landscape. The level of change to the characteristic landscape should be low

**Class III Objective:** To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.

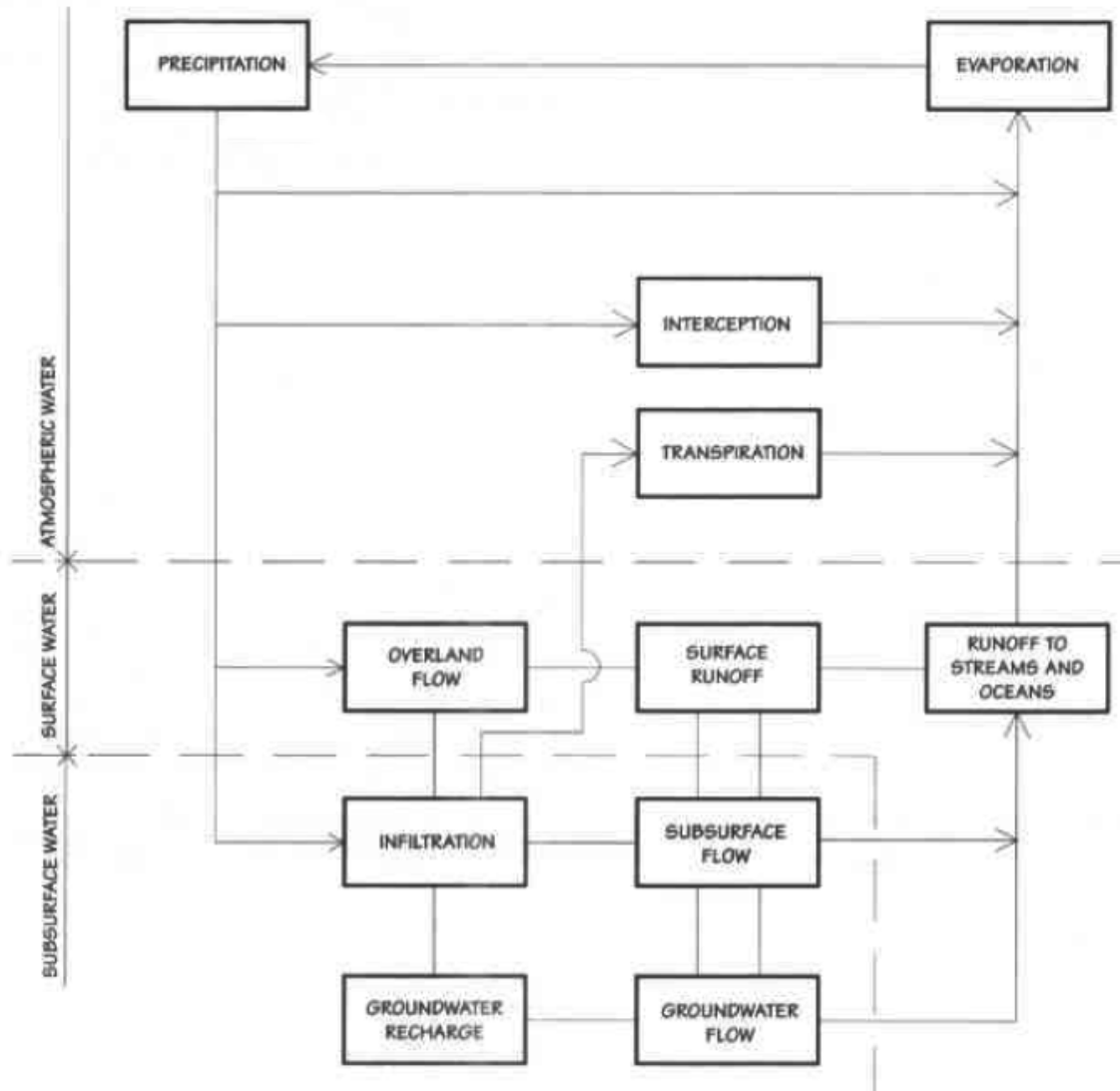
**Class IV Objective:** To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

This example shows a visual assessment for parkland in Utah where there are landscape features of national visual significance. The assessment was used to guide placement of development to avoid degrading areas of high visual character.



# 4.10 Perform Hydrological Analysis

(eg floodplain, site drainage, watershed, surface, subsurface)



# 4.11 Review Ecological Analysis (eg habitat, biodiversity, ecosystems)

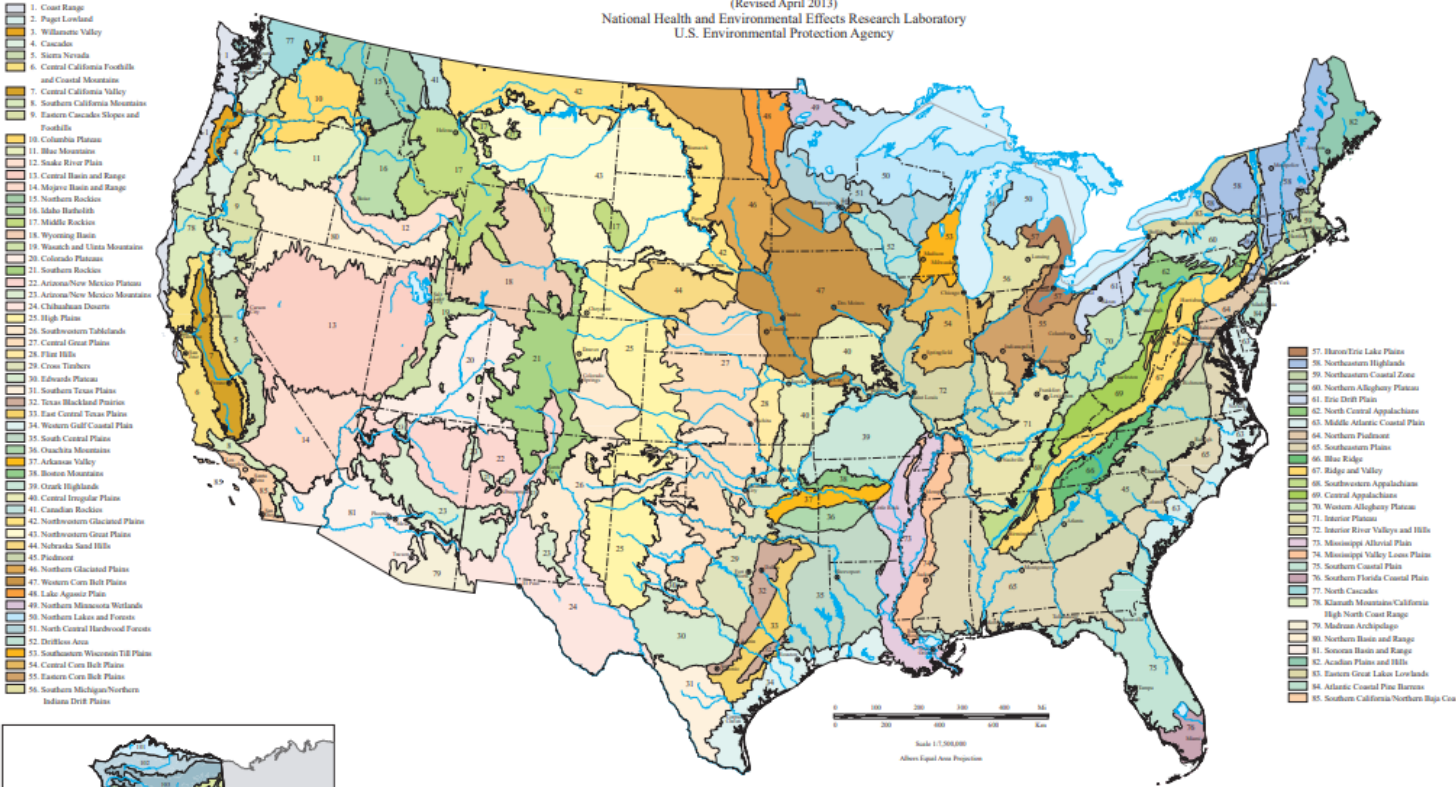
- More biodiverse habitats are generally considered to be healthier ecosystems within habitat types (forests, meadows, grasslands, tundra, etc.)
- Presence and predominance of invasive species is an indicator of less healthy or less mature habitat types.
- Development can destroy or fragment habitats. Smaller fragments are generally able to support lesser populations of wildlife or less diverse populations of wildlife.
- Removal of vegetation through logging, mining, or clearing for agricultural or other human uses can severely alter habitat suitability for both terrestrial and aquatic habitats.
- Wildfire and other catastrophic events can drastically alter ecosystems and return areas to pioneering stages in vegetation succession.
- Soil erosion severity can be impacted by removal of vegetation, winds, storm runoff, and slope steepness or slope instability.
- Pollution due to human uses can negatively impact soil health, surface and groundwater, and vegetation, wildlife, and human health.
- Rare and endangered species of plants and animals usually occupy fairly narrow ecological niches which is why they are rare and very sensitive to change in their environments.

# Omernik Ecoregions

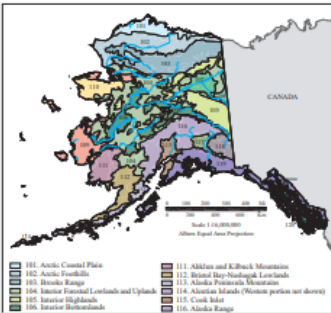
## Level III Ecoregions of the Continental United States

(Revised April 2013)

National Health and Environmental Effects Research Laboratory  
U.S. Environmental Protection Agency



Omernik Ecoregions EPA has mapped the entire US and categorized into Levels I, II, III and IV, with Level IV the most specific and small. Zones are available as GIS shapefiles or PDFs.



Ecoregions are areas where communities (and the types, quality, and quantity of environmental resources) are generally similar. This concept is based on a synthesis of the 1977 and 1987 data, supported first by a synthesis of the U.S. EPA regional office field reports, then by a synthesis of regional and national data. The synthesis was done by a synthesis of regional and national data. The synthesis was done by a synthesis of regional and national data.

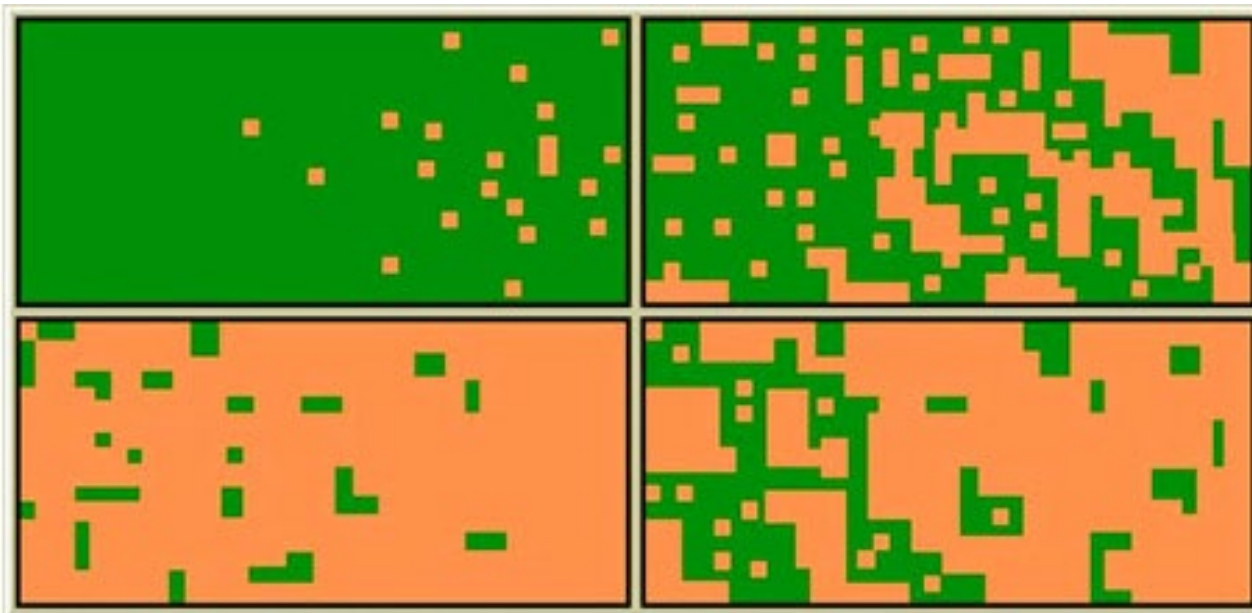
Continental United States (CONUS) Ecological Regions of North America: Levels I, II, and III. The synthesis was done by a synthesis of regional and national data. The synthesis was done by a synthesis of regional and national data.



The names and identification numbers for the North American Level I, II, and III ecological regions are given in CRC 1997, 2006.

# Landscape Ecology

Matrix, fragmentation, patches and corridors are used to understand how much development can be permitted before an ecosystem ceases to function



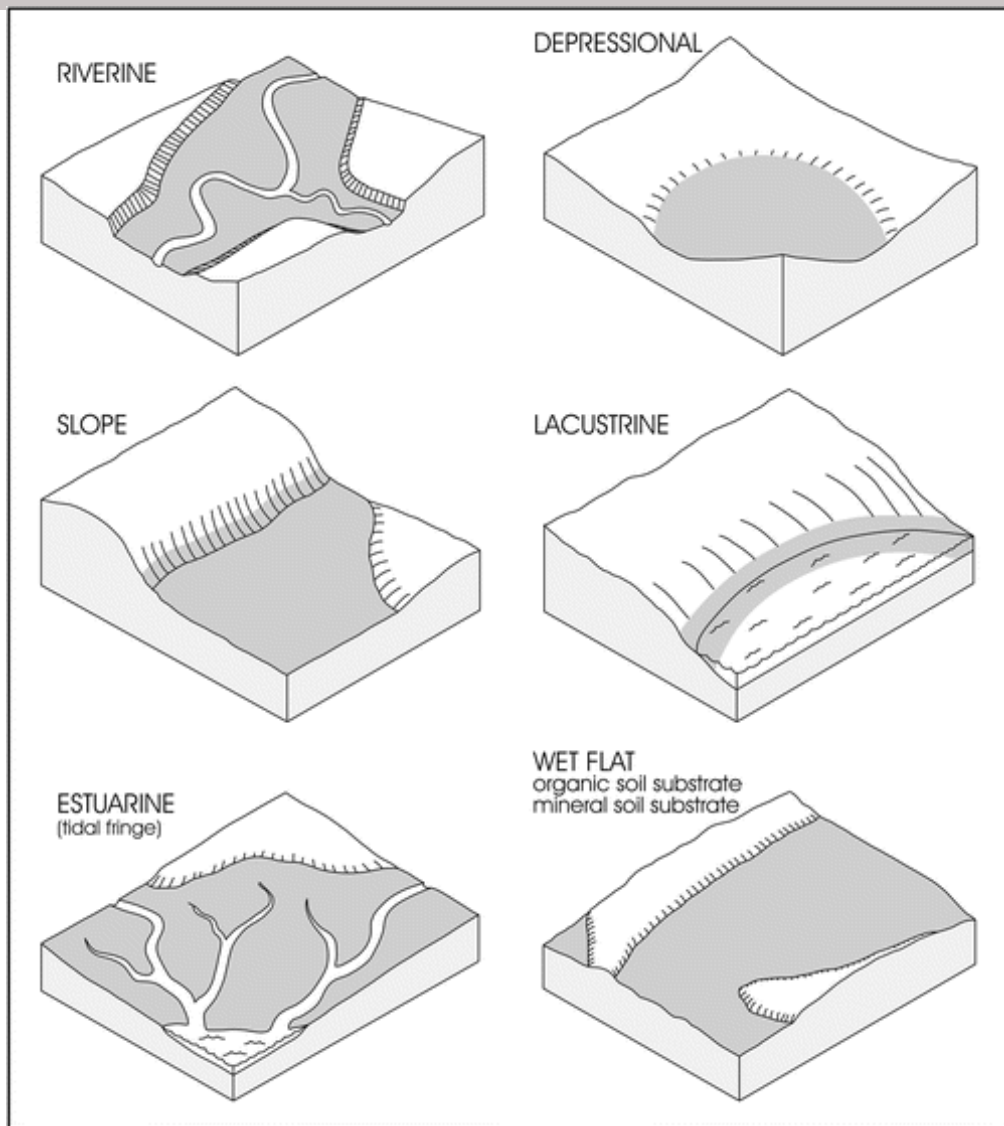
**Figure 3: Process of landscape fragmentation**

Fragmentation can be summarized in several different phases. Clockwise, from the upper left panel: (a) perforation (initial small openings), (b) dissection (larger intrusions of change, often along physical features), (c) dissipation (spread and coalescing of alteration), and eventually, (d) shrinkage (reduction of patch size), and attrition (loss of patches).

© 2010 Nature Education Courtesy of Michigan Forests Forever Teachers Guide. All rights reserved. 

The modern Greenway Movement is a result of insights from this discipline.

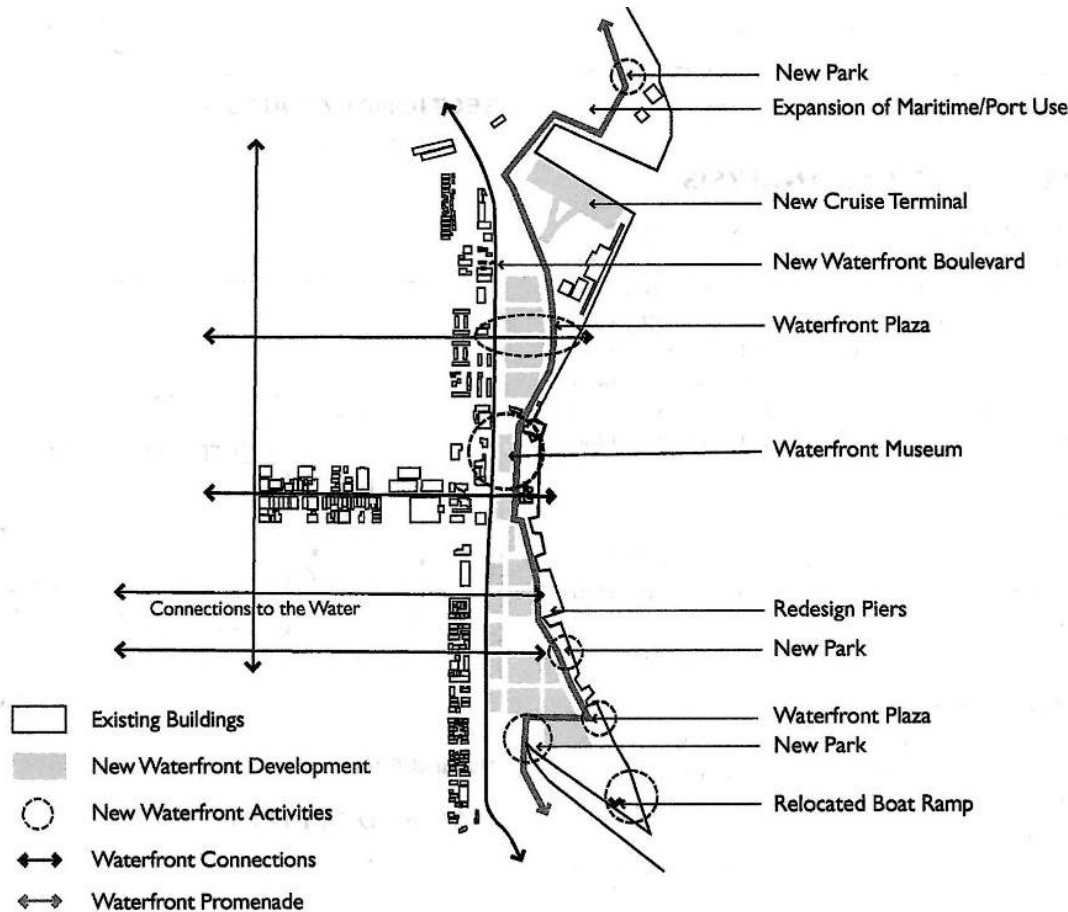
# Hydrogeomorphic Classification for Wetlands



## Seven classes:

- Riverine (rivers and streams)
- Depressional (ie. vernal pools, pocosins, etc.)
- Slope (Artesian wells, seeps, other places where groundwater discharges to the surface but does not accumulate)
- Mineral Soil Flats (dry lakes, etc)
- Organic Soil Flats (peat bogs)
- Tidal Fringe (ocean edges)
- Lacustrine Fringe (lake edges)

# 5.1 Anticipate Impacts of Future Developments



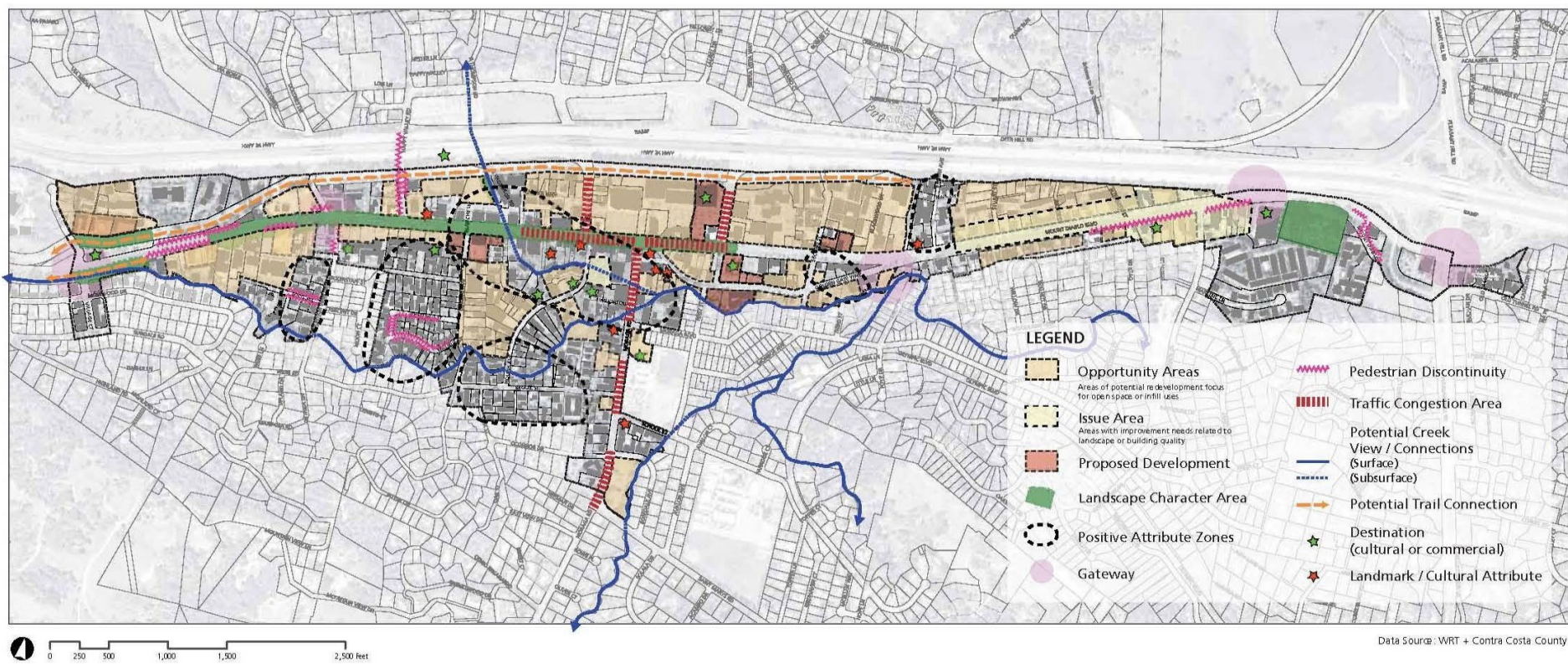
## COORDINATED FRAMEWORK PLAN

Source: SMWM 2005.

Cities prepare Framework Plans to anticipate future development.

- They build on previous planning efforts
- Aimed at setting goals and standards for an area defined by a single issue
- Intended to be flexible over time
- Leave some areas undefined to allow for future decisionmaking based on opportunities that may arise in the future

# 5.2 Identify Contextual Constraints and Opportunities



## Lafayette Downtown Strategy Opportunities and Issues Map

October 30, 2007



# 5.4 Conduct Code Compliance Review

QAQC is 'Quality Assurance/Quality Control' and it is shorthand for one of the Prime Consultant's most important duties. A knowledgeable senior designer sits down with a complete set, including drawings from all disciplines, and looks for coordination errors or holes in the documents. Checking for code compliance is part of this review. Some places where these errors are often found:

- Utility lines planned in tree root zones
- Grading errors around swimming pools or accessible routes
- Power supply for irrigation
- Drainage connections for drains behind retaining walls
- Drains under play surfacing, drainlines for fountains and containers on structure
- Horizontal clearances at gates, ramps, and stairs
- Egress routes from fenced areas to public streets or assembly areas

# How to Study

## **ORGANIZE YOUR STUDY TIME**

It is best to set up a regular study schedule. Many short sessions are better than a few cram sessions. Can you devote 2-3 hours a week to study, in 30-60 min segments? Block this time out on your calendar and make it realistic given your work and family commitments.

Figure out how many weeks you have and assign a topic or two to each week. Make a study plan.

### **Each session:**

- Start with something easy and pleasant – 5-10 minutes of flashcards is a good beginning.
- 30-40 minutes of reading – review CLARB’s reference books first and then our additional recommendations. Skim for graphics and vocabulary if you have a hard time focusing on reading. Try to understand concepts rather than memorizing numbers or formulas (other than the ones we’ve reviewed today).
- 10 minutes of practice exams

### **Do you have exam anxiety?**

We highly recommend some regular mindfulness practice to defuse the emotional charge around this upcoming event. I have been experimenting with the online course ‘Waking Up’ but also can recommend free lectures by Tara Brach available online. Regular exercise, relaxing with your family or pets, or forest bathing may work too. Be kind to yourself and find ways to enjoy this part of your life while you are doing the work. <3

# Turbocharge your effort by forming a Study Group!

A study group needs to be organized just like any project team. Someone needs to take the lead, but there are many online resources that can make this easier. We've set up a Google Sheet to organize this group's contact information. Try to find a few people whose experience is different than yours, by region or by specialization.

- It is often easiest to divide into groups by time zone.
- Schedule regular meeting times. It's okay if you can't make every session but commit to a regular time and set up a calendar invitation so that you won't let it slide to the bottom of your to-do list.
- For each meeting, it works well to divide your time into two or three parts. Maybe start with a review of a reference document, and then move on to doing practice tests. Don't worry about perfection.
- Divide up time-consuming tasks like reading reference books. Take turns summarizing what you think is most important from the books on CLARBs and our list.
- Do practice exams before you meet, review them together and talk about what makes an answer right or wrong. You will learn a lot by just talking about practice questions – especially AIT questions.
- Use CLARB's online Demonstration Exam tools to do calculations and make notes during your practice sessions. Can you build comfort and speed using these tools before test day? Share tips and tricks.
- Write practice questions for each other, especially if you struggle with being able to see what the purpose of a question is. Questions usually have one correct answer and several 'distractors' that are not quite correct. How would you write a fair but difficult question?
- Some study groups make summary sheets or flashcard decks. I have heard that the process of doing this for yourself is more valuable than just using one someone else has made. Make use of Quizlet or Anki.
- Provide each other with positivity and support. Follow up after test day and encourage each other.
- After test day you may find that your study cohorts become long-term friends and resources. I did. Don't be afraid to stay in touch and ask each other technical questions as you continue on with your career.