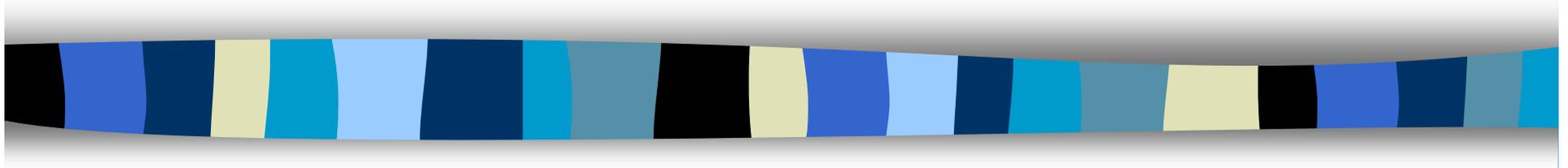




Technical Standards for Subsurface Sewage Disposal Systems



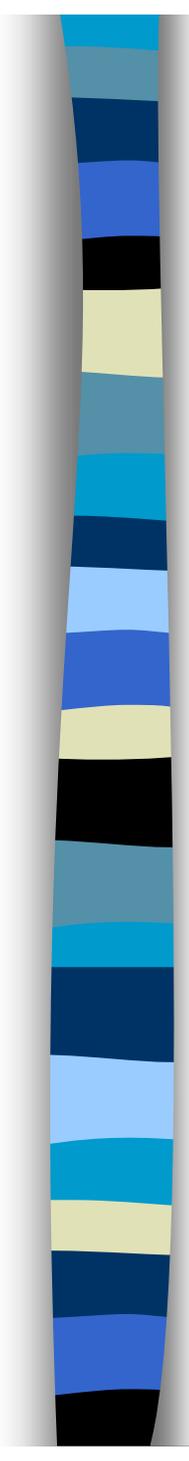
Revised January 1, 2011

Presented by:

Environmental Engineering Program
CT Dept. of Public Health
410 Capitol Avenue- MS# 51-SEW
P. O. Box 340308
Hartford, CT 06134

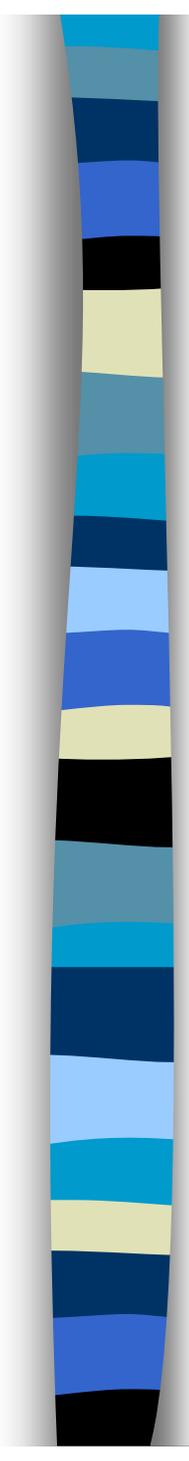
Phone: (860) 509-7296

Fax: (860) 509-7295



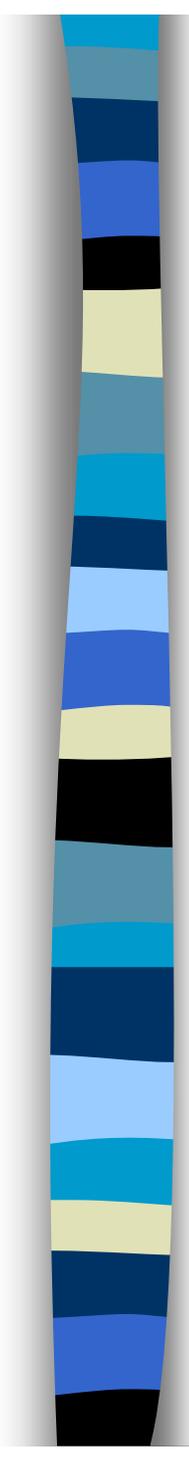
Program Updates

- Circular letter 2009-62
- New plan review fees (effective 10/1/09)
 - Each large system (over 2000 GPD)
 - \$625
 - Each small system
 - \$200
- CT DPH approval required for small and large systems on Large System Sites (sites with a large system)



Program Updates

- DEP draft General Permit for existing sites regulated by DEP
 - Tech. Standards to be used for design of small septic systems.
- New Program Supervisor for DEP Subsurface Group, Michael Hart (replaces Warren Herzig) 860-424-3819
 - Jennifer Perry left program
- CEHA Soils Training Workshop October 2011
 - Budget \$100-150 per person



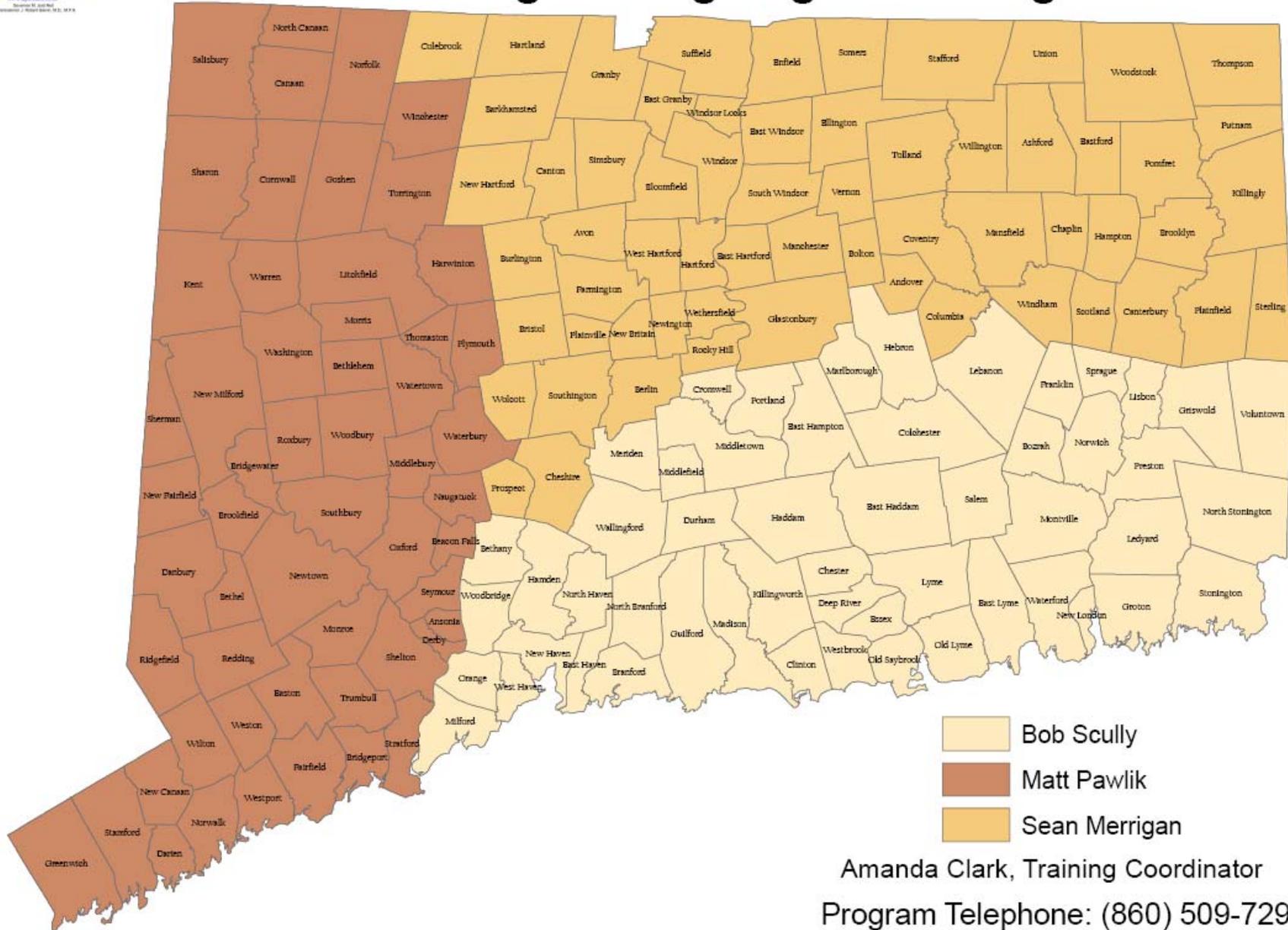
Program Updates

- Central System Exceptions
 - Many submittals lack detail
 - Pipe location
 - Pump detail
 - Design flow
 - Accurate diagram to verify separating distances
 - 15' to LS for building served
 - B100a compliance
 - Central System exception form to be developed in near future



Keeping Connecticut Healthy
www.dph.state.ct.us
Department of Public Health, 100 Capitol Avenue, Hartford, CT 06103

CT Department of Public Health Environmental Engineering Regional Assignments



- Bob Scully
- Matt Pawlik
- Sean Merrigan

Amanda Clark, Training Coordinator
Program Telephone: (860) 509-7296

Website Information

- www.ct.gov/dph/subsurfacesewage
 - Copy of presentation, summary of revisions
 - Download PDF 2011 Technical Standards (FREE)
 - Historical 2009, 2007 and 2004 TS
 - New product approvals
 - Proprietary leaching systems that submitted H2O information
 - Circular Letters from 1995-2010
 - Training opportunities

Technical Standards 2011

- Latest revision January 1, 2011
- Code Advisory Committee
 - COWRA-Bill Hall and Frank Talarico
 - CEHA- Jeff Polhemus and Don Mitchell
 - CADH- Rob Miller, Neal Lustig and Rick Matheny
 - CSCE- Doug DiVesta
 - Home Builders- George Smilas and Larry Fiano
 - DEP-Kim Hudak, Mike Hart and Oswald Inglese
 - Soil Scientist- Rick Zulick and John Ianni
 - Professional Engineers- Jay Keillor, Larry Marcik, Roger Nemergut
 - DPH- Robert Scully, Matt Pawlik, Sean Merrigan and Amanda Clark



CONNECTICUT PUBLIC HEALTH CODE

On-site Sewage Disposal Regulations, and Technical Standards for Subsurface Sewage Disposal Systems

PHC Section 19-13-B100a (Building Conversions, Changes in Use, Building Additions, etc)

Effective August 3, 1998

PHC Section 19-13-B103 (Design Flows 5,000 Gallons per Day or Less)

Effective August 16, 1982

Technical Standards for Subsurface Sewage Disposal Systems

Effective August 16, 1982

Former revisions: 1986, 1989, 1992, 1994, 1997, 2000, 2004, 2007, 2009

Revised January 1, 2011

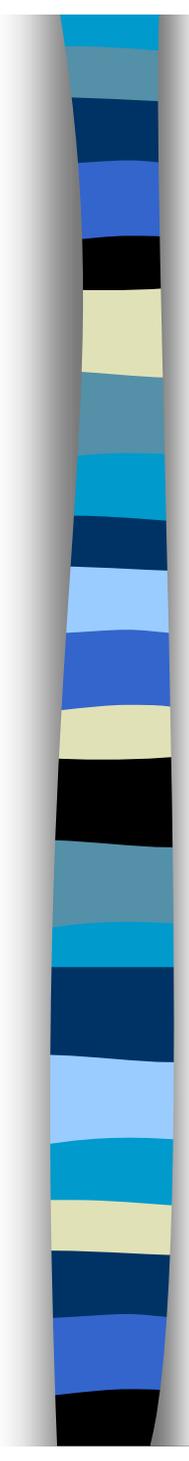
PHC Section 19-13-B104 (Design Flows Greater than 5,000 Gallons per Day)

Effective August 16, 1982

State of Connecticut
Department of Public Health
Environmental Engineering Program
410 Capitol Avenue - MS #51SEW
P.O. Box 340308
Hartford, Connecticut 06134

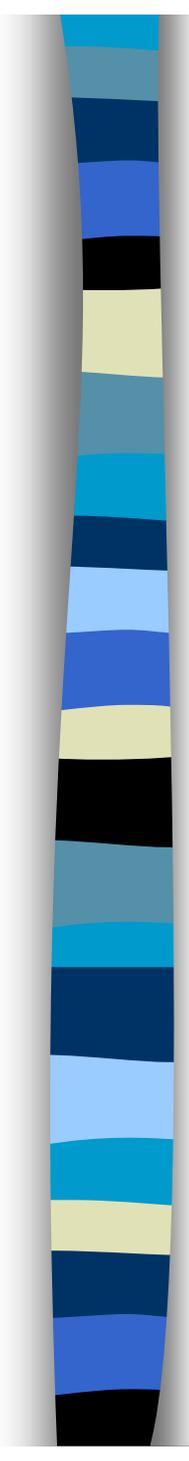
www.ct.gov/dph/subsurfacesewage

January 2011



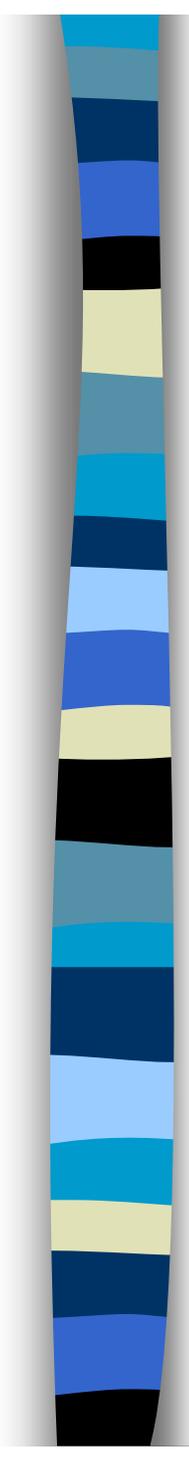
Technical Standards Revision 2011

- No changes to:
 - 19-13-B100a (MLSS changes)
 - 19-13-B103
 - 19-13-B104
- PHC Section 19-13-B103d(b)
 - Technical Standards shall be established by the Commissioner of Public Health and reviewed annually.



Section 19-13-B100a (b) Building Conversions, Changes in Use

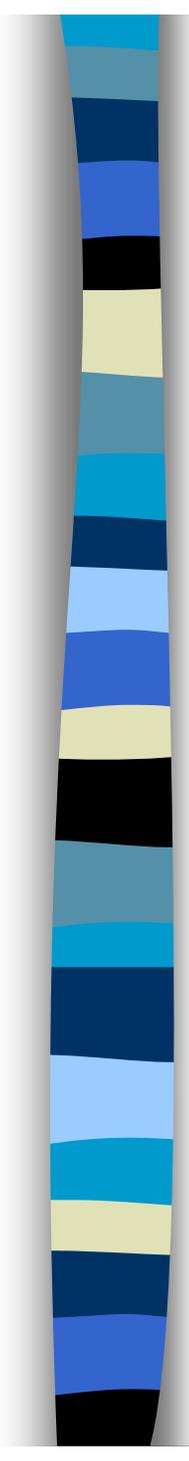
- Apply when:
 - Public sewers not available
 - Increase in design flow
 - Adding bedrooms
 - Increasing seats in a restaurant
 - Winterizing
 - Converting seasonal dwelling to year round use



Section 19-13-B100a (b)

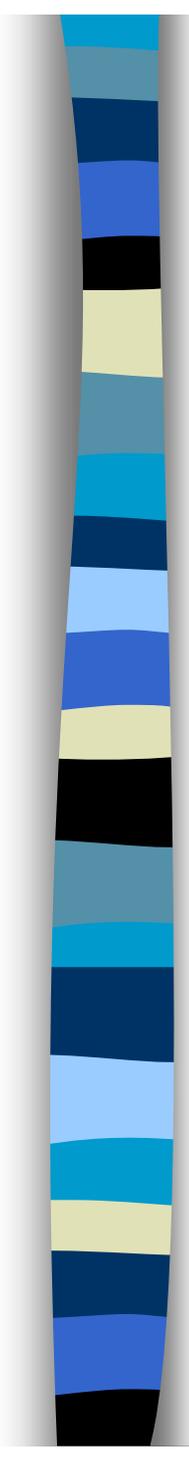
Building Conversions, Change in Use

- Prior to approval the applicant must demonstrate a code complying area (CCA) exists on the lot.
 - CCA must meet all requirements of 19-13-B103 and Technical Standards except 100% reserve
 - CCA may be an existing septic system on the property, existing systems area or encompass portions of an existing system area.
 - Must meet natural soil MLSS



Determining if a Code Complying Area (CCA) exists on the property

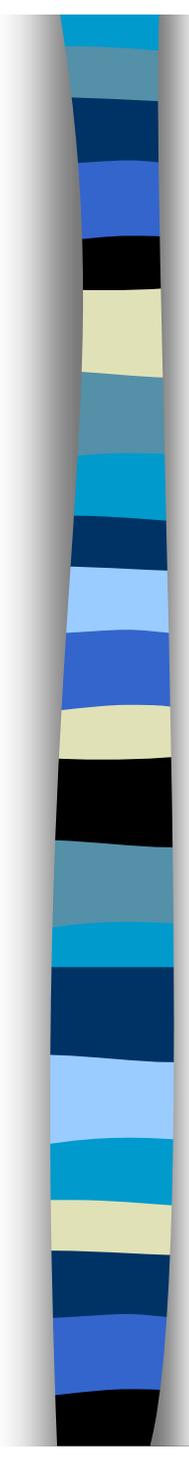
- Review file for evidence of an existing CCA
 - Soils testing
 - Plot plan
 - As-built of an existing system meeting code
 - If data is not available the property owner must:
 - Perform soils testing
 - Soils testing must be witnessed by local health department
 - Submit plan demonstrating CCA
 - Local Health must review and approve the plan.
 - Plan to be kept on file



Section 19-13-B100a (b)

Building Conversions, change in use

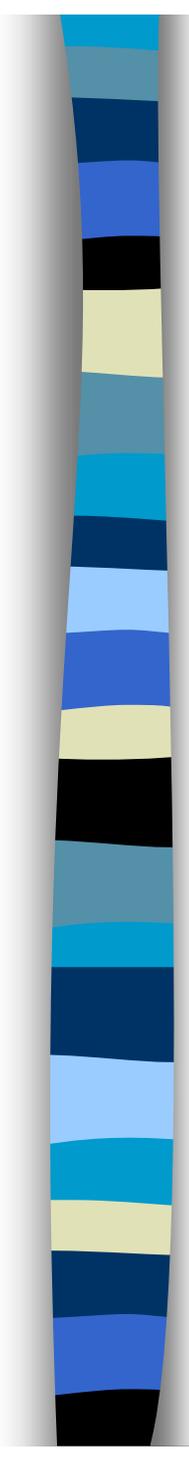
- Local health can require expansion of the existing system or installation of a new system if the change results in an increase in design flow of more than 50%.



Section 19-13-B100a (c)

Building additions

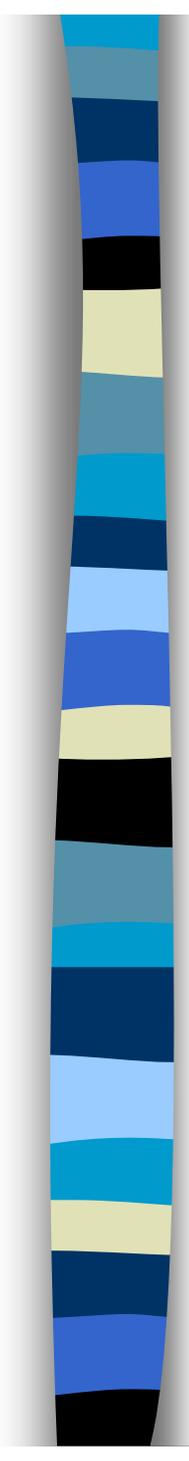
- Apply when:
 - Public sewers not available
 - Adding an addition to a building
 - Dormer, razing roof line, bump out, etc.
 - No increase in design flow



Section 19-13-B100a (c)

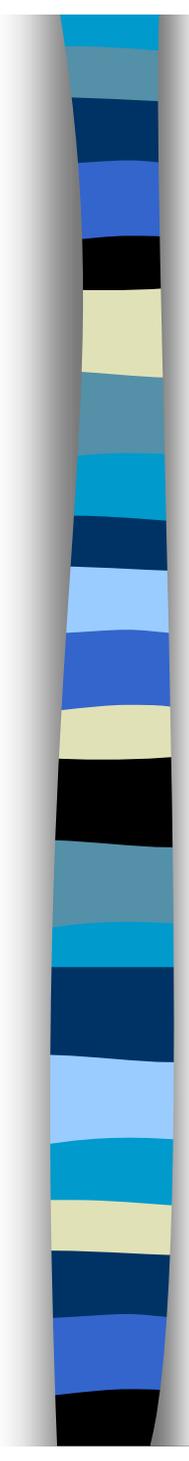
Building additions

- Approved CCA if identified.
- Applicant must submit a plan.
 - If the plan submitted cannot identify a CCA the addition may be approved provided the plan demonstrates:
 - minimum 50% of the required ELA
 - minimum 50% of the required MLSS
 - No well exceptions
 - No reduction in potential repair area
 - No increase in design flow



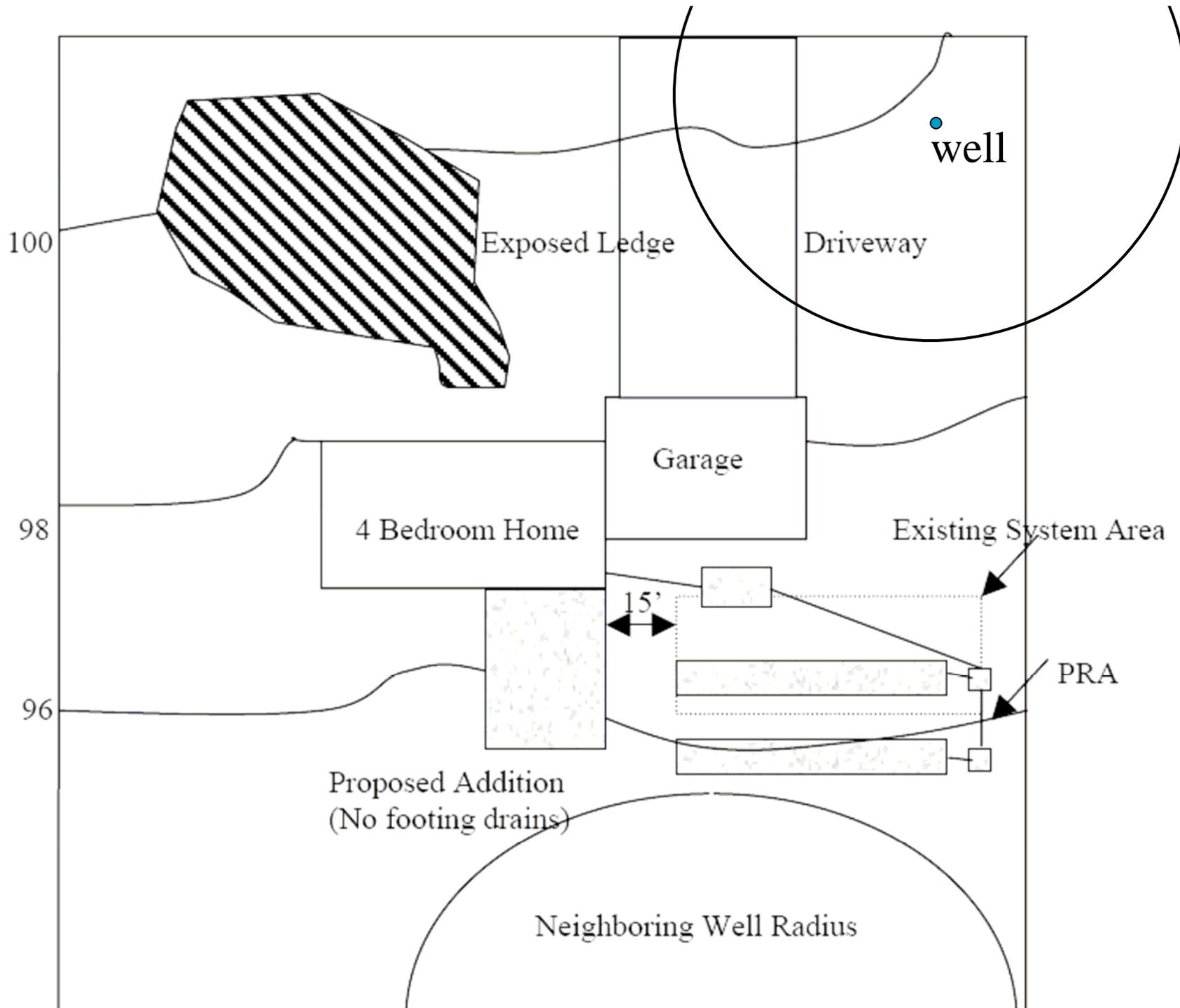
B100a Potential Repair Area

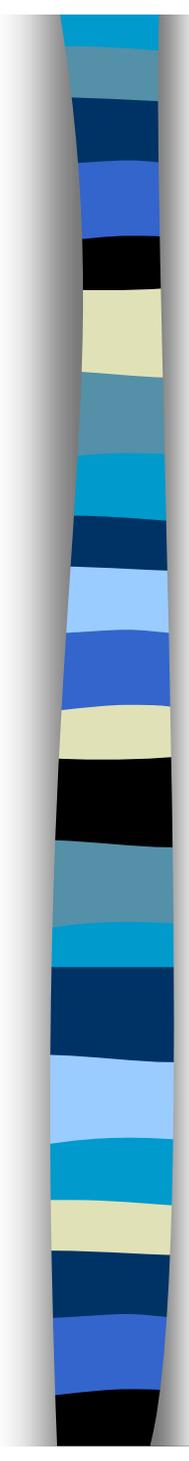
- an area on a property which could be utilized to repair or replace an existing or failed septic system and includes areas on the property where exceptions to Section 19-13-B103 could be granted by the local director of health but does not include areas beyond those necessary for a system repair and areas of exposed ledge rock.



B100a Potential Repair Area

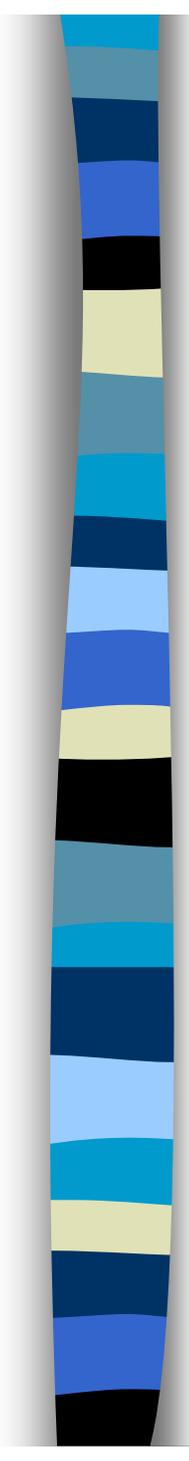
- Homeowner wants a family room addition.
- Either a code complying system must be identified or conditions 1-5 under the building addition criteria must be satisfied.
- Soils testing has been conducted
- Served well





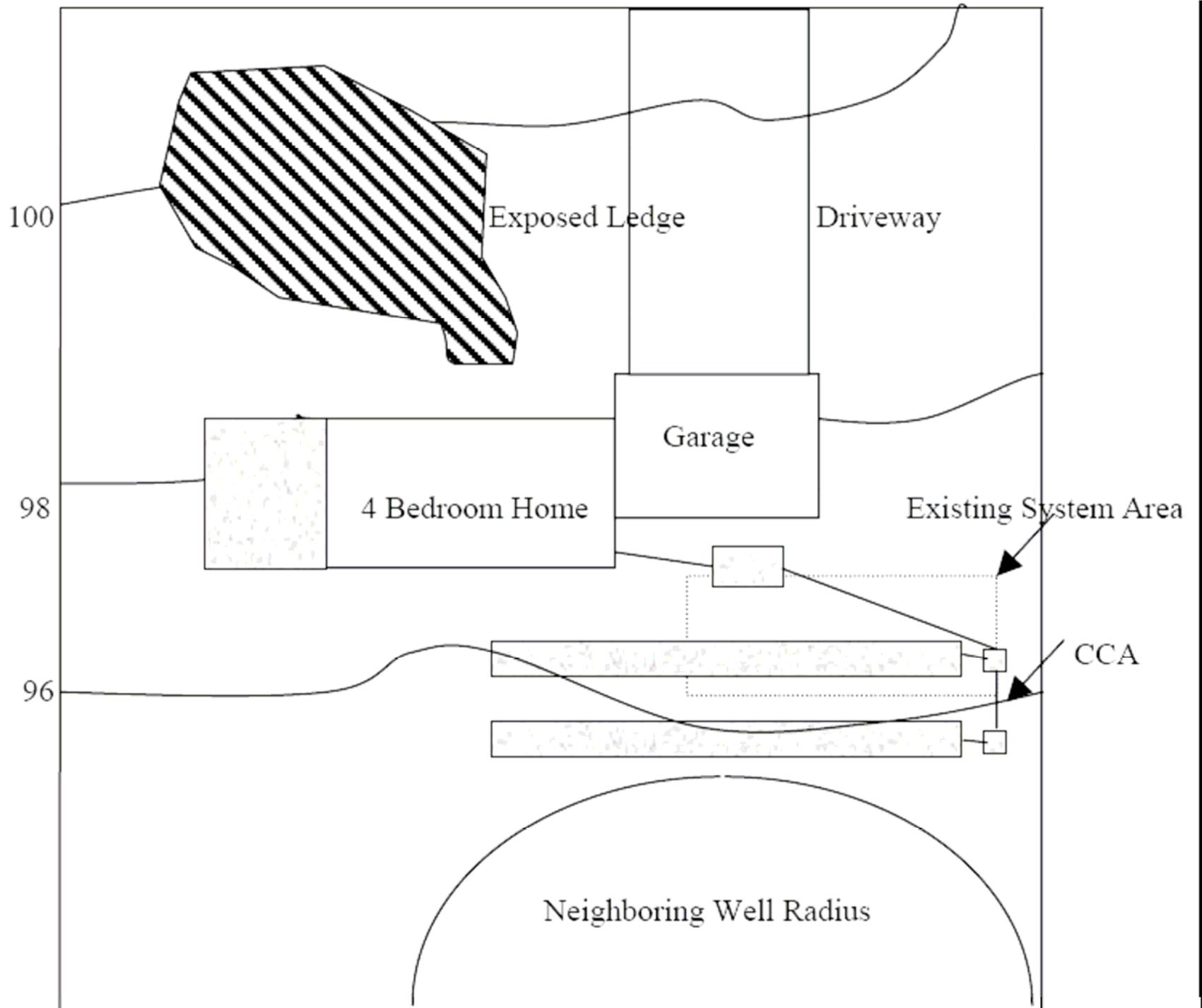
B100a Potential Repair Area

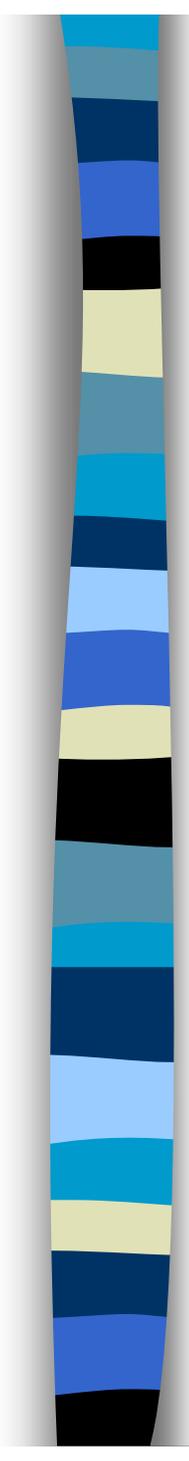
- The system illustrated provides approximately 60% of the required MLSS and 100 % of the required ELA.
- Does the addition reduce potential repair area?



B100a Potential Repair Area

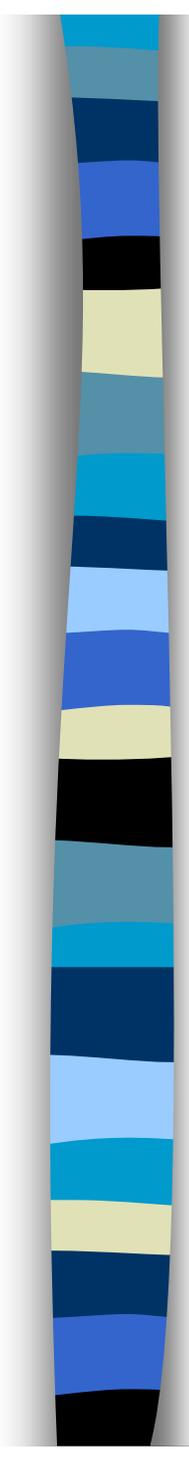
- If the proposed addition were not constructed, more spread could be provided that would allow a code complying system.
- This addition reduces potential repair area.





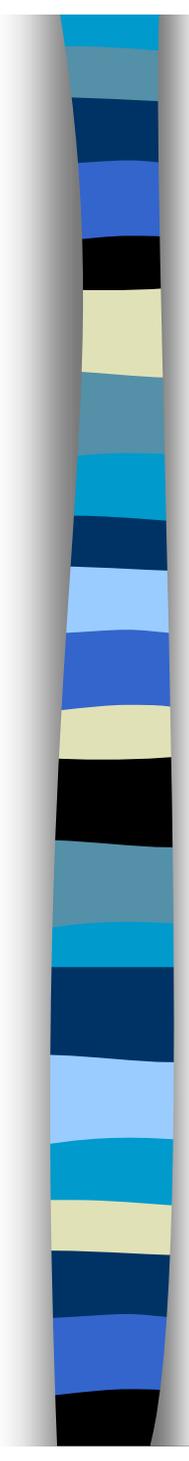
Section I Definitions pg. 13

- C. Bedroom - minimum 70 square feet required for new bedrooms
 - Rooms with less than seventy (70) square feet are not considered bedrooms, unless the room has been historically designated a bedroom in an existing home.
 - Removed reference regarding “habitable space” per the building code



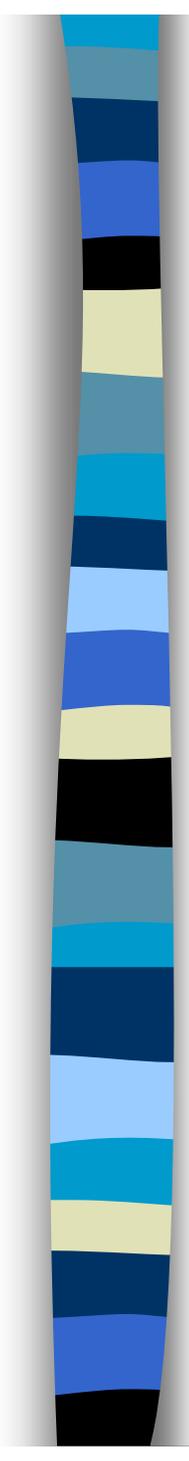
Section I Definitions pg. 14

- H. Free draining material - revised to note that such material is coarser than surrounding excavation material.
 - Free draining material (i.e., gravel, broken stone, rock fragments, etc.) means backfill that meets CT DOT Form 816 Specification M.02.07 (or latest specification) and is coarser than the surrounding excavation material.



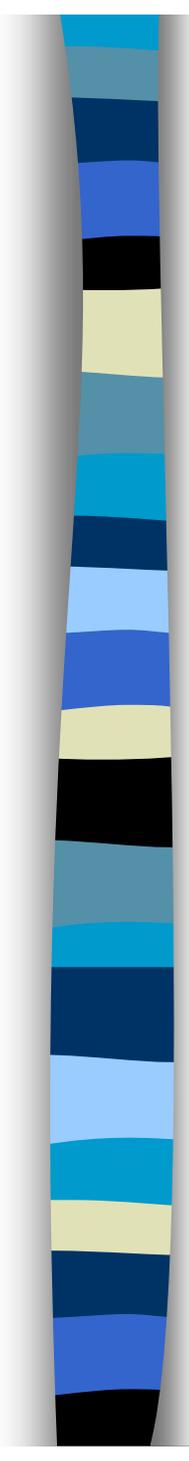
Section I Definitions pg. 14

- Select fill includes ASTM C33 sand
 - means clean bank run sand, clean bank run sand and gravel, or approved manufactured fill having a gradation which conforms to the specifications stipulated in Section VIII A or ASTM C 33.



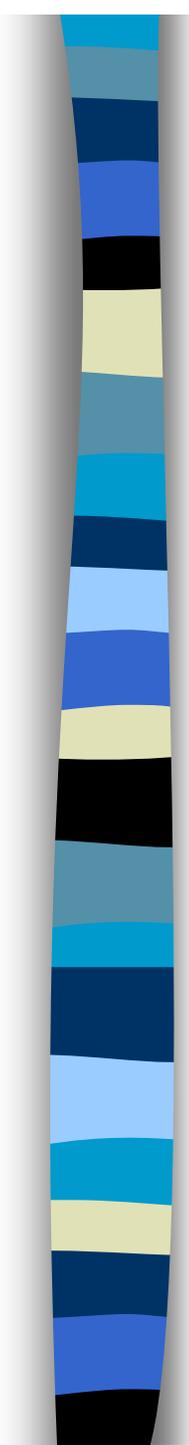
Section I Definitions pg. 14

- R. Two (2) inch nominal tire chip aggregate revised to remove reference DEP's General Permit
 - Currently not permitted to use in CT



Section I Definitions pg. 14

- S. Watertight tank seal definition
 - means a pipe to tank connection (inlet & outlet pipe seal) that meets ASTM C 1644, ASTM C 923, or is accepted by the Commissioner of Public Health as an approved equal...

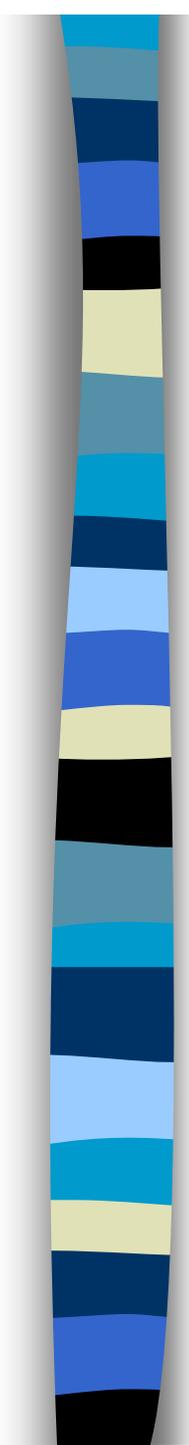


Section II Location pg. 15

- Language added to:

- A. Minimum Separating Distance:

- Groundwater control systems only need to comply with the separating distances cited in Item G.
- Proposed relocation of lot lines shall comply with the distances cited in Item I.



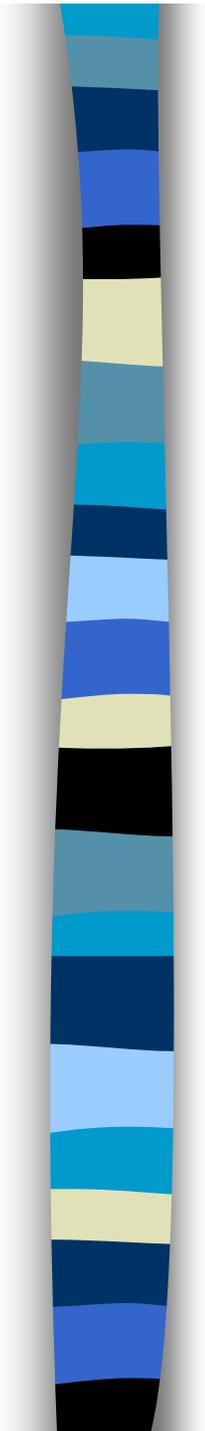
Section II Location pg. 15

- Language added to:

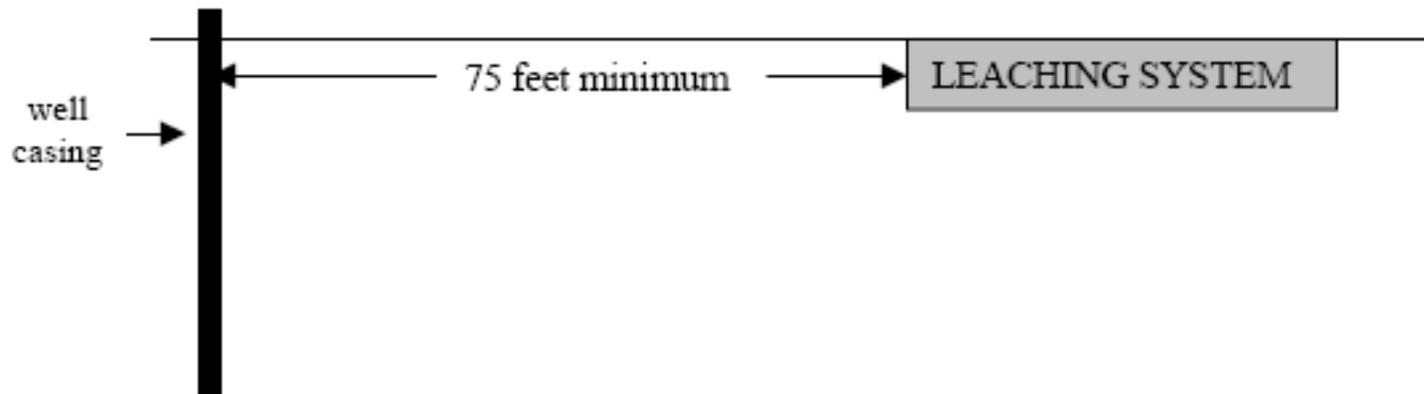
- A. Minimum Separating Distance:

- Separating distance shall be based on horizontal measurements

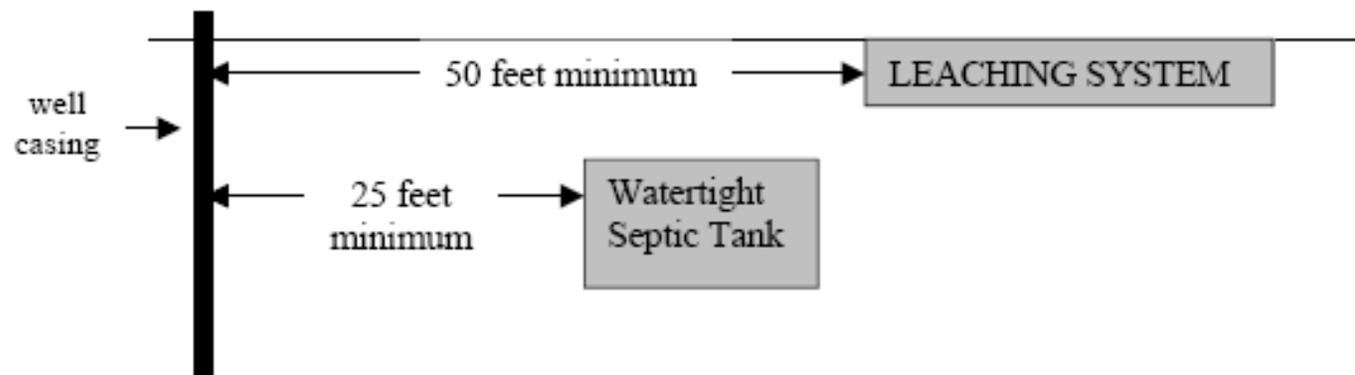
- except for non-vertical closed loop geo-exchange bore holes that utilize measurements taken from the closest portion of the bore hole.



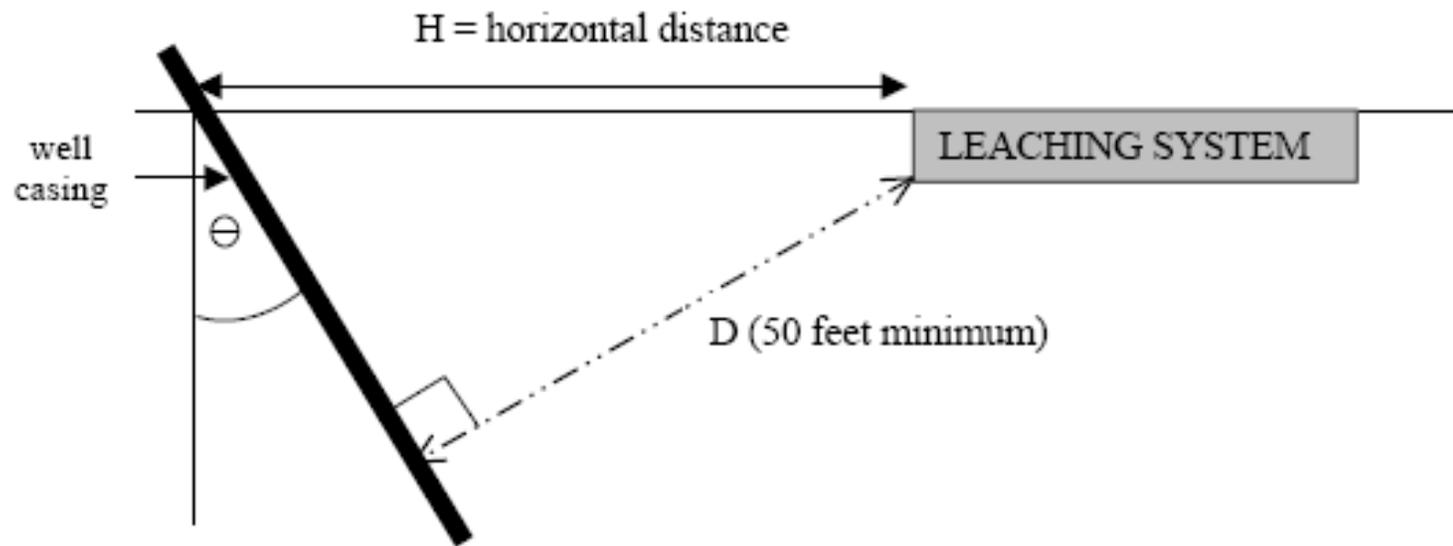
Vertical Wells (potable, irrigation, open loop geothermal)



Vertical closed loop geothermal wells

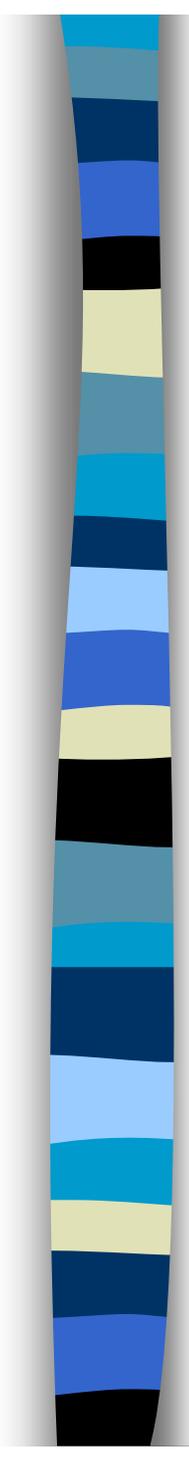


Non-vertical closed loop geothermal wells



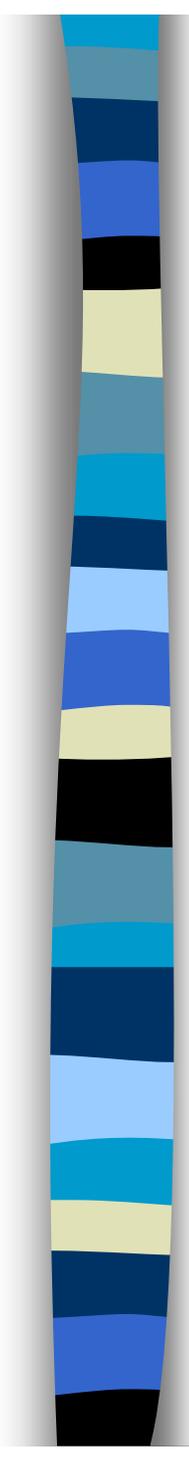
To provide a minimum distance of 50 feet (D) to the leaching system, the minimum horizontal distance (H) can be determined based on the degree of vertical angle of the well casing as follows:

$$H = 50 / \cos \Theta$$



Section II Location pg. 15

- Item A (Water Supply Wells, Springs, Domestic Water Suction Pipes)
 - 3. Separating distance between a domestic water suction pipe and a septic tank/pump chamber/grease interceptor tank shall be reduced to 25 feet if tank is verified to be watertight.



Section II Location pg. 15

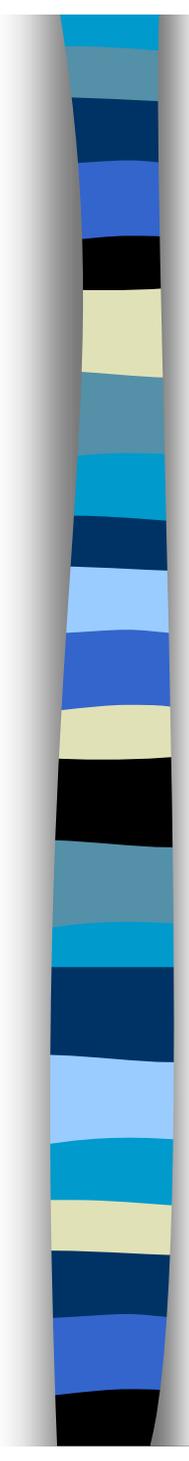
- Item G Groundwater drains
 - Added number for special provision reference
- Item P Closed loop geo-exchange systems
 - 50 feet to closed loop geo-exchange bore hole or trench
 - reduction to 25 feet for watertight tanks.

Section II Location pg. 15

■ Item I Property Line

- Added maximum distances applied to chart and reduced distances to special provisions #1-3.

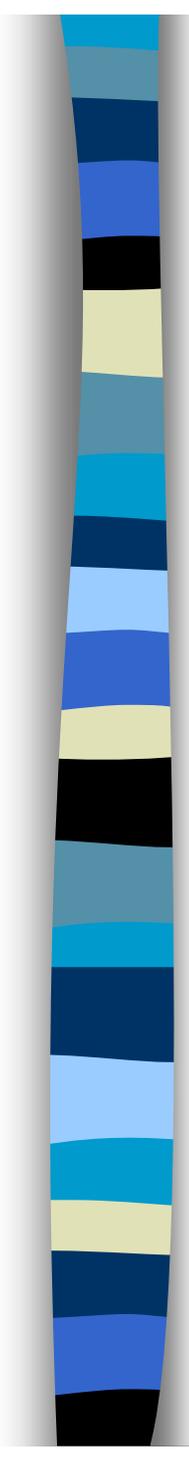
I. Property line		
Upgradient or on sides	15 ⁽²⁾	1. Separating distance to septic tank/pump chamber/grease interceptor tank and reserve leaching system shall be reduced to 10 feet.
Downgradient	25 ^(2,3)	2. Separating distance shall be reduced to 10 feet if the top of the leaching system is below original grade, grading rights from the affected property owner are secured, or retaining walls are utilized (See Section VIII A for retaining wall provisions). 3. Separating distance between the primary leaching system and downgradient property line shall be reduced to 15 feet if MLSS is not applicable or on flat groundwater table lot.



Section II Location pg. 16

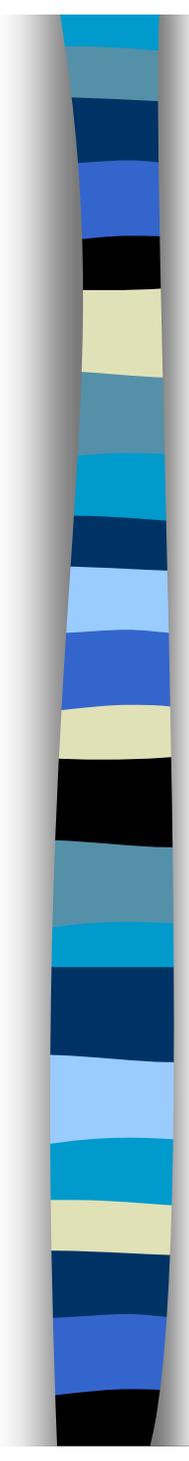
■ C. Plan Adherence

- Modifications to the approved plan shall be authorized by the plan designer and approved by the local director of health.



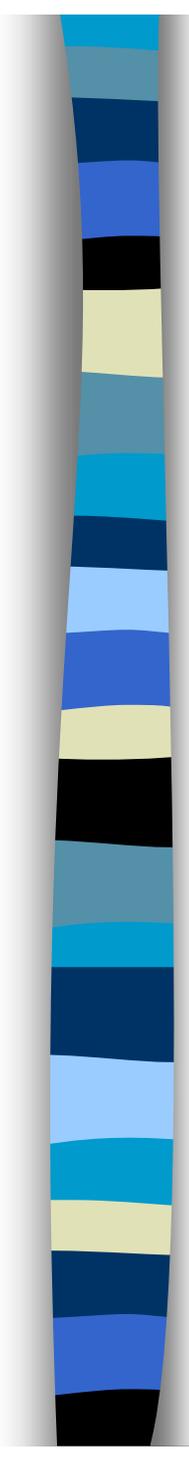
Section III: Piping pg. 19-23

- Table 2 and 2D (Building Sewers and Force Mains)
 - Wording in Tables 2 and 2D revised to clarify that the approved piping is also for sewer piping that is in close proximity (25' – 75') from domestic water suction pipes.



Section III: Piping pg. 19-23

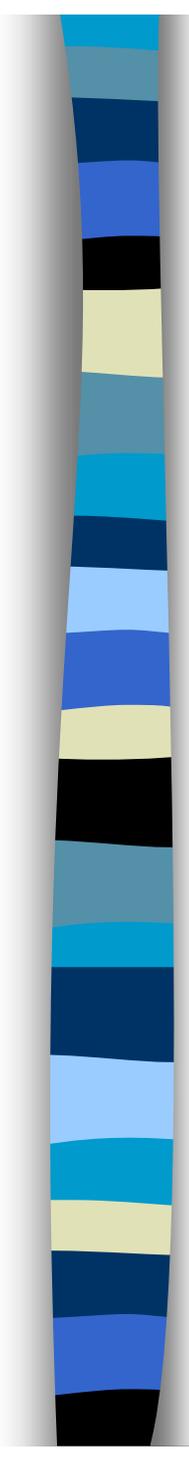
- Tables 2-A & 2-B (Public Sewer Laterals and Mains)
 - Language modified to clarify why public sewer piping & joint specifications are included in the Technical Standards
 - DPH's Water Supply Section & Private Well Program to approve other public sewer piping that is proposed to be placed within the sanitary radius of water supply wells.



Section III: Piping pg. 19-23

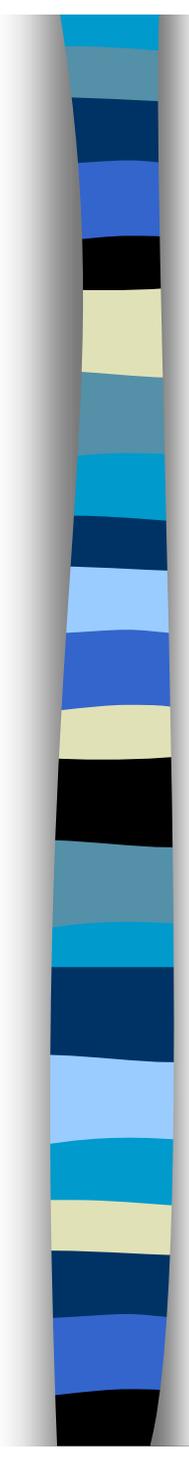
■ Table 2A

- Exterior grease interceptor tanks are sources of pollution that need to be kept a minimum of 75 feet from all water supply wells (Greater distances for larger wells).
- Higher-grade piping (i.e., Schedule 40, ASTM 1785) specified for building sewer between building and grease interceptor tank



Section IV Design Flows pg. 24-25

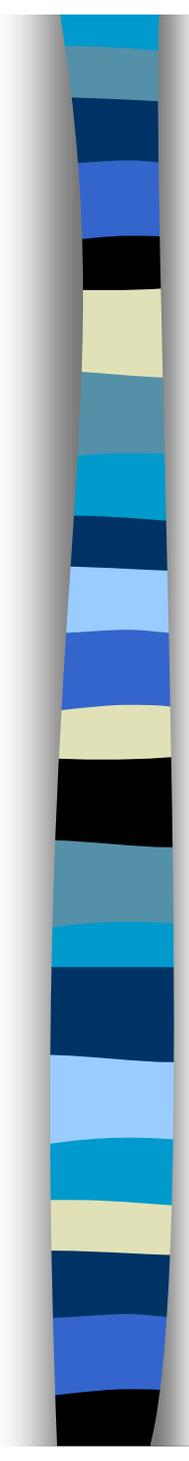
- Table 4 formatting modifications for readability.
- C. Water Usage Monitoring
 - large system (>2,000 GPD) plans shall include provisions to monitor domestic sewage generation via the use of water meters or other available means (i.e., pump cycling and dose volume documentation).



Section IV Design Flows pg. 26

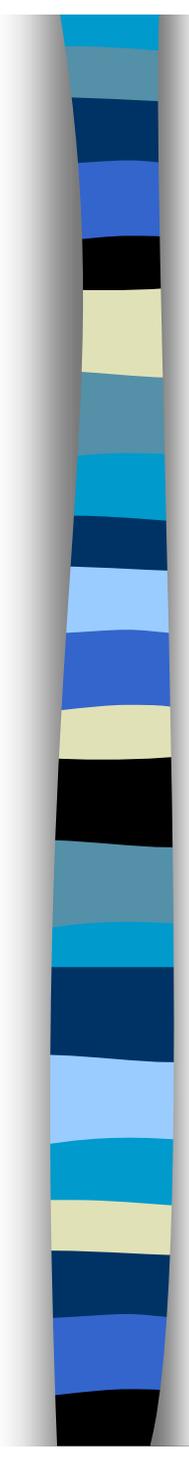
■ E. Management Programs

- proposed ordinances and regulations shall be submitted to DPH for review prior to adoption.
- Formal approval not required



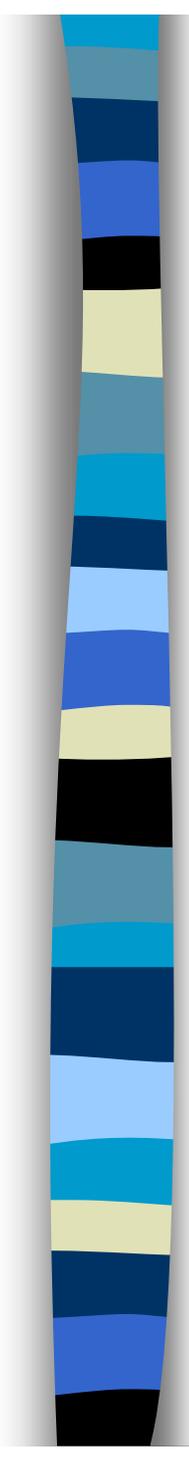
Section V Septic Tanks & Grease Interceptor Tanks pg. 26

- Recommend replacement of single compartment septic tanks at time of leaching system repairs.
- If single compartment tank is to remain, an assessments is required to confirm tank is in satisfactory condition and is properly baffled.



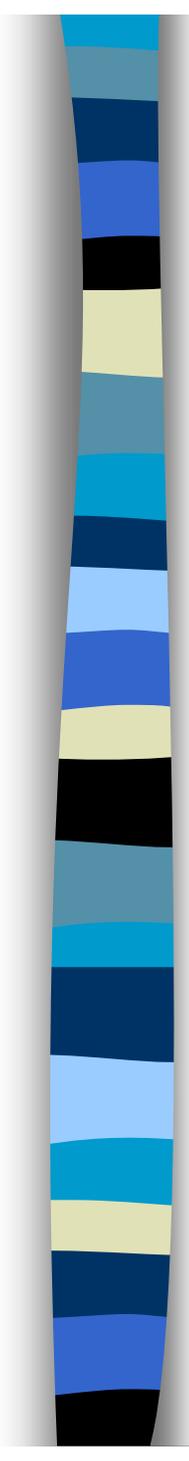
Section V Septic Tanks & Grease Interceptor Tanks pg. 26

- Proprietary leaching system companies should be consulted if a repair plan includes a single compartment septic tank.
- Septic tanks shall have a minimum of 6 inches of cover.
- Watertight tank seal required if specified by plan designer.



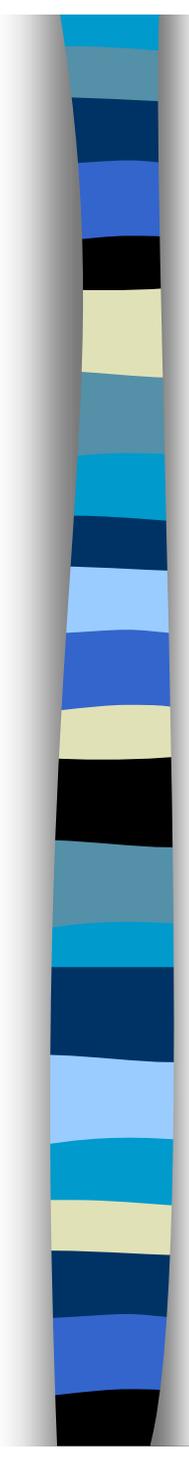
Section V Septic Tanks & Grease Interceptor Tanks

- Effluent filters do not have to meet performance criteria in NSF/ANSI Standard 46-2005. Companies must notify DPH by 7/1/11 if specs met (p.26)
- Performance leakage testing revised to be consistent with ASTM C1227, and stipulate watertightness when critical (p.29)



Section V Septic Tanks & Grease Interceptor Tanks

- Effluent filters used in Grease Interceptor Tanks must be specified for such use by the manufacturer (p.30)
- Detention time is the volume of the liquid in the septic tank divided by flow rate thru tank (pg. 30)



Effluent Dist., Pump Systems & Air Injection Processes.(p.33)

- Electrical connections readily accessible from ground surface
- Piping attached to pump close to top of tank to allow for servicing; quick disconnect be provided for servicing.
- Pump chambers in shallow groundwater areas shall utilize watertight tank seals.
- Pump Diagram added.

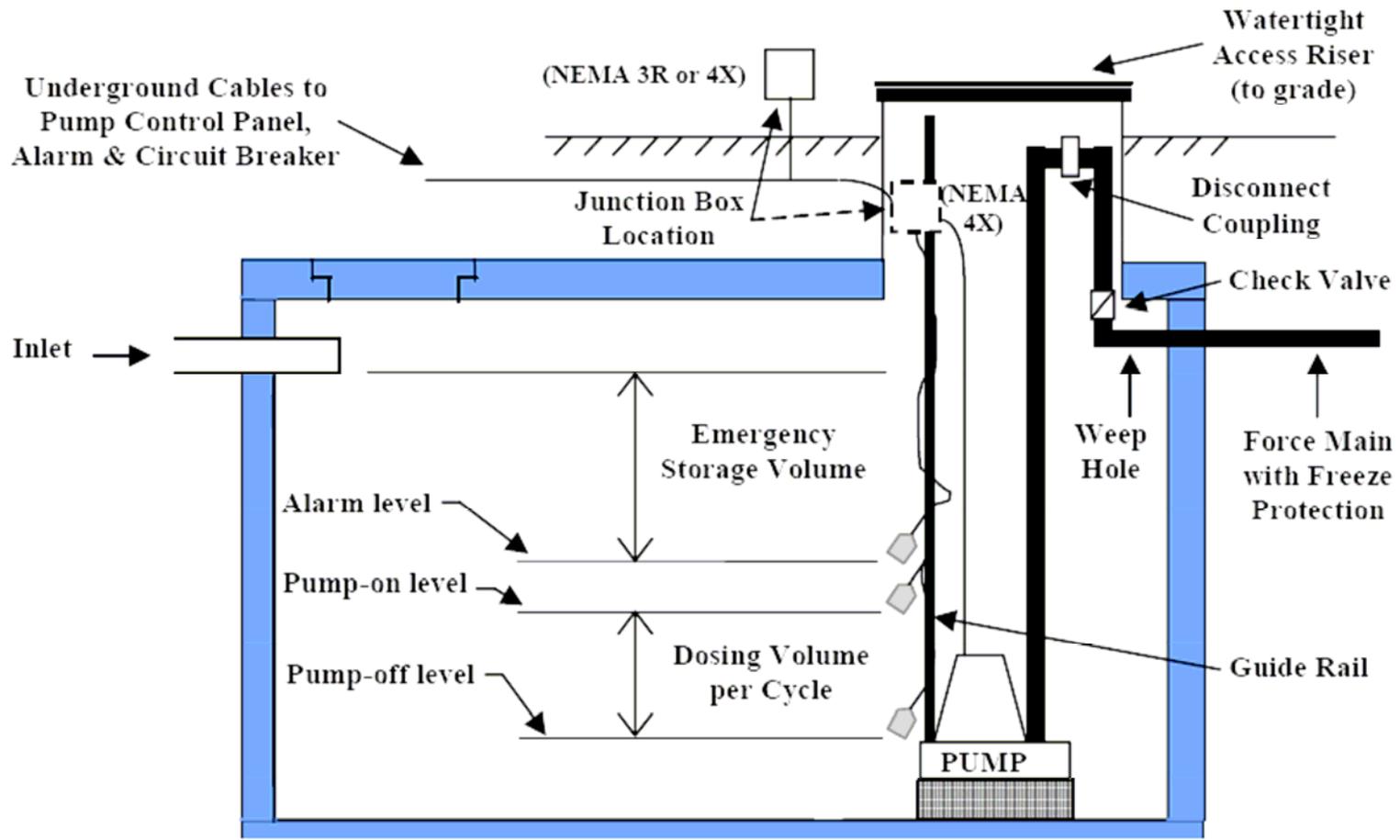
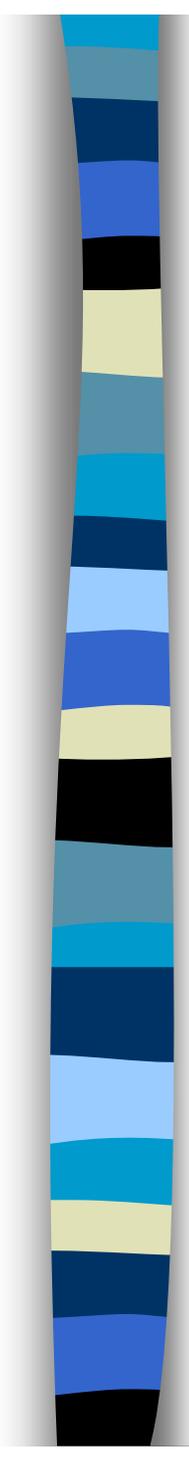
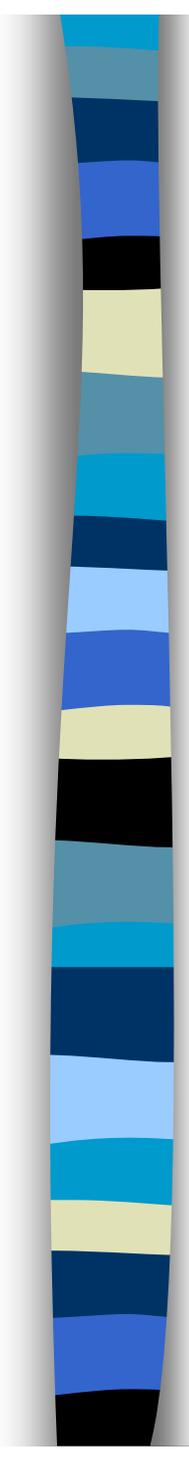


Figure 11 - Pump Chamber



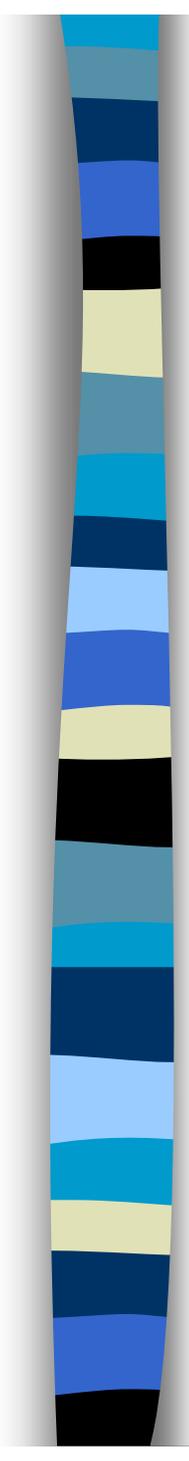
Percolation Tests (p. 35-36)

- Receiving soils added in place of naturally occurring soil
- Miscellaneous language changes and rewording



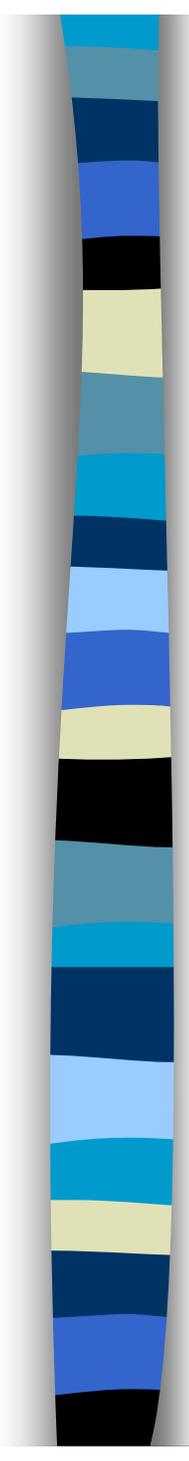
Leaching systems

- Responsibility of proprietary companies to ensure installers are properly trained on installation protocols (p.43)
- Added GreenLeach Filter products (Series 37) p.44



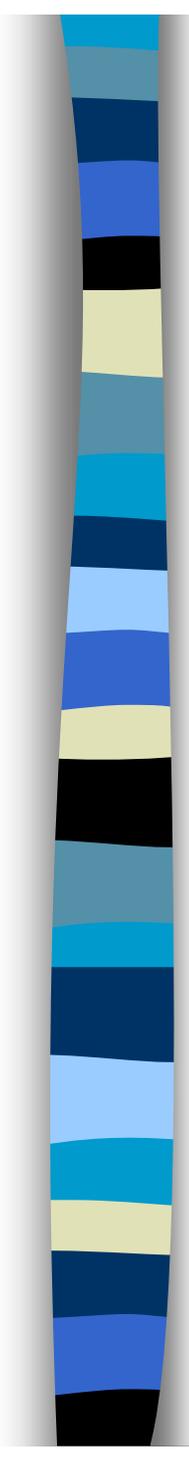
Leaching systems (p.46)

- S-Box, LLC has been dissolved, and their proprietary systems have been assigned to Geomatrix. Reapprovals pending.
- Added Geomatrix products GST 37 Series & GeoMat Edge U-Shape
- GeoMat and GeoU systems must be installed in conjunction with Soil Air



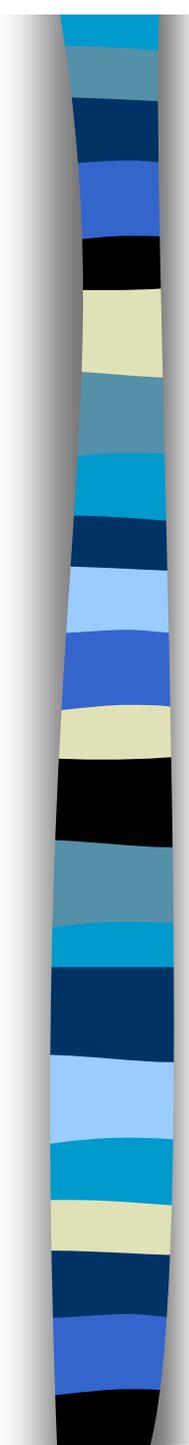
Leaching systems (p.48)

- DPH can require third party/ independent test data in conjunction with reviews/approvals of proprietary leaching systems deemed substantially different than those currently approved.
- Max ELA credit rating of 29.9 sf/lf



Other Wastewater (p.49)

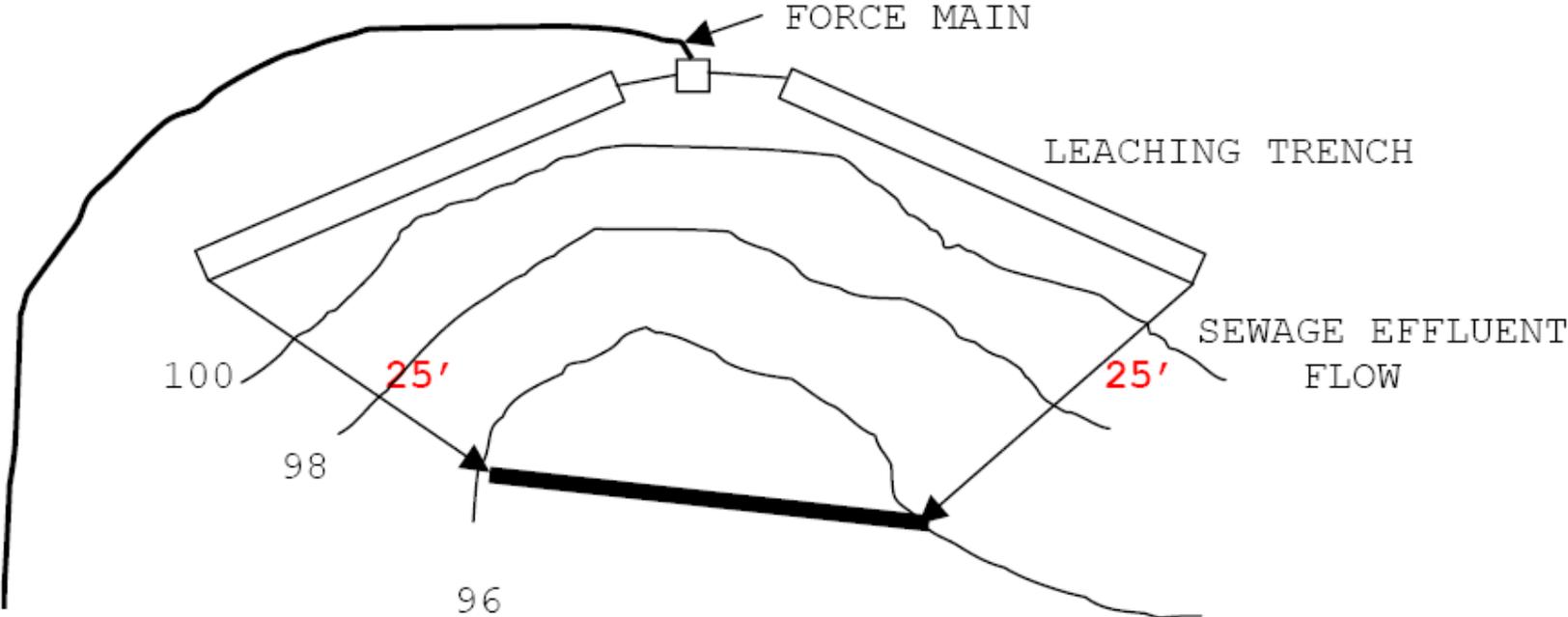
- DPH may authorize the discharge of minor volumes of water treatment wastewater to SSDS if DPH deems the discharge to be incidental.
- DEP contact: James Creighton
phone: 860-424-3681
email: james.creighton@ct.gov



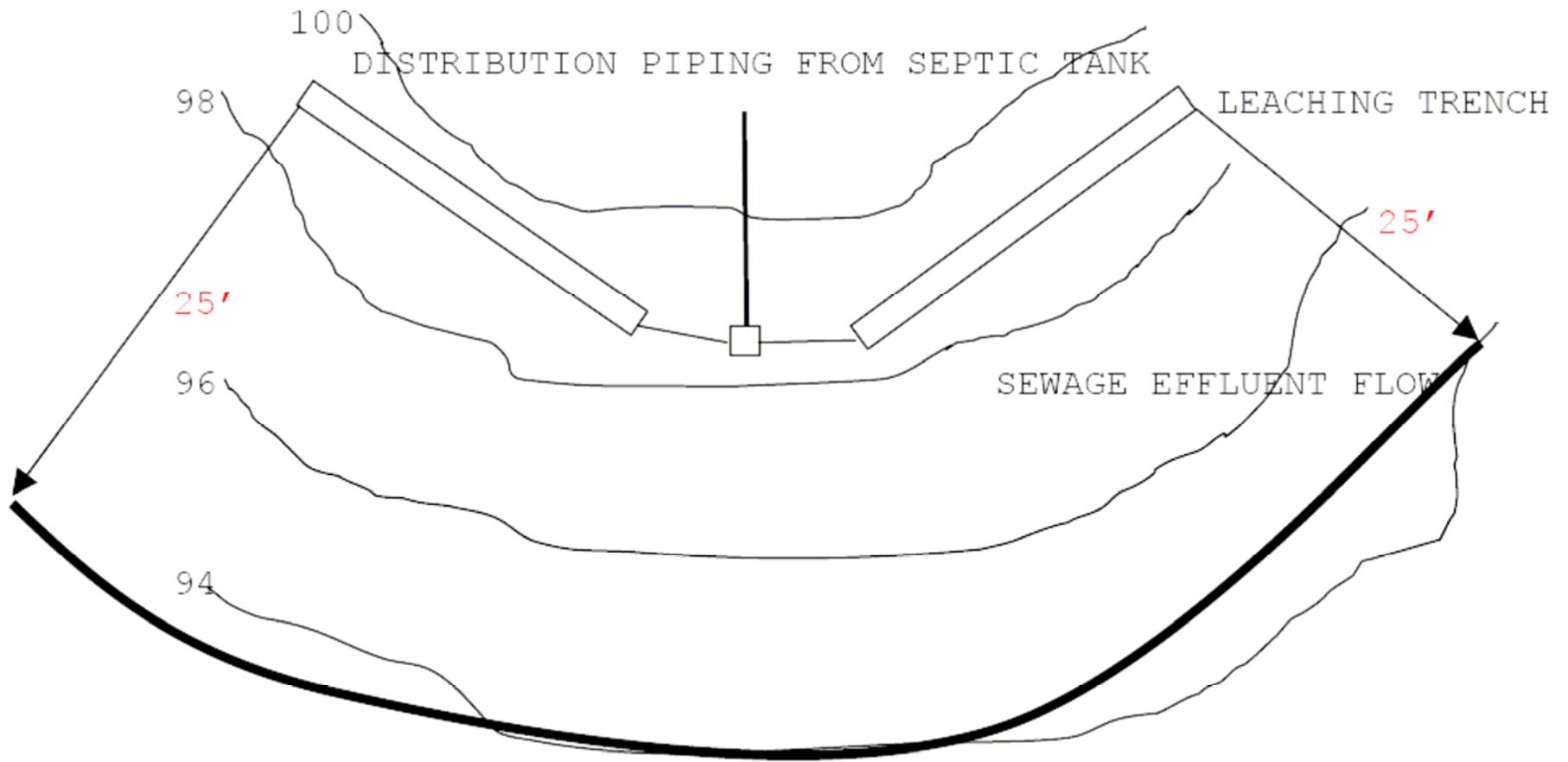
Appendix A: MLSS (definitions p. 59)

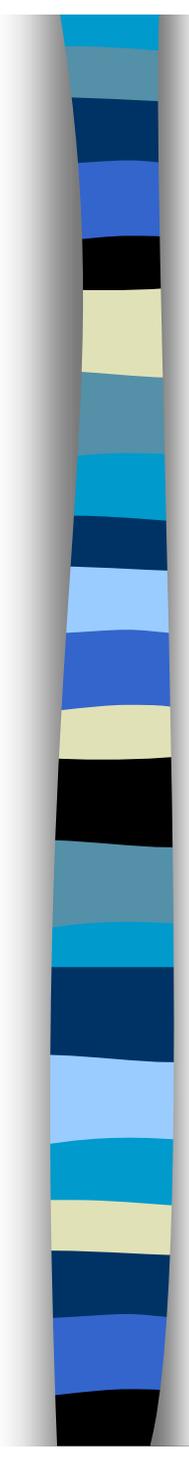
- Leaching System Spread: sloping lots must take into account converging & diverging contours
- Receiving Soil and Receiving Soil Depth added; Depth to Restrictive Layer removed
- Restrictive Layer: impervious soil and redoximorphic added; severely restricted hardpan removed

CONVERGING SEWAGE FLOWS



DIVERGING SEWAGE FLOWS





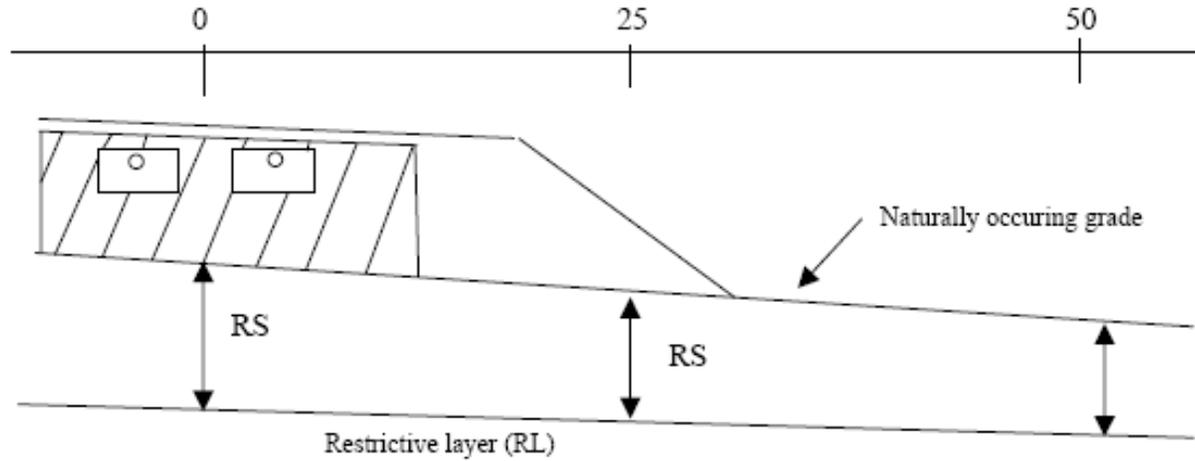
Appendix A: Use of MLSS (p.60)

- Language revised stating that New Systems and Code-complying areas shall provide leaching system spread based on natural occurring soils only
- MLSS, hydraulic analysis or loading test used to demonstrate compliance with PHC Section 19-13-B103e(a)(4)

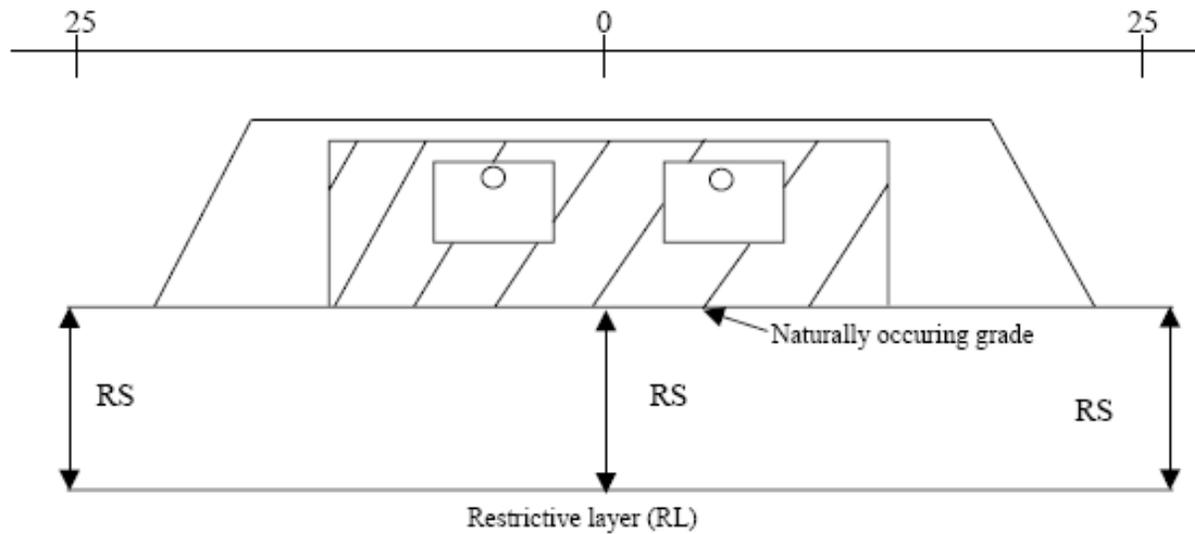
MLSS Compliance for New Systems and Code-Complying Areas

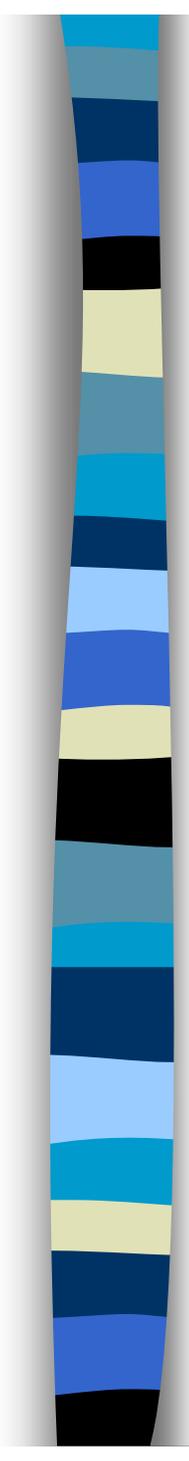
Only Naturally Occurring Soils Considered

Lots with Gradient



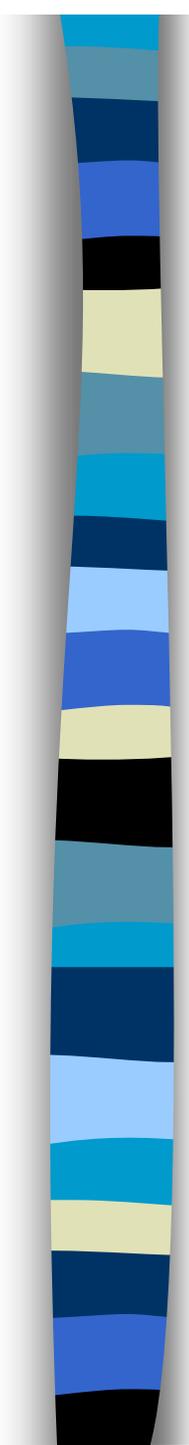
Lots with Flat Gradient





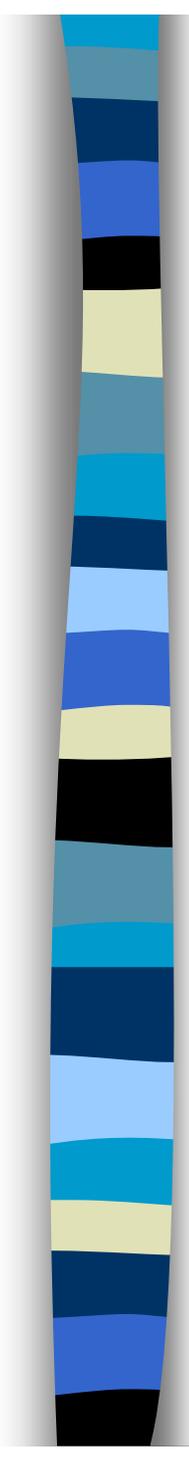
Appendix A: Use of MLSS (p.60)

- Repairs and Potential Repair Areas that cannot provide leaching system spread based on naturally occurring soil require LHD exception
- An assessment referred to as a Non-Compliant Repair (NCR) MLSS necessary prior to exception being granted by LHD



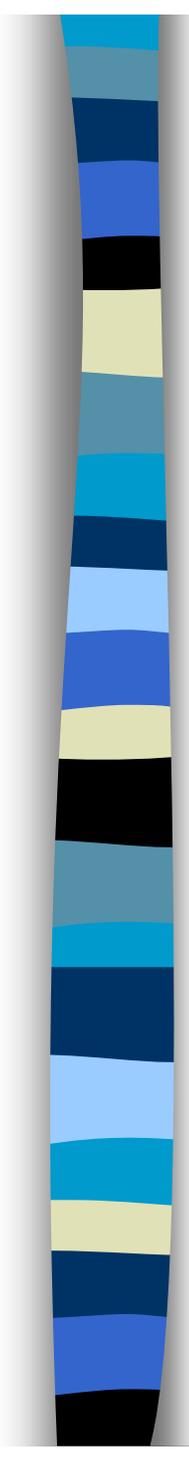
Appendix A: Use of MLSS (p.60)

- NCR MLSS takes into account hydraulic capacity of existing receiving soils (RS) and fill be included in repair design
- Existing fill must have perc rate faster than 30 min/inch, and be clean material free of debris
- RS measured from bottom of leaching system to RL



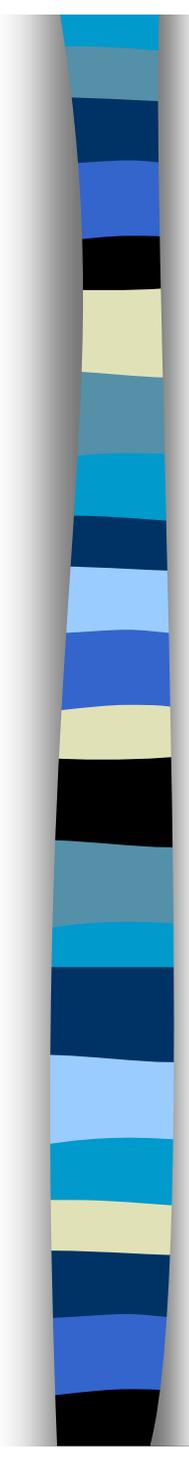
Appendix A: Use of MLSS (p.60)

- Lots with flat water tables; minimum 6" of RS around perimeter of system
- Lots with gradient; minimum 12" of RS 25' downgradient
- Minimum RS Depth (average) provided shall be 18 inches; max is 60 inches
- Perc rate of 10.1-20 min/inch can be used for select fill layers



Appendix A: Use of MLSS (p.60)

- Leaching systems shall provide max. possible of NCR MLSS based on RS Depth of 18-22 inches
- If NCR MLSS (18-22") cannot be met, then addition fill may be considered
- If less than 50% of NCR MLSS met, or minimum RS depths not provided, then PE plan required

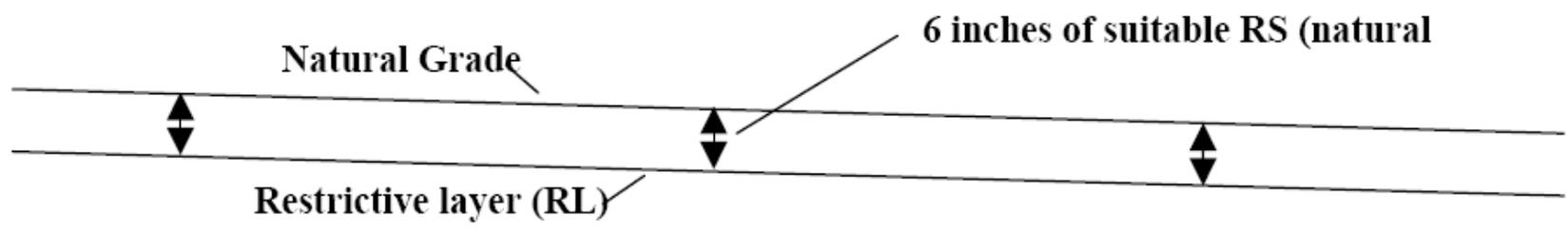


NCR MLSS: Lots with <18” of Natural Occurring Soil

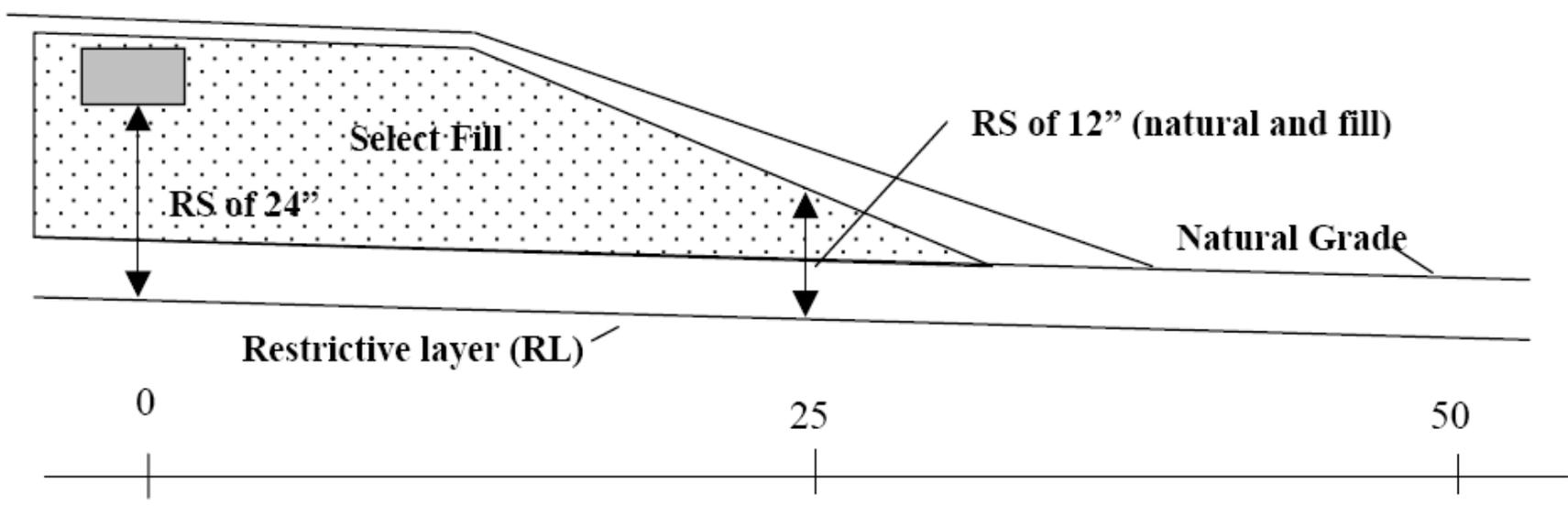
- 12-inch minimum provided 25 ft downgradient and RS Depth at least 18”
- Calculate NCR MLSS based on RS Depth of 18.0-22 and provide maximum percent possible (if can't be met)
- May provide additional fill material to increase RS Depth & reduce NCR MLSS.
- Leaching area must provide at least 50% of NCR MLSS using receiving soil, including additional fill material, or PE plan required.

Lot with Gradient

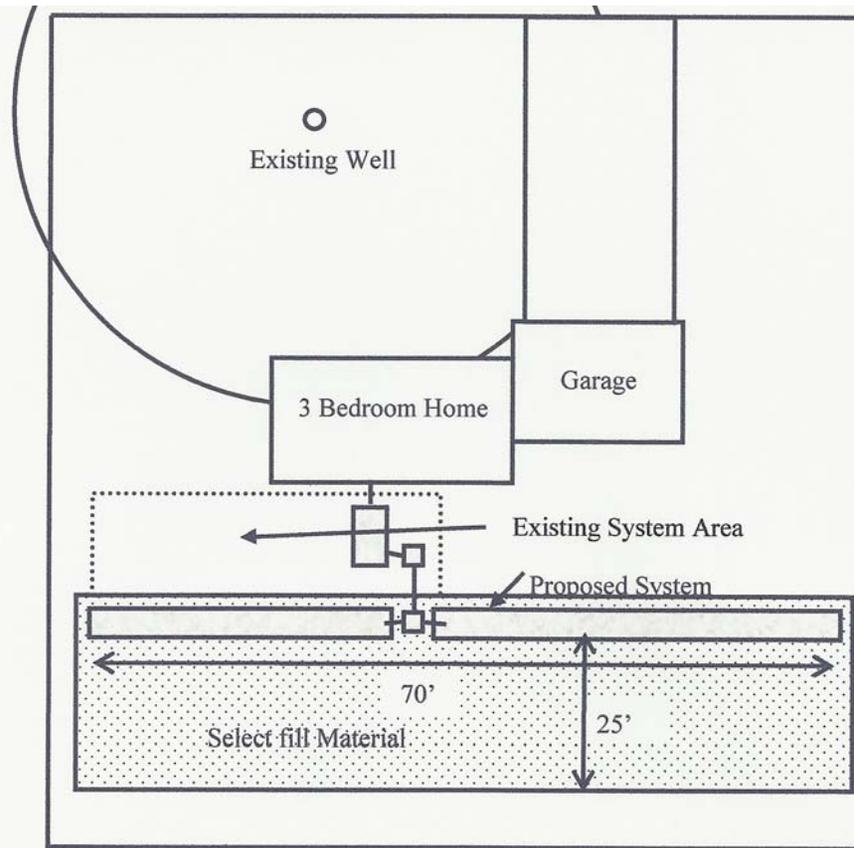
(Existing Conditions)



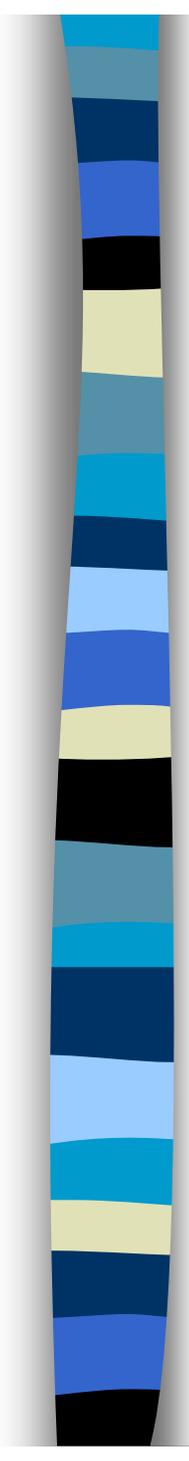
(Proposed Repair)



RS Depth is average in leaching area and 25 ft downgradient
 $(24+12)/2= 18''$



- Leaching area has 6" of natural suitable soil
- Bring in additional fill to provide minimum 12 inches of RS 25' downgradient and increase RS Depth of 18"
- Calculated NCR MLSS based on 18" = 100'
- Can provide 70' of leaching system spread on site
- 70% of NCR MLSS has been provided (70/100)
- Permit to Discharge shall be restricted to 70% of design flow for 3 bedroom house (450 GPD)
- Permitted flow = $450 \text{ GPD} \times 0.7 = 315 \text{ GPD}$

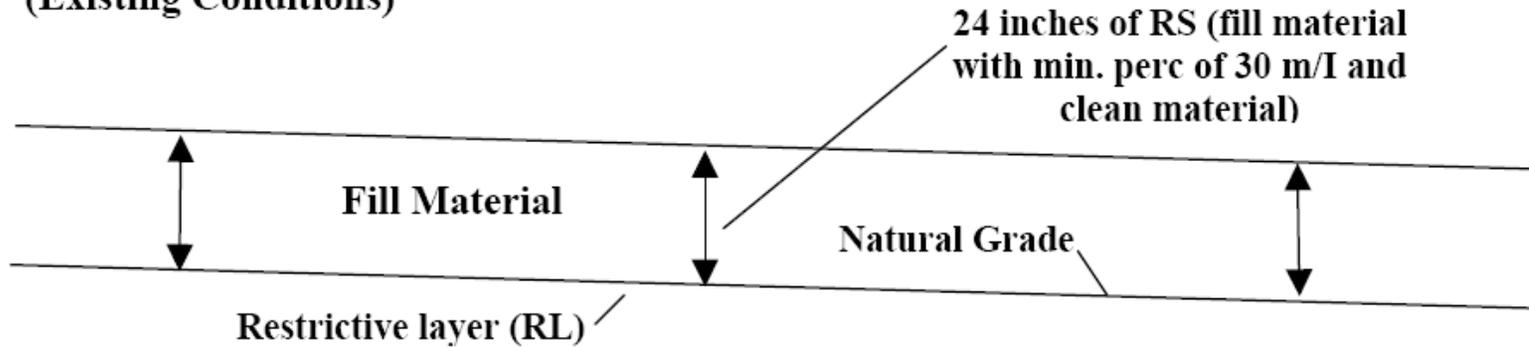


NCR MLSS: Lots with <18” of Natural Occurring Soil; Existing Fill on Site

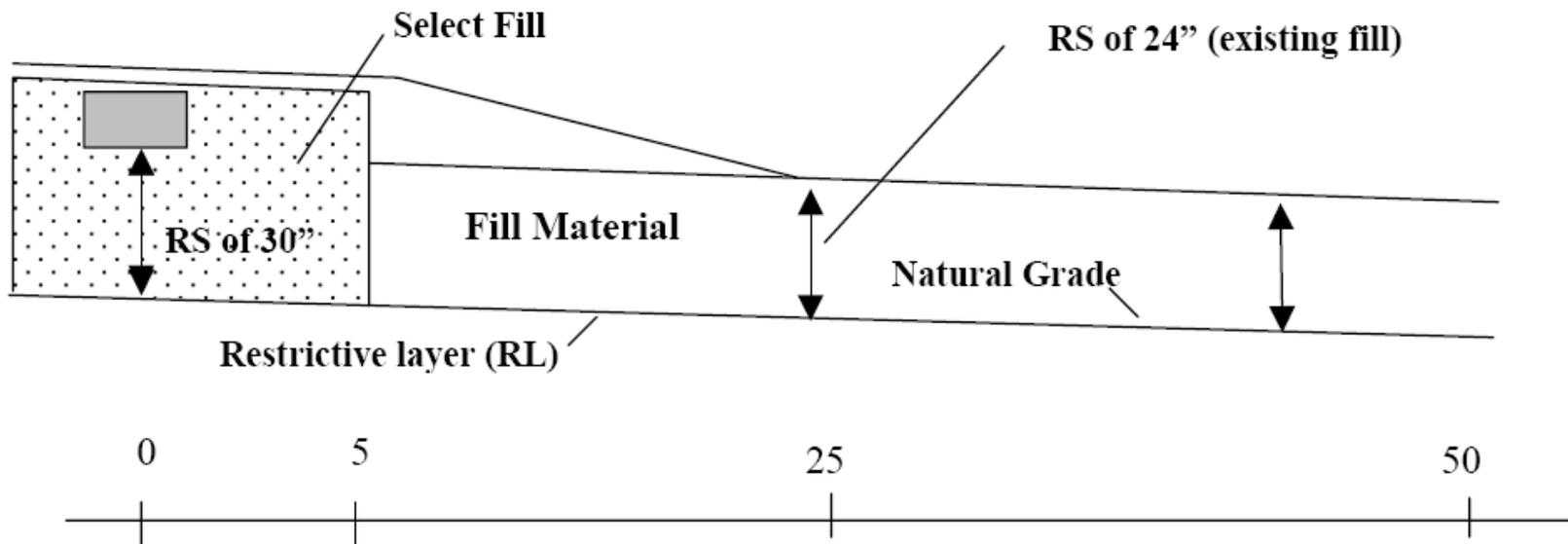
- 12-inch minimum provided 25 ft downgradient and RS Depth at least 18”
- Calculate NCR MLSS based on RS Depth of 18.0-22 and provide maximum percent possible (if can't be met)
- May provide additional fill material to increase RS Depth & reduce NCR MLSS.
- Leaching area must provide at least 50% of NCR MLSS using receiving soil, including additional fill material, or PE plan required.

Lot with Gradient

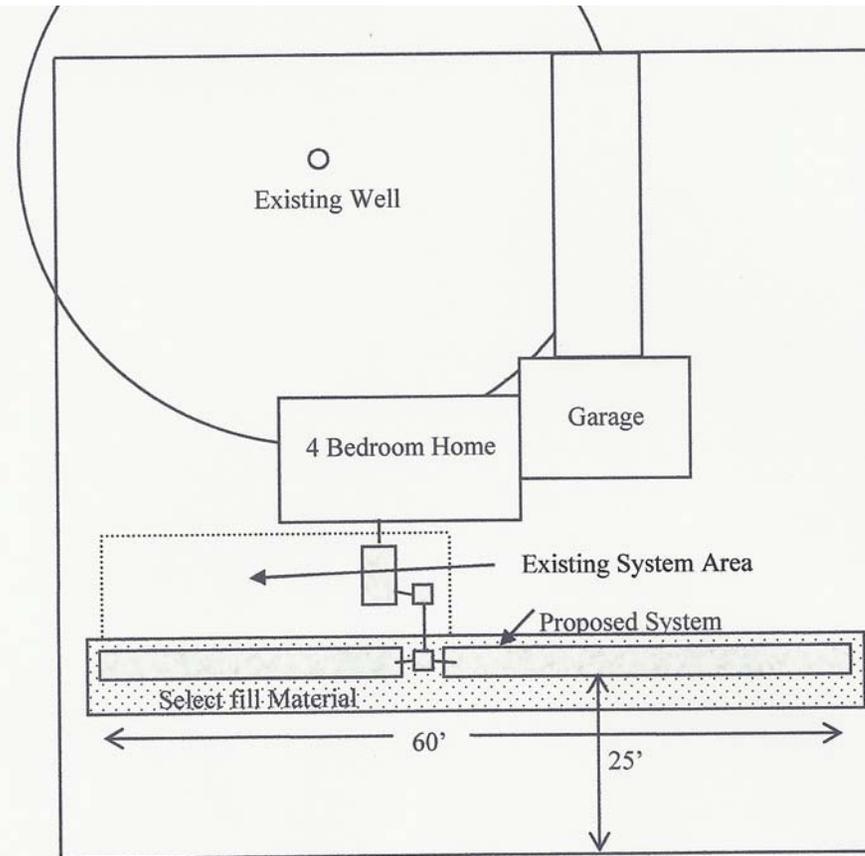
(Existing Conditions)



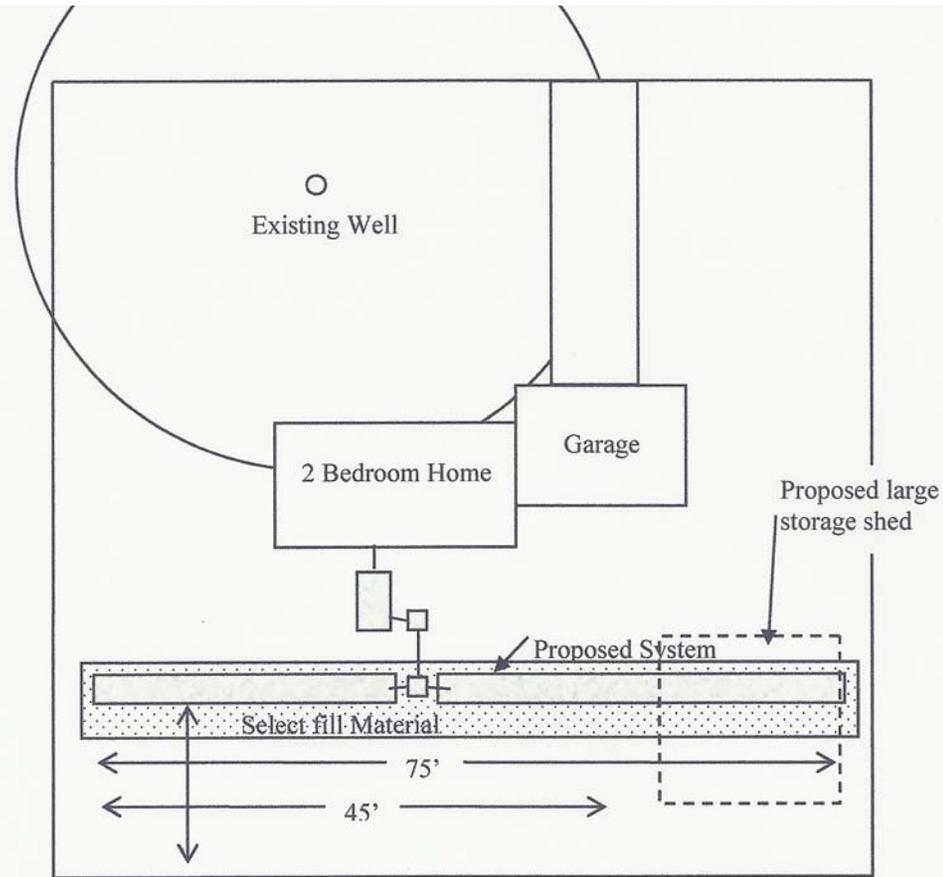
(Proposed Repair)



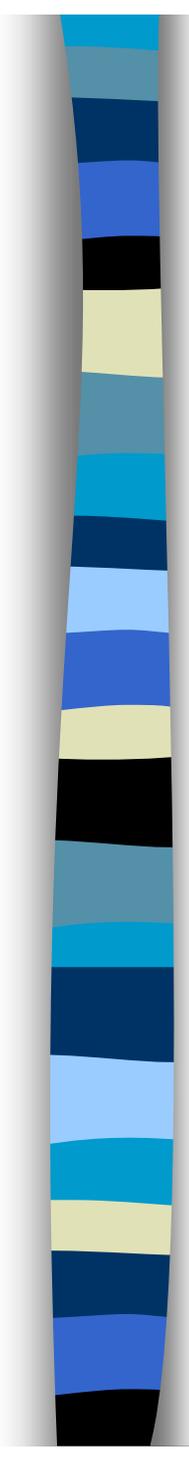
**RS Depth is average in leaching area and 25 ft downgradient
 $(30+24)/2= 27''$**



- Leaching area has 24" of suitable receiving soil (RS)
- Calculated NCR MLSS based on 18" = 150'
- Can provide 60' (or 40%) of leaching system spread
- Bring in additional fill to increase RS Depth of 27"
- Calculated NCR MLSS based 27" RS Depth = 100'
- 60% of NCR MLSS has been provided (60/100)
- Permit to Discharge shall be restricted to 60% of design flow for 4 bedroom house (600 GPD)
- Permitted flow = $600 \text{ GPD} \times 0.6 = 360 \text{ GPD}$



- Leaching area has 30" of RS (suitable fill and NOS)
- Calculated NCR MLSS based on 18" = 75'
- Can provide 100% of leaching system spread
- Using 30" of RS available, calculate NCR MLSS=45'
- Is this allowable to approve proposed shed location?
- Yes/No?
- Permitted flow = 300 GPD x 1.0 = 300 GPD

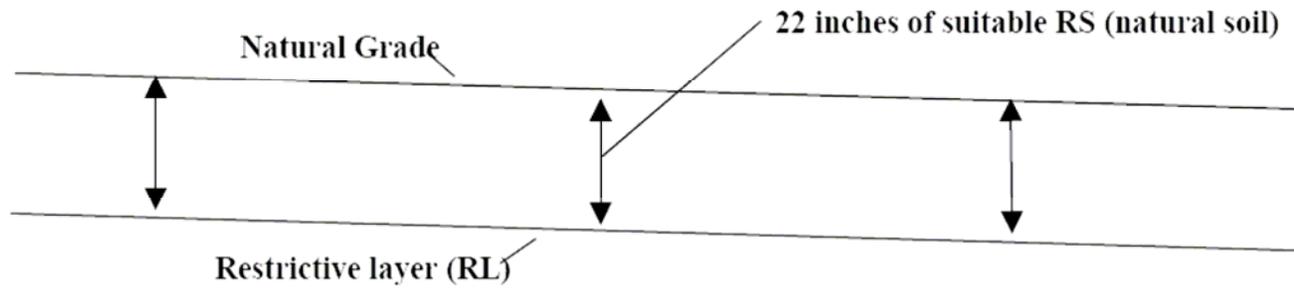


NCR MLSS: Lots with 18” or more of Natural Occur Soil, but full MLSS cannot be provided:

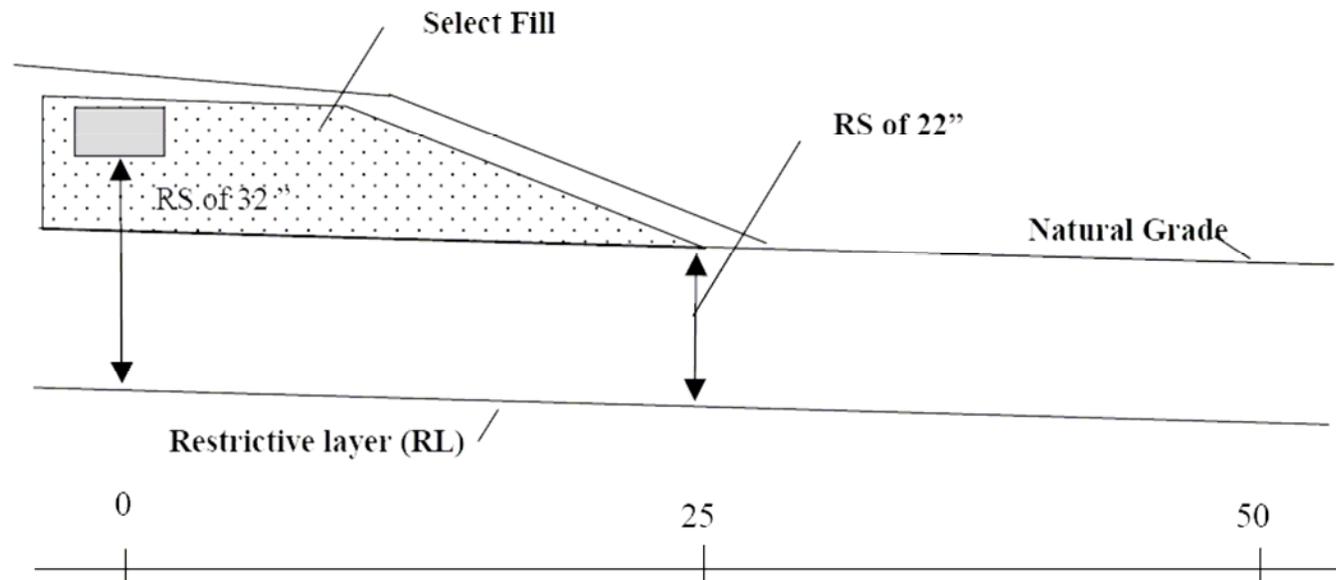
- NCR MLSS must be determined.
- Calculate NCR MLSS based on RS Depth and provide maximum percent possible (if can't be met)
- May provide additional fill material to increase RS Depth & reduce NCR MLSS.
- Leaching area must provide at least 50% of NCR MLSS using receiving soil, including additional fill material, or PE plan required.

Lot with Gradient

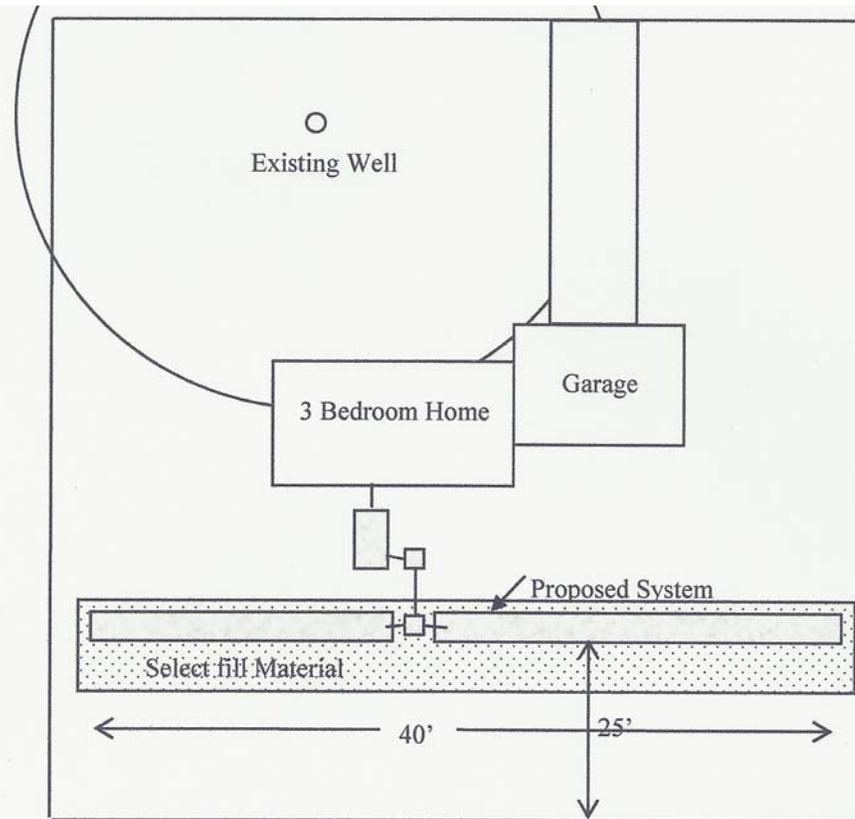
(Existing Conditions)



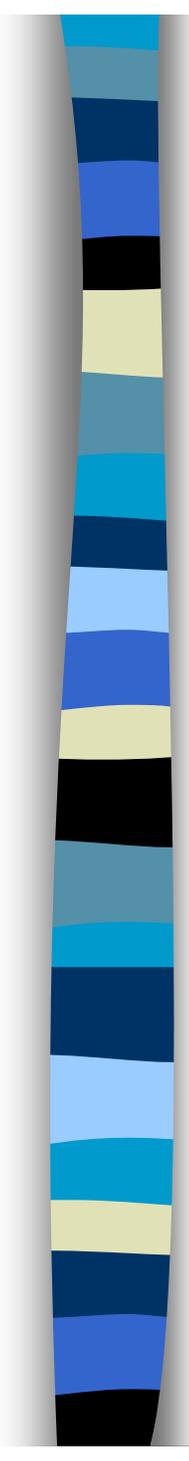
(Proposed Repair)



**RS Depth is average in leaching area and 25 ft downgradient
 $(32+22)/2= 27''$**

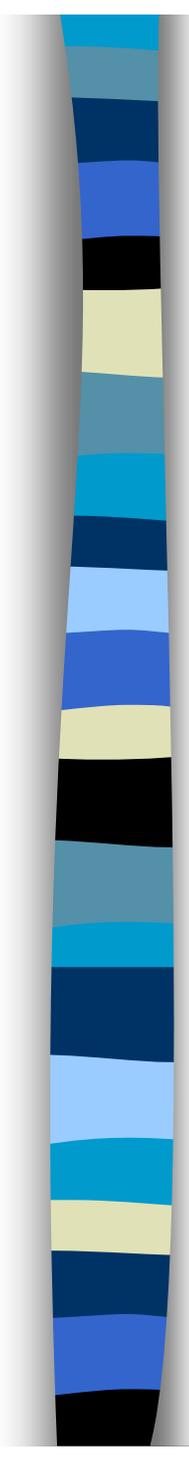


- Leaching area has 22" of nat. occ. soil as RS
- Calculated MLSS based on 22" = 100'
- Can provide 40' (or 40%) of leaching system spread
- Bring in additional fill to increase RS Depth of 27"
- Calculated NCR MLSS based 27" RS Depth = 80'
- 50% of NCR MLSS has been provided (40/80)
- Permit to Discharge shall be restricted to 50% of design flow for 3 bedroom house (450 GPD)
- Permitted flow = $450 \text{ GPD} \times 0.5 = 225 \text{ GPD}$



Appendix A: Use of MLSS (p.60)

- NCR MLSS shall be equivalent to MLSS for purposes of non-flow increasing building additions.
- Such additions may now be approved as long as other requirements of PHC Section B100a(c) are met.



Appendix A: Use of MLSS (p.60)

- Permitted flow noted on Permit to Discharge shall be based on most limited percentage of ELA or NCR MLSS provided
- Permit to Discharge shall state that system is non-compliant relative to MLSS, and exception has been granted

PERMIT TO DISCHARGE

Approval is hereby given to Mr. Green, in accordance with Public Health Code Section 19-13-B103e (h) to discharge to a subsurface sewage disposal system located at 1 Main Street in the town of Hartford, CT that will receive domestic sewage from a:

- X Residential building containing: Three(3) bedrooms. Single family (Y/N): Y.
- Restaurant containing _____ seats.
- Commercial/Office building providing _____ square feet.
- Other structure as described: _____.

Design Flow = 450 gallons per day. Permitted Flow = 315 gallons per day. The design flow shall equal the permitted flow, except for non-compliant repairs (See Section IV D).

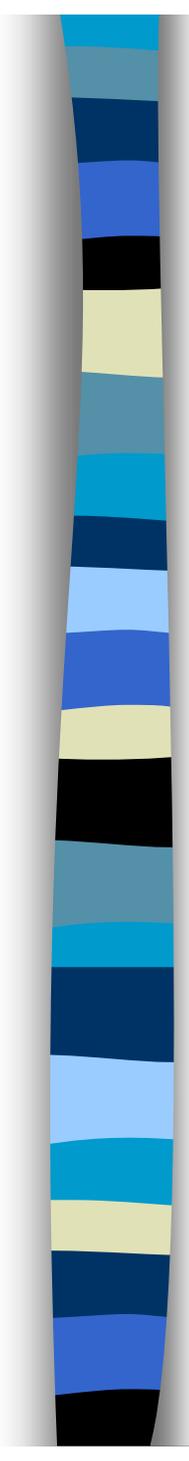
In order to provide a sufficient factor of safety it is recommended that the average daily discharge not exceed 2/3 of the permitted flow or 210 gallons per day.

Exceptions (Repairs Only): Leaching system is non-compliant relative to MLSS requirements. 70 percent of the NCR MLSS has been provided; 100 percent of ELA has been provided. Refer to approved plan dated 1/1/2011 in file for additional information. Separation distance to side property lines reduced to 10 feet.

File Information: Construction Permit No. 100. Approved as-built on file (Y/N) Y.

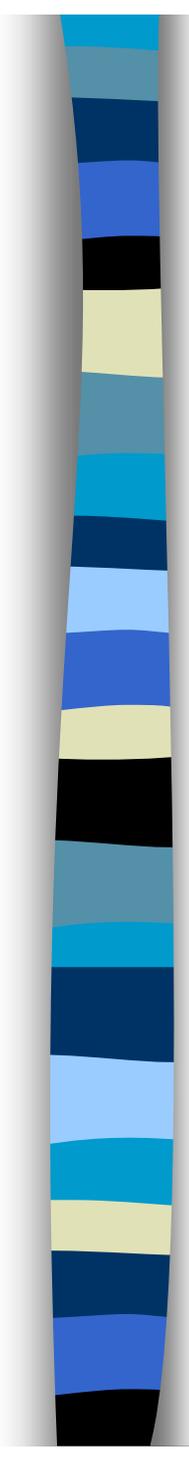
Date of Final Inspection: 1/31/2011 Inspected By: SANITARIAN.

Permit Issuance: Issued by: _____ Title: _____
(Director of Health or Registered Sanitarian)



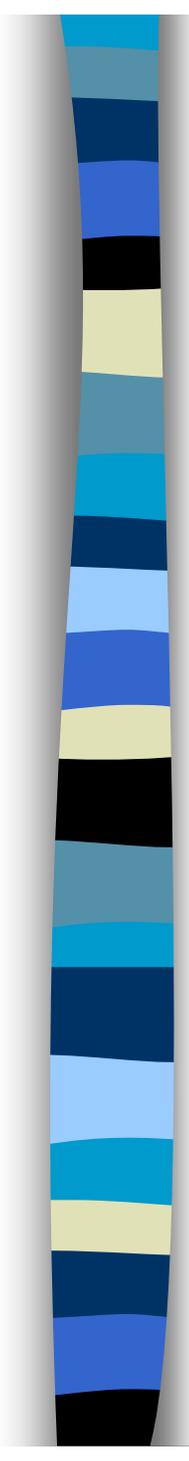
Form 3 pg. 56-57

- Removed tire chip reference
- Added elevation notes section for the leaching system



Appendix D pg. 63

- Updated Approved non-concrete tank list



Readability Changes

- Non-substantive formatting or grammatical changes were made to several sections of the 2011 Technical Standards.

Many thanks to our Local Health
Department host.

