

**Transfer
Stations:
Getting
Better
All the
Time**

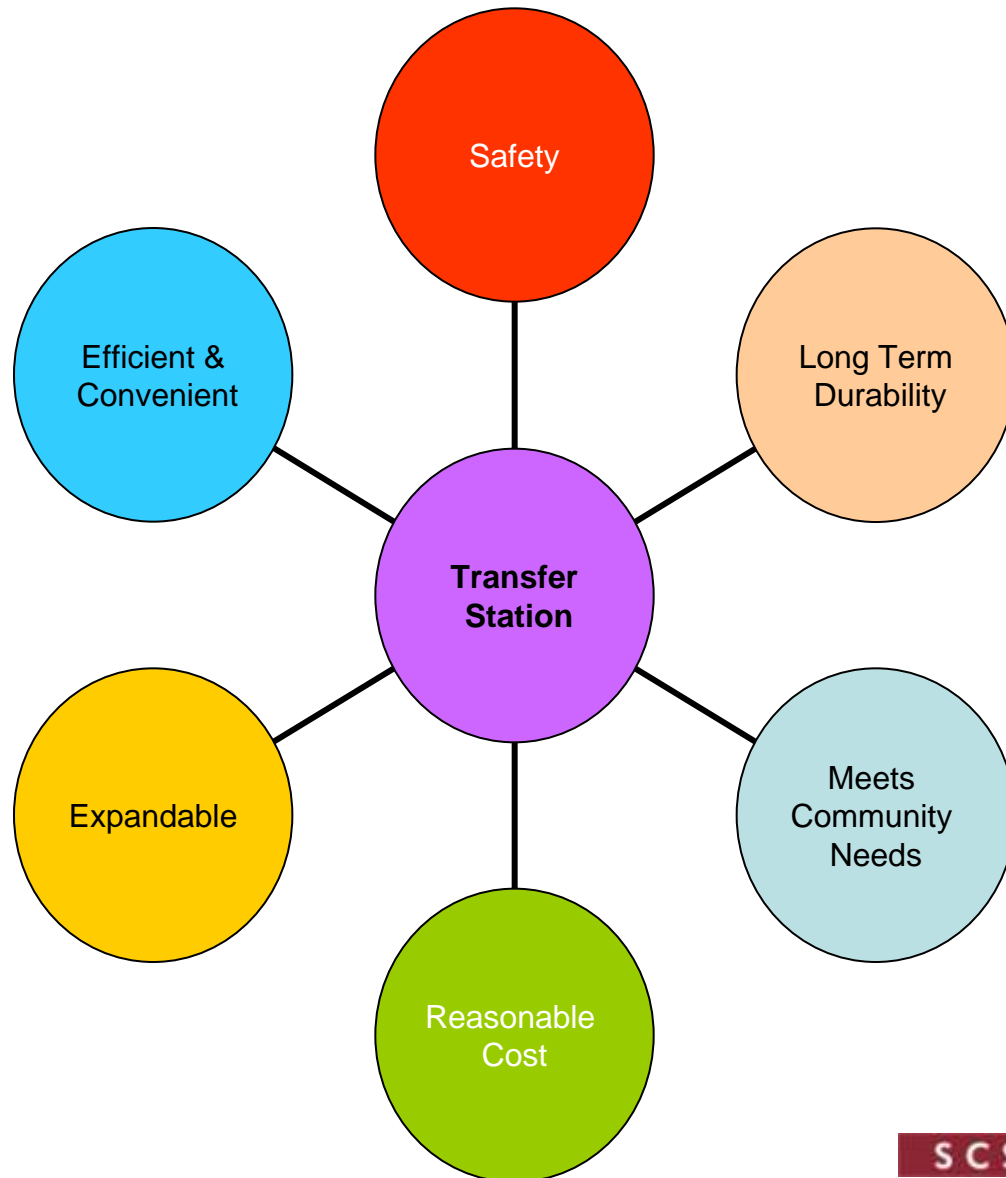
**Bruce Clark, P.E.
SCS Engineers
April 28, 2010**



Overview

- Planning Aspects
- Facility Design & Renovation Considerations
- Some Green Building Considerations

Facility Requirements



Basic Design Function Criteria

- Community Engagement (architecture, landscape, traffic, access, drainage, odor, etc.)
- Design Capacity & Future Expansion
 - Queuing
 - Scale
 - Tipping / transfer
 - Processing & storage
- Site Area Requirement
- LEED Building Certification Consideration
- Codes and Standards
- Load-out Design (top load, compactor, rail car, etc.)
- Rail Spur Access
- Type Material of Construction
- Traffic Generation & Flow
 - Consider effect of heavy traffic in sensitive areas
 - Separation of public & commercial
 - One-way flow if possible
- Odor and Dust Controls
- Processing Capabilities
- ADA Consideration (office, scales, other public buildings)
- Parking, Trailers, Office, Scale, etc.
- Covered Areas Outdoors / Drive-through Access
- Utilities (fire protection, sewage, etc.)
- Drainage Controls / Contact Liquids
- Public Access (recycling, educational, fall protections, etc.)
- Site Design (min. cut & fill, large radius turns, generous maneuvering areas)
- Ancillary Buildings (HHW, fueling, garage, visitor center, etc.)



Aesthetics / Architecture

Heritage Preservation

- Takes cues from historic use of area; maritime, industrial (former gas plant)
- Liberal use of brick facing



Contemporary

- Employs lots of angular surfaces, multiple roof lines, offsetting walls
- More “commercial office” than industrial look



Utilitarian / Purpose-Built

- Function over form
- “Industrial” look
- Few architectural adornments



Planning - Capacity

Planned 16 per hour. Wait = 5 minutes

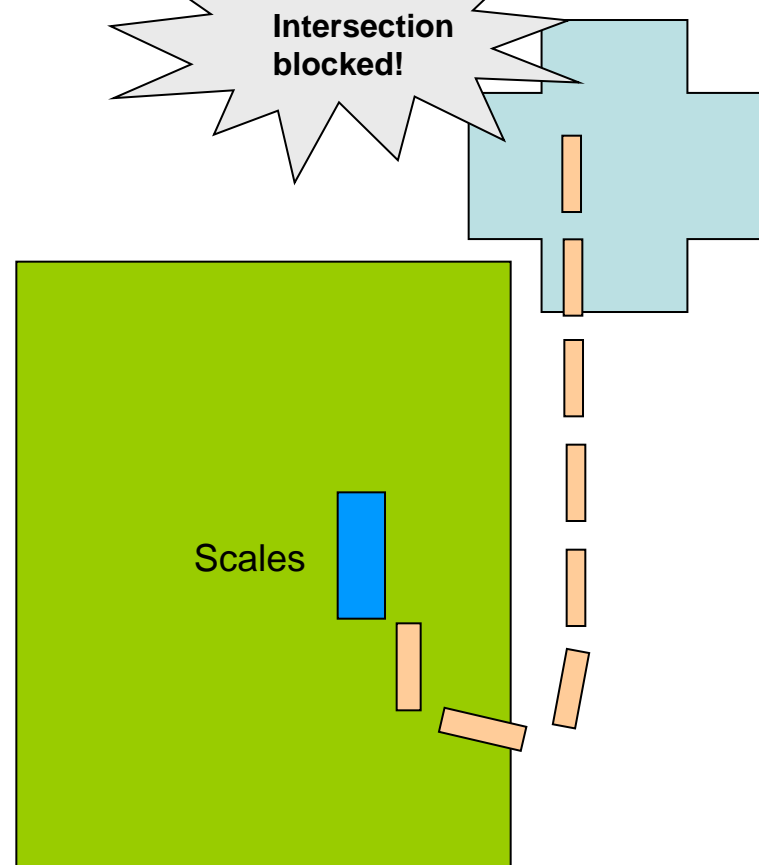
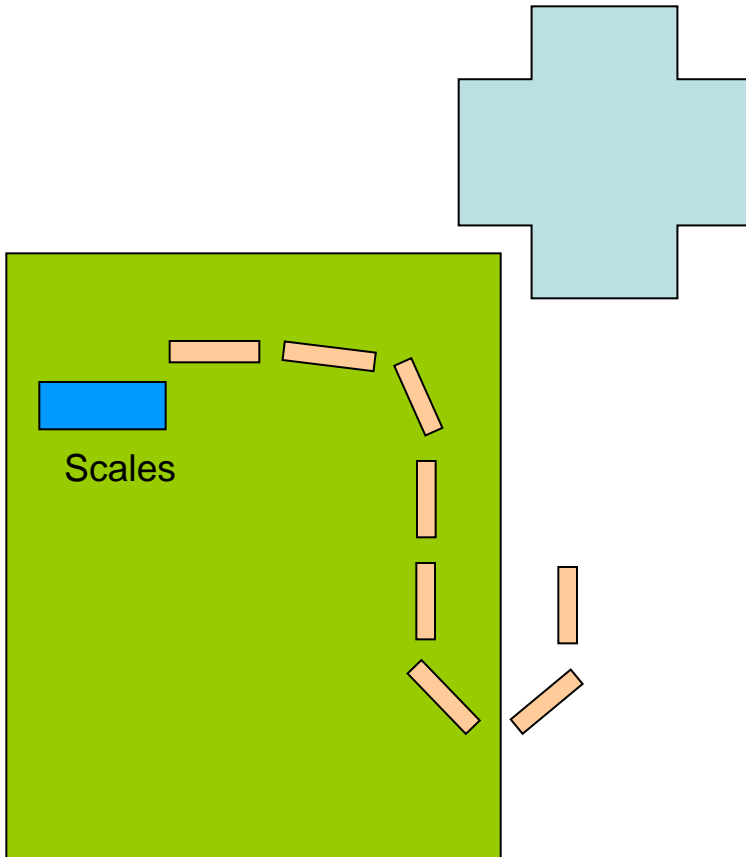
Reality 40 per hour. Wait = 15-20 minutes



Scale Location (further in – less complaints)



Intersection blocked!



Scales

Plan for Expansion

Temp. Outbound Scale



Permanent 2nd Scale and By-Pass



By-Pass Road Added

Traffic Flow

Separate Customers from County Trucks

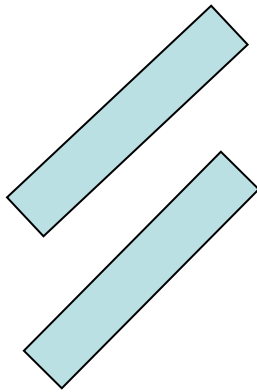


Traffic Flow

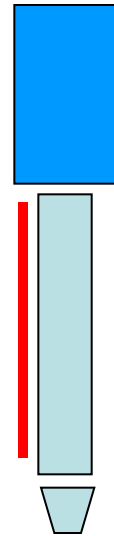
Drive-through Stations with Room for Vehicles to Pull Off to Allow Other Traffic to Pass



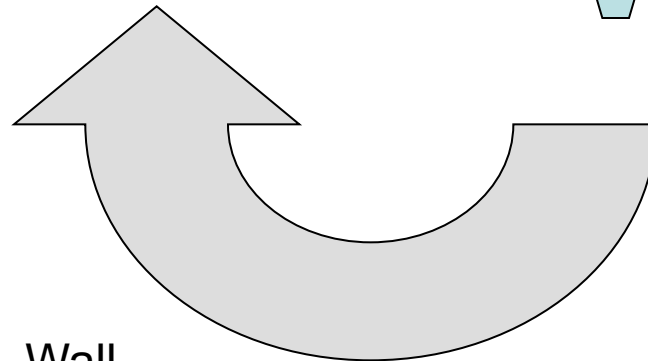
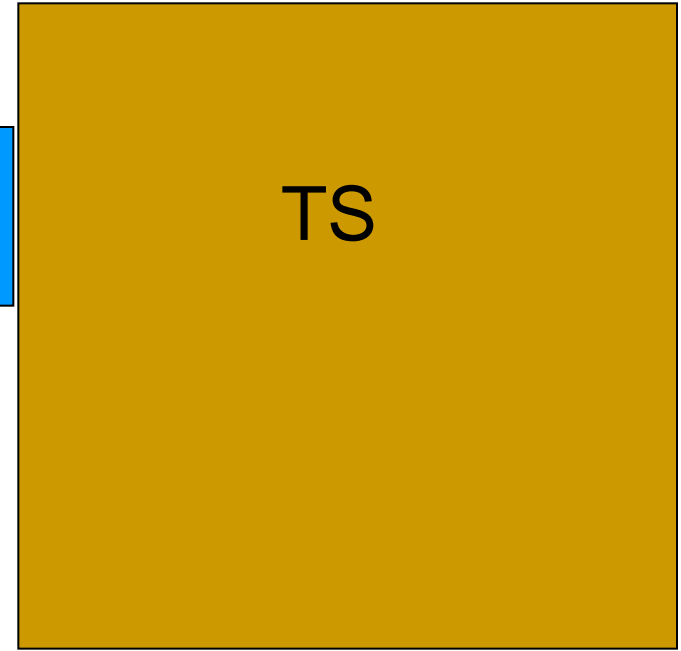
Turning Access



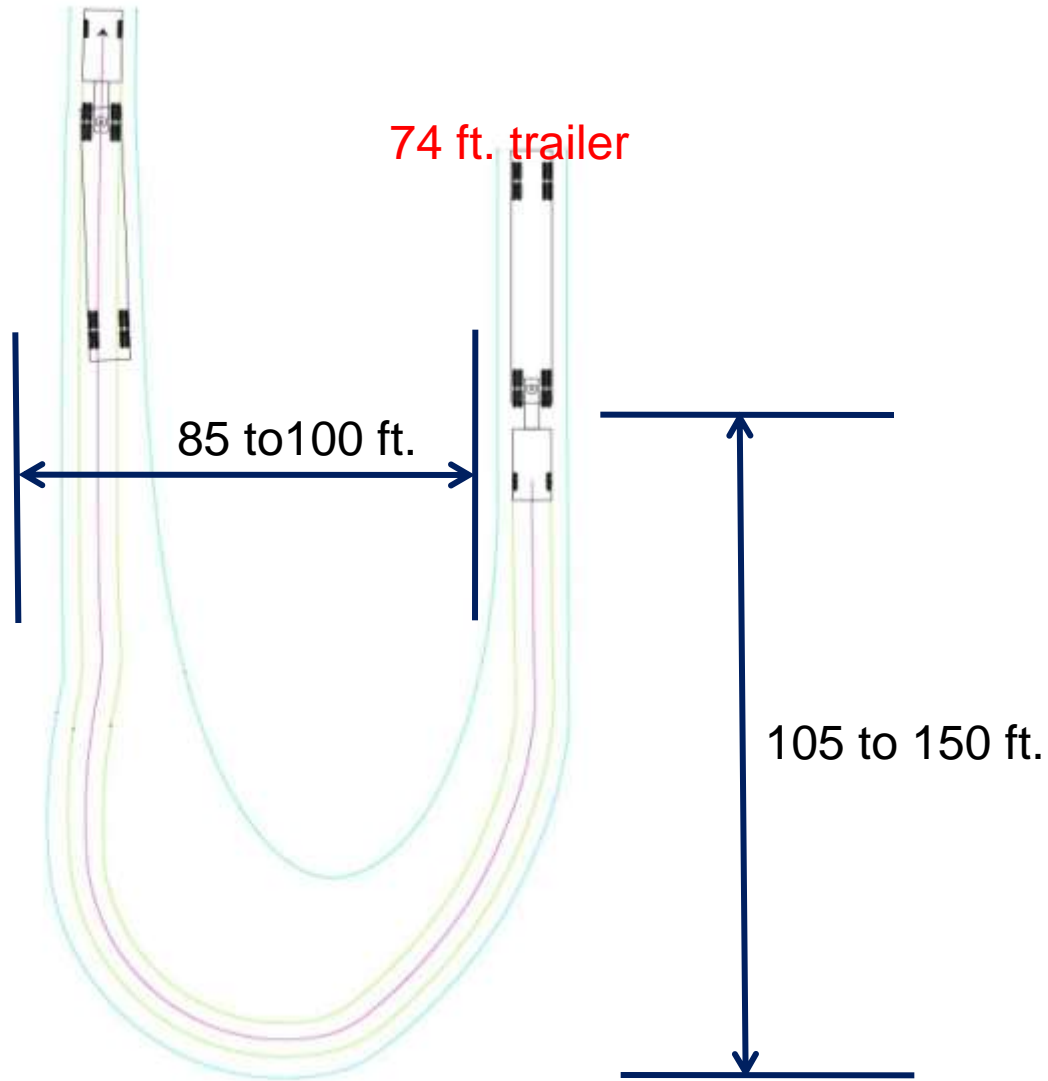
Wall



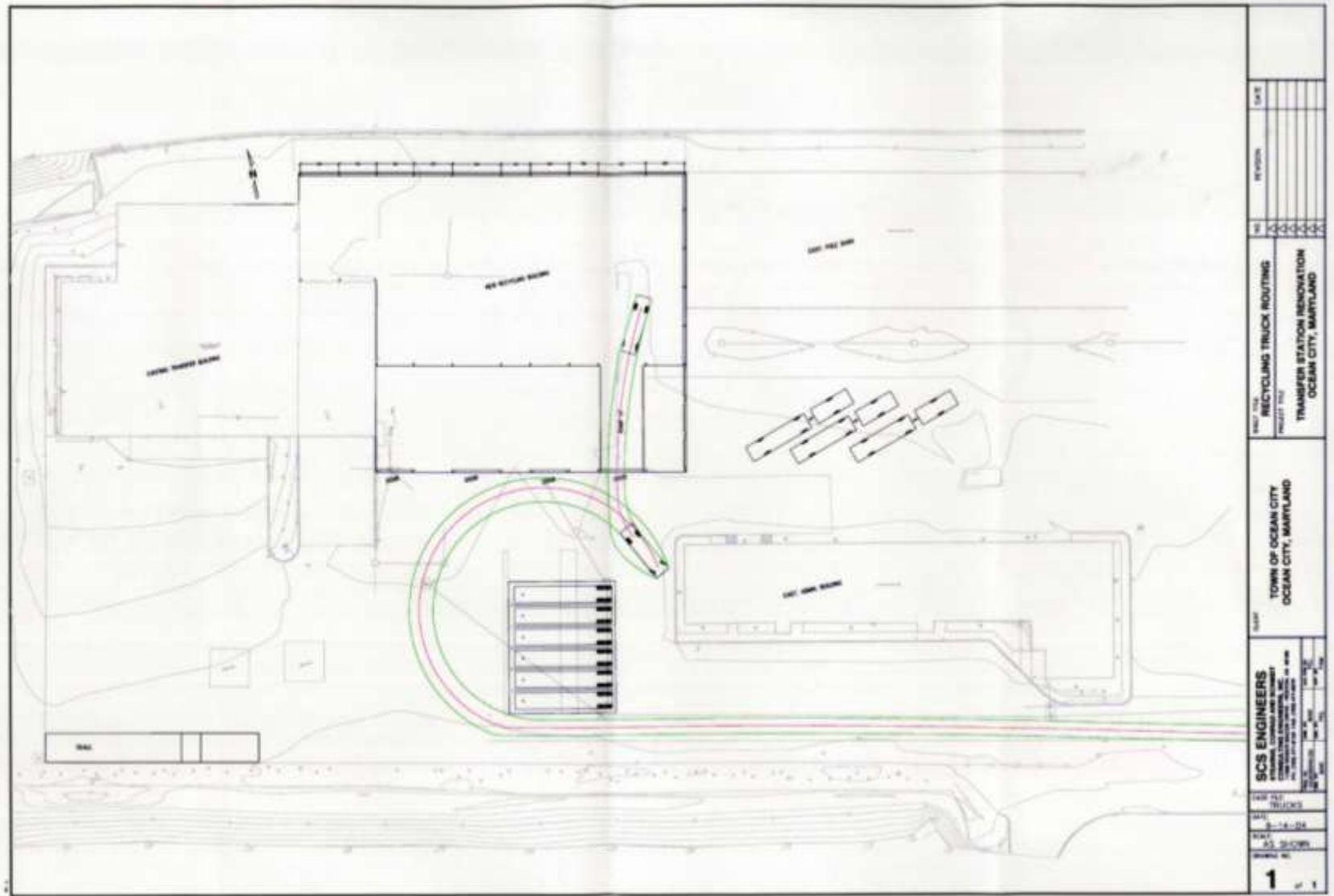
TS



Wall



Auto-Turn® Software



Traffic Flow



Eliminate Traffic Hazards

Trusses



Beams



Center supports are collision hazard

ADA (Offices, Scalehouse, Visitor)

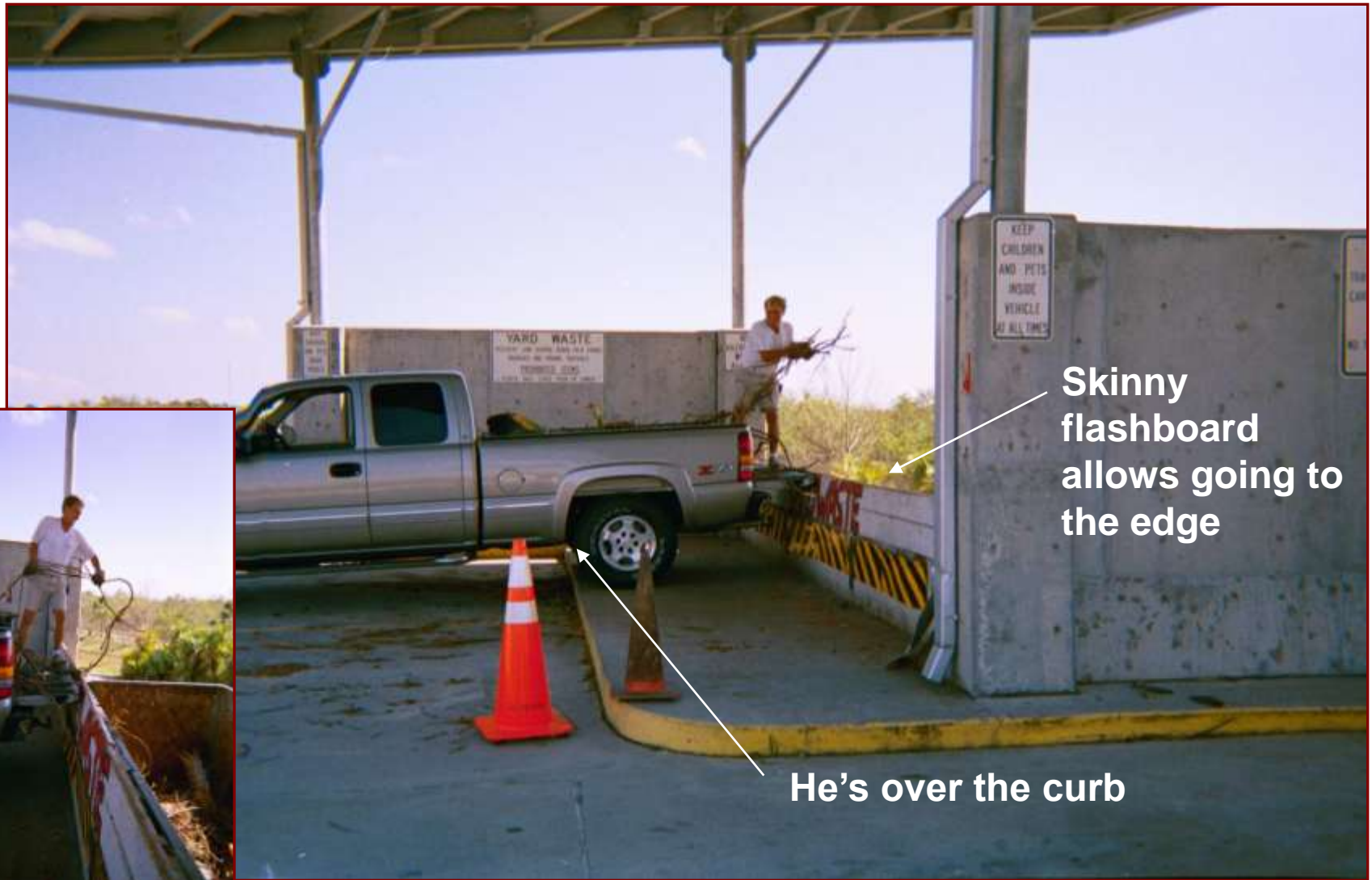
Van parking
Signs
Entrances
Water fountains
Storage and shelves
Volume controls
Assembly areas
Bathrooms
Detectable warnings
Carpet and carpet tile.
Curb ramps
Visual alarms



Recyclables Sorting/Processing



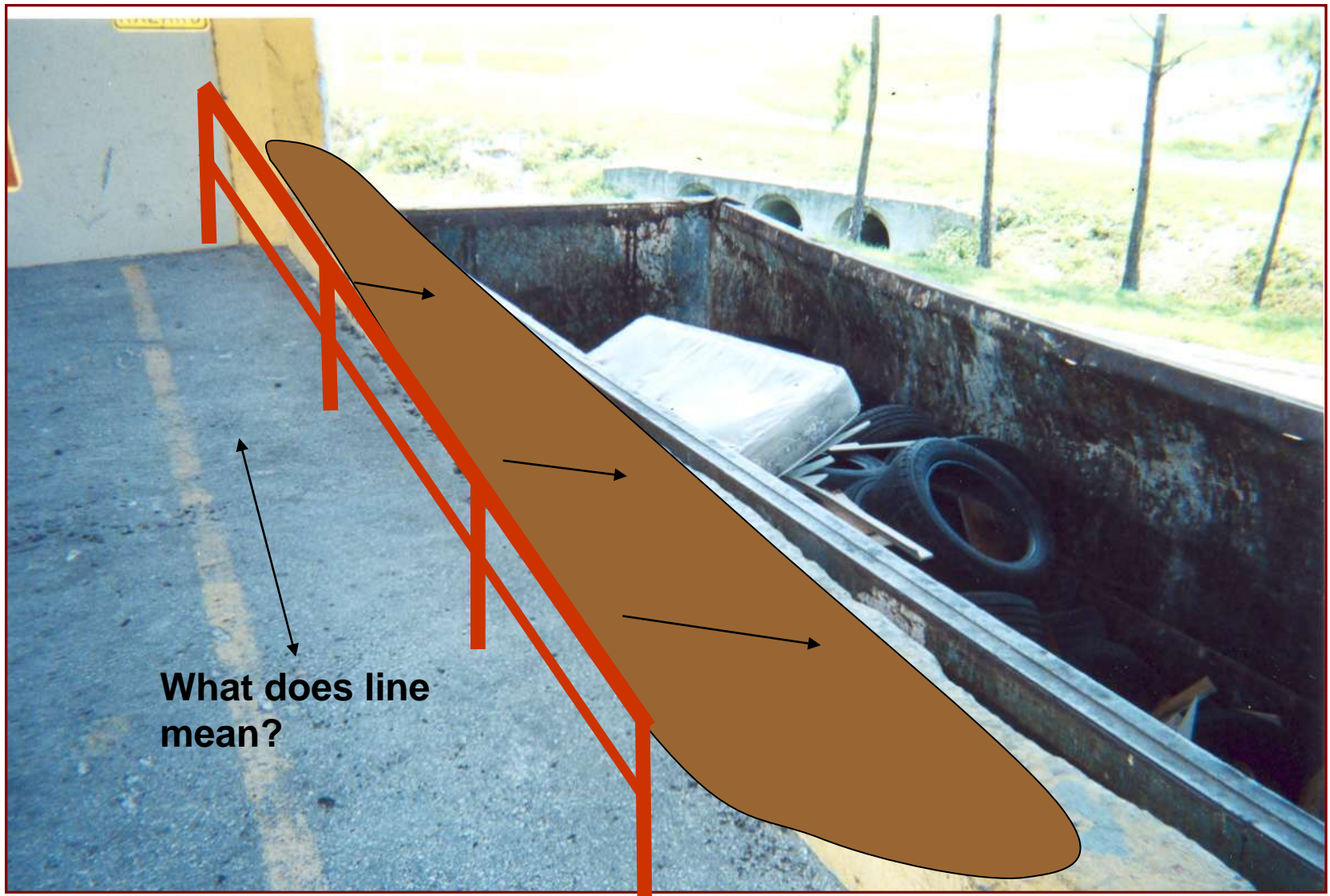
Safety at Openings



Safety at Openings



Safety at Openings



Proper Height Barrier



Proper Height Barrier



Safety

Needs an Emergency Stop Push Button for Someone to Help



Conveyor End Enclosed

Floor Restoration



3-Inch HS concrete topping

Epoxy resin

Base slab



Floor Restoration

550 TPD Transfer Station with 4-Year Old Floor Resurfacing



Incompatible Materials

Leachate Drips Eating the Asphalt



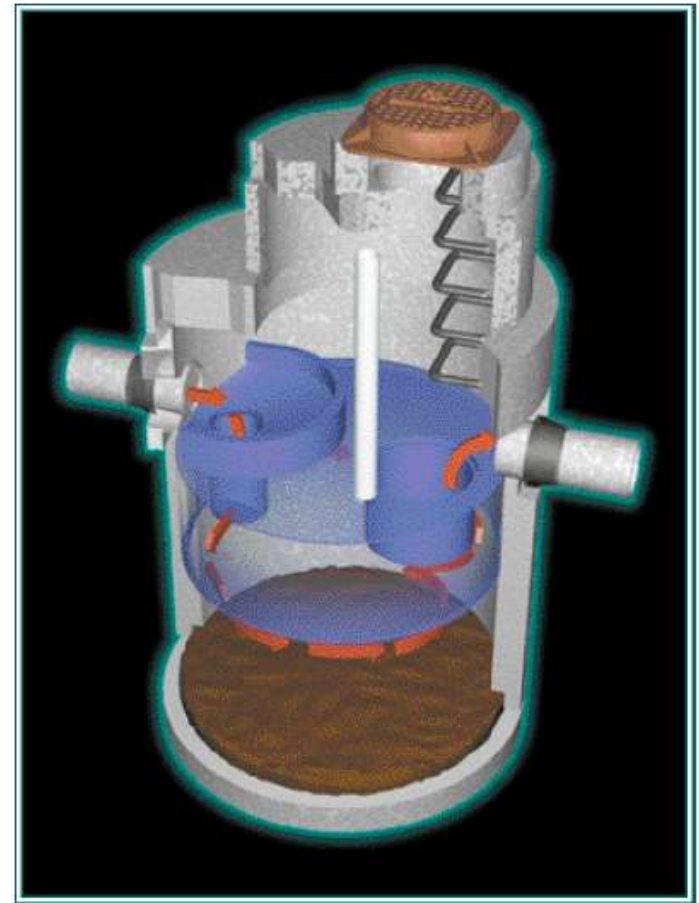
Replace Asphalt with
Concrete

Erosion



Environmental BMP

(Sediment -oil / Run-Off Management)



Stormceptor, courtesy Rinker Materials

Environmental BMP



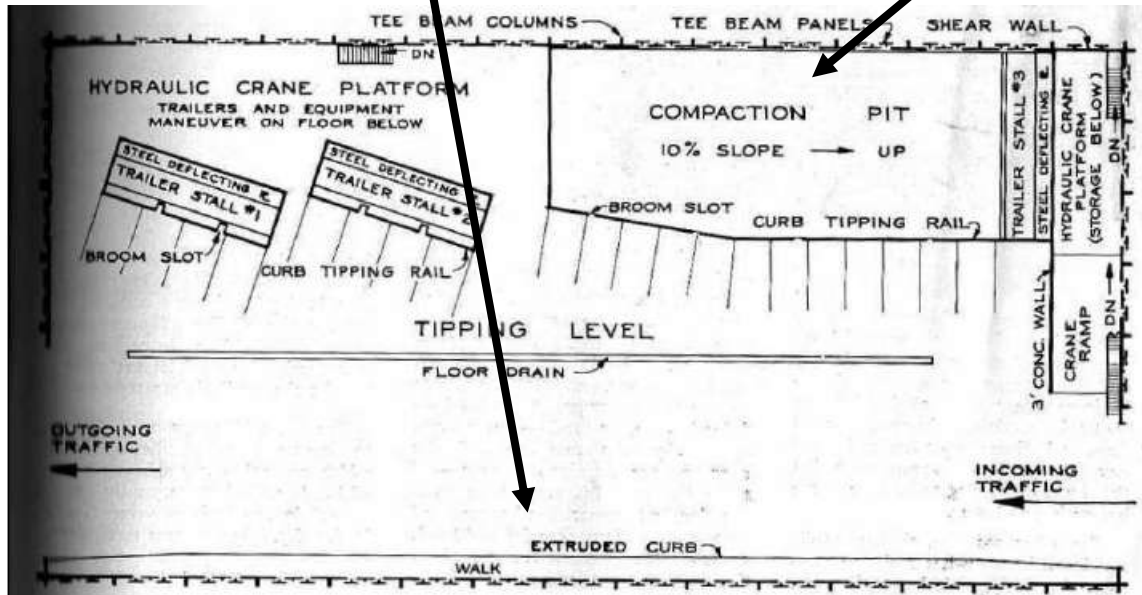
Accommodating Change

(probably more in the future)

Citizen's Recycling/Drop-Off



Compactor for Rail Haul



Designed for 150
TPD taking 600 TPD.

Design in 1967

“Makeovers”

“Warehouse-Look” Transfer Station to Condo-Look for Upgraded Marina Development



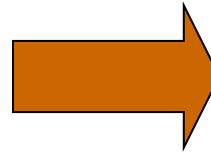
“Makeovers”



Incinerator to 3,000
TPD Transfer Station



Unintended Consequences



Premature Shaft Breakage

Maintenance - Access



Need Catwalk to
Maintain & Clean
Chain Drive System

Ultimate Solution

Self-Contained Wheel Wash



Photo courtesy Stanton Systems

SCS ENGINEERS

Definition

“*Sustainable*” - procedures, techniques, equipment, systems, or materials used in the planning, design, construction and operating phases of a building and site that

- ✓ reduce environmental impacts,
- ✓ use materials and spaces efficiently,
- ✓ do not deplete natural resources, and
- ✓ reduce premature obsolescence.

Sustainable Facility Elements

Reduce Water Usage

Rainwater Harvesting

Reuse for irrigation, washing, etc.
(check Building Code)



Photo courtesy BRAE, Oakboro, NC

Reduced Flow Fixtures

Toilets, urinals, faucets and
showers (if you have lockers).



Look for EPA WaterSense- certified ,
low flow and high performance



Sustainable Facility Elements

“Porous Pavers” to reduce runoff
and have smaller drainage systems



Sustainable Facility Elements



Tankless Water Heaters
(reduce energy waste)



Solar Water Heating
(reduce energy usage)



Good Choice for Low-Volume Needs, Like a Mini-transfer Station



Sustainable Facility Elements

Reducing Energy Needs with Roof Coverings

Vegetated “Green” Roofs



Waste Management
Bluff City Transfer Station

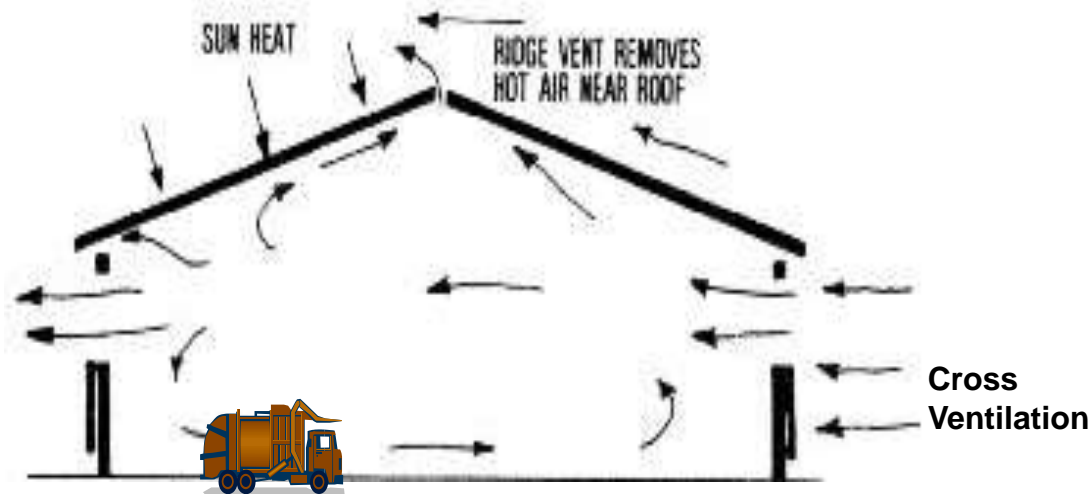
Reflective Roofing
(reduces peak cooling load up to 15%)



Photo courtesy Honda Motor Co.

Sustainable Facility Elements

Use of “Passive” Ventilation



Depending on the climate, passive ventilation can be an effective substitute, or partial substitute, for powered ventilation.

Sustainable Facility Elements

Reducing Lighting / Power Needs with Skylights



*Photo Courtesy King County
Solid Waste Division, Washington*



Optimizing skylight size and placement produced better work conditions too.

Data Logging

- A useful tool in realizing cost savings
 - Track energy usage on equipment in any part of the building to identify areas where energy costs can be reduced;
 - Inefficient equipment
 - Equipment adjustments (i.e., compressor start-stop, etc.)
 - Equipment schedules (i.e., lighting or HVAC controls)
 - Verify changes to design or operations.
 - Provide documentation for certification.



Photos courtesy Onset

Shoreline Transfer Station - Renovation

Energy-Saving and Sustainable Features

- Roof-top rainwater harvesting used to wash station floors, equipment, and flush toilets. A 57 percent reduction, saving 254,000 gallons per year.
- Solar panels provide up to 5 percent of the building's energy needs.
- The facility uses natural daylight as the primary light source through the translucent wall panels and overhead skylights, reducing energy costs by 50 percent a year.
- A natural ventilation system pushes air through the building, reducing energy needs for ventilation by 80 percent.
- Low volatile organic compound paints and adhesives contribute to healthy indoor air.
- Green building materials: recycled content steel, Forest Stewardship Council-certified wood, and fly ash concrete.
- Landscaped bioswales slow water flow to reduce erosion along Thornton Creek, a nearby salmon-bearing stream.

