Site Planning and Water Conservation

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Site Planning

Site Selection Criteria

- No harmful chemicals or toxics on or near the site.
- Good air quality near the site (e.g., no major pollution sources).
- Acoustics (quiet).
- Little impact on the environment (Preserve habitat and natural resources).
- Sites with existing buildings that can be retrofitted.
- Existing infrastructure (water, power, etc.).
- Close to the “customer”.
- Near public transportation.

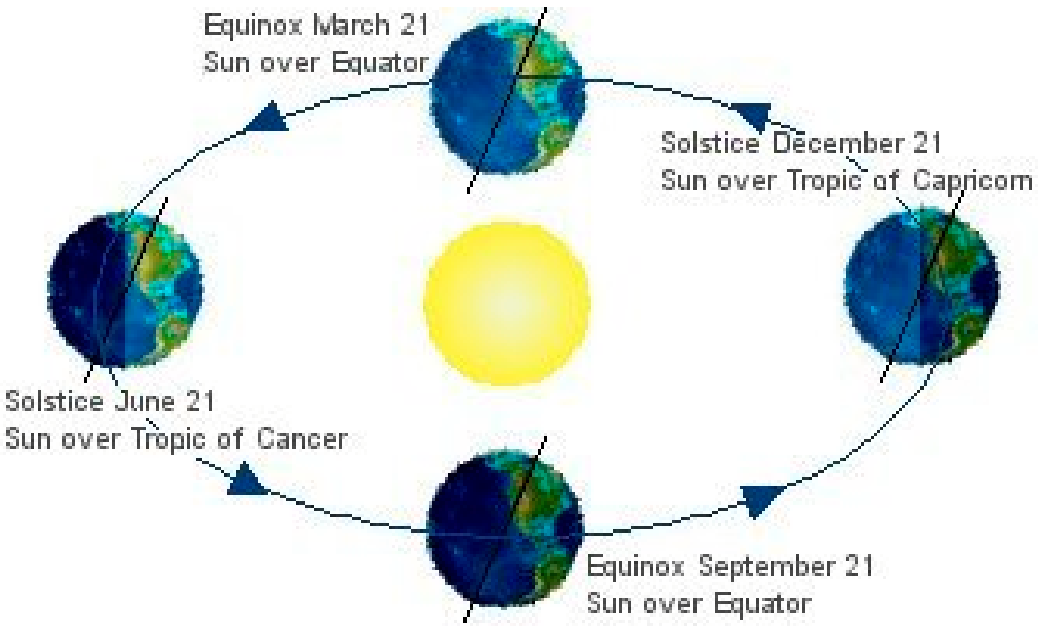
Site Plan Should Consider…

- Energy efficiency.
- Water efficiency.
- Material efficiency.
- Protection of the natural ecosystem.
- Acoustic, thermal, and visual comfort.
- Health and indoor air quality.
- Security and safety.
- Connection to neighborhood and community.
- Learning from nature.
- Space for playing.

Site Planning Criteria

Orientation

- The Sun's position is easy to calculate and identify
- Why would anyone design a building ignoring the position of the sun???
- Think before designing windows that face West or East



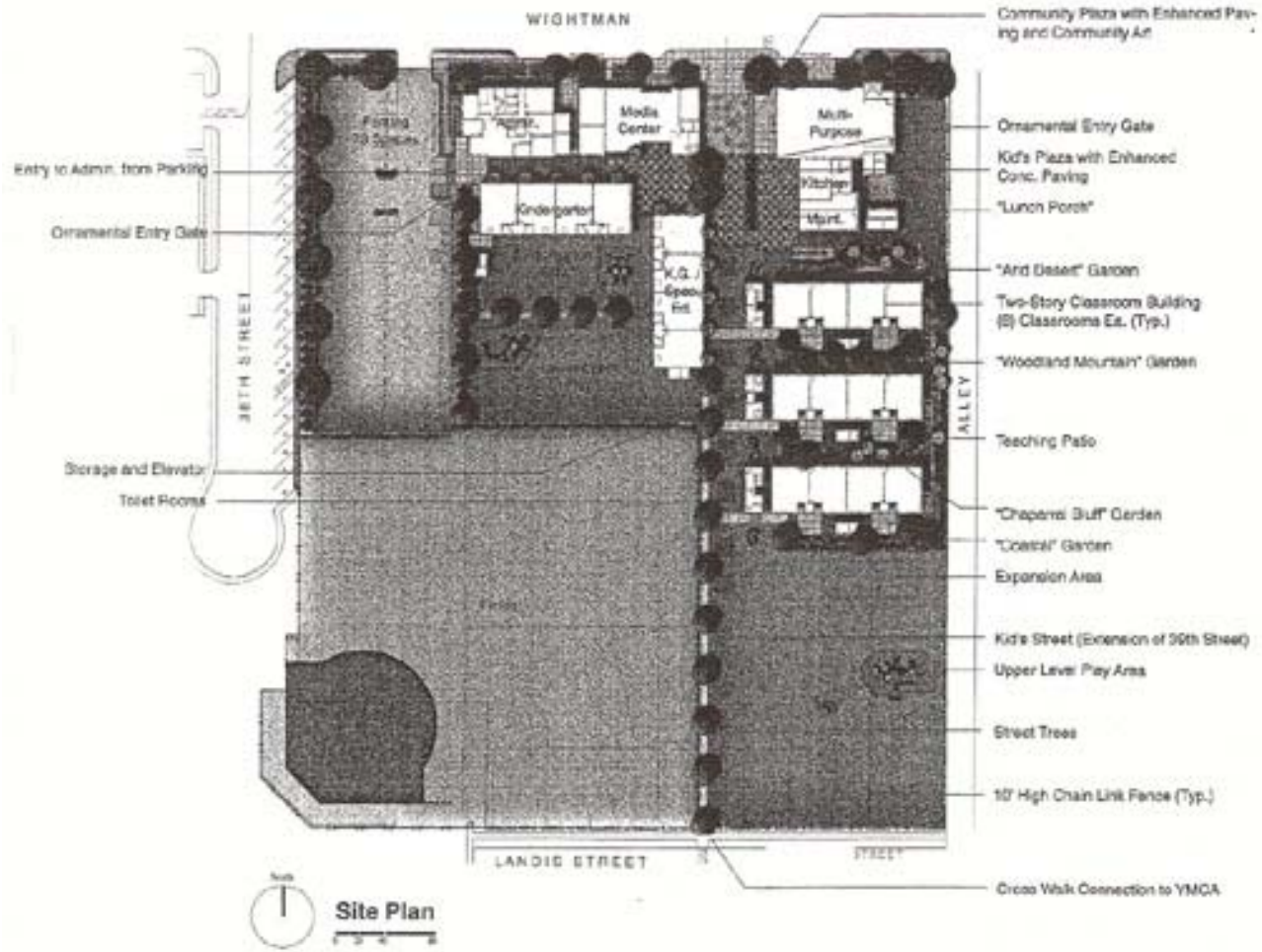
Orientation Basics

- East-west orientation to maximize north-south day-lighting.
- Width of building less than 60 feet for daylight and ventilation.
- Single story designs for top-lighting daylight strategies.
- Use shade and airflows for summer cooling and winter heating/wind protection.

Optimum Building Orientation

- Face major windows either north or south.
- Position classrooms so light and air can enter from two sides.
- Locate teaching areas away from noise sources, like roadways.

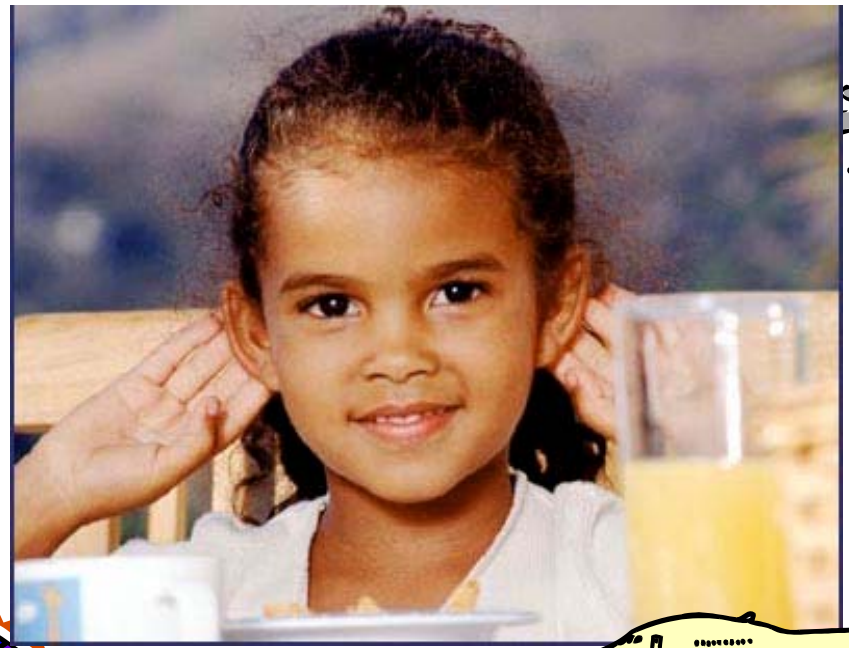
What's so hard about orientation?

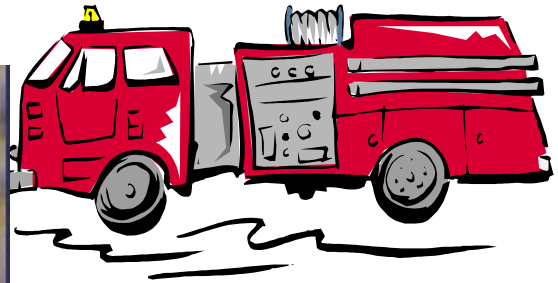


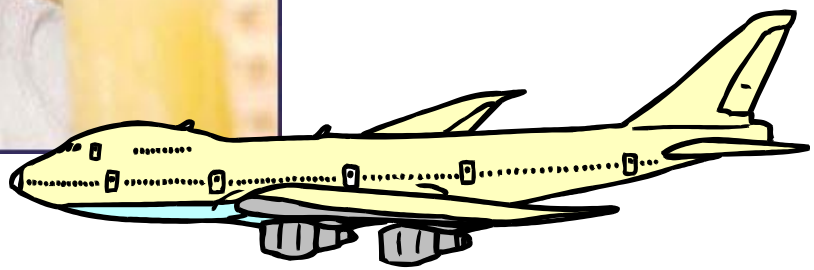
Cherokee Point Elementary School
San Diego Unified School District

Courtesy RNP Architects

Acoustics







Acoustics

Building orientation significantly affects acoustical performance:

- Locate noise producers away from noise sensitive areas.
- Solid walls or berms of earth can reduce sound intrusion.
- Double glazed windows can control exterior noise; normal therma-pane double paned windows not effective.
- For low frequencies (traffic or aircraft noise), 2 – 4 inches of airspace and thicker laminated glass may be needed.

Protecting and using natural features

Protecting and Using Natural Features

A high performance school responds to its site:

- Use shade and airflows for summer cooling and winter heating/wind protection.
- Reduce parking and building footprints.
- Keep long buildings and parking areas parallel to landscape contours to minimize land disruption.
- Preserve local vegetation and landscape with indigenous plants to restore damaged areas.

Zoning of the site for community access

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High performance schools are an important part of the local community:

- Consider community gardens, school parks, meeting rooms.
- Consider multi-use facilities like day care, laundry, cafes.
- Joint-use partnerships with local nonprofit organizations can fund and share facilities.
- Connect to community through bike paths and public transportation.

Transportation and Site Planning

- Use site design to connect the school to the community.
- Locate schools and design school sites to encourage car/vanpooling and pedestrian modes of transportation, rather than single-use automobile transportation.
- Incorporate safe and effective parking and storage for bicycles, skateboards, roller blades, scooters, etc.

Water Conservation and Landscaping

Overview

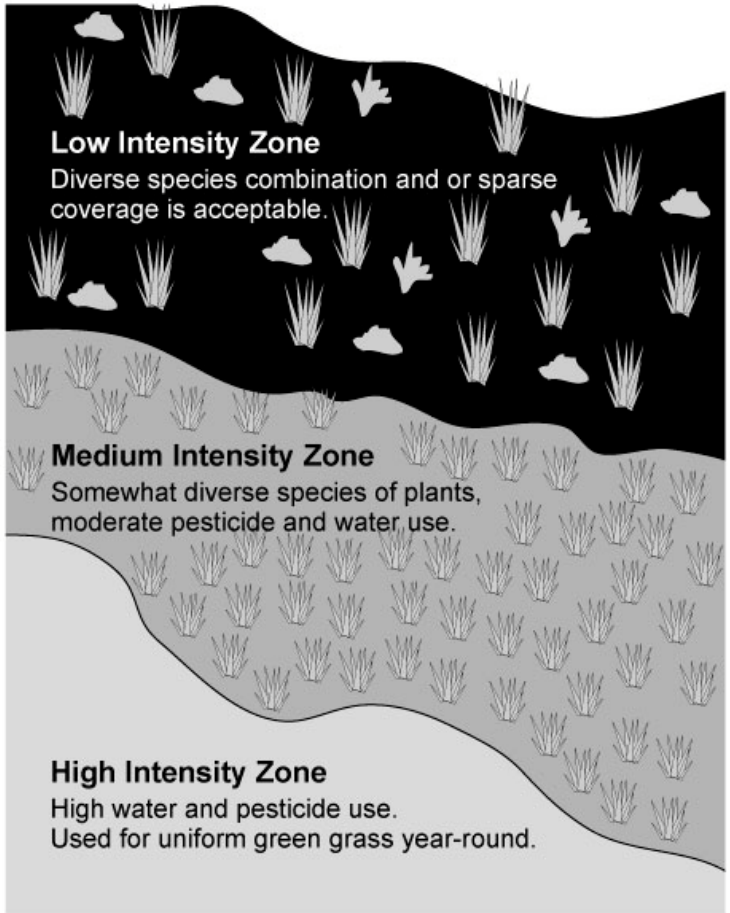
- Design landscaping to use water efficiently by reducing water use and specifying hardy, native vegetation.
- Use recycled water for non-potable purposes.
- Set water use goals for the school and use efficient plumbing fixtures for urinals, showers and faucets.

Landscaping & Irrigation Design Goals

- Protect and/or restore the site.
- Incorporate the site's natural features to achieve high performance.
- Select environmentally preferable products.

Landscape Design and Management

- Develop a landscape plan based on an ecological approach, emphasizing plant diversity, natural lawn care, and resource conservation.
- Include objective plans, tasks, standards, and requirements that provide information about how to create a healthy and attractive landscape.



Native and Drought-Tolerant Plants

- Use vegetation that is drought-tolerant and native to the school's climate area.
- Preserve existing vegetation, especially groups of plants or significant specimens wherever possible.
- Design with hearty plants.
- Design landscapes with a minimal water-use budget, using low-flow irrigation systems.

Issues Related to Turf (ball fields)

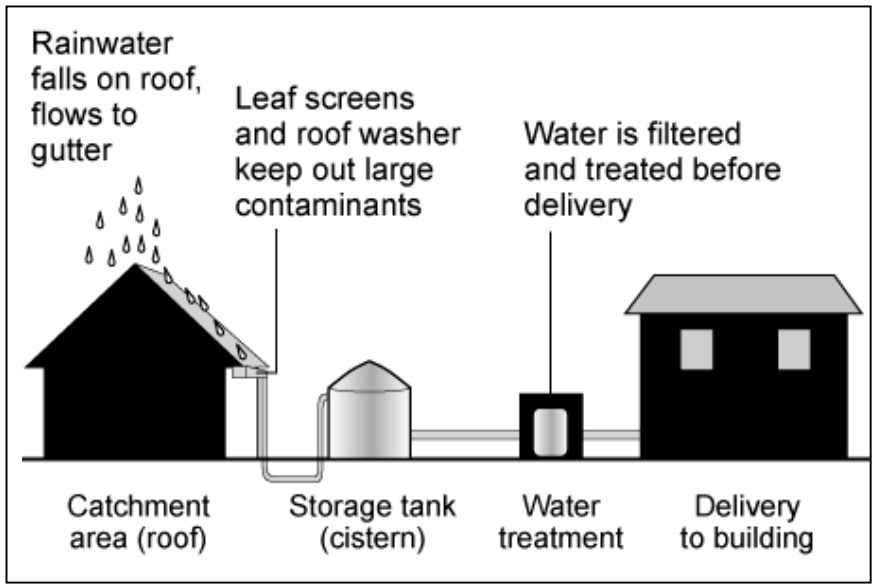
- Requires more irrigation.
- Higher cost and air pollution from maintenance.
- Liability and storm water issues related to pesticides and fertilizers.
- If close to buildings, may reduce temperature and glare to building.

Storm water Management

- Manage storm water with systems that slow water velocity, maximize its use for irrigation, and filter pollutants.
- Use material-efficient options for on-site drainage systems.
- Groundwater should be managed separately from surface water.

Rainwater Collection

- Consider rainwater collection systems to provide potable or non-potable water to the site.
- Rainwater can be used for showers, sinks, toilets, dishwashers.
- Weather conditions limit the applicability of these systems in colder climates.



Efficient Plumbing Fixtures

- Low-flow fixtures, toilets, and urinals can reduce water consumption by 15-20%.
- Installing low-flow devices is simple and cost effective.