Minnesota Pollution Control Agency

Water Quality

Wastewater Technical Review and Guidance

RAPID INFILTRATION BASINS – REVIEW CHECKLIST

Water/Wastewater/#5.65, May 2001

FACILITY NAME _____ DATE _____

CONSULTING ENGINEER _____ SITE INSPECTION (DATE & INSPECTOR) _____

PLANNING OR DESIGN PHASE

Primary or secondary treatment before discharge? _____

Number of days of storage _____

Will the effluent be chlorinated (if so, possible chlorinated organics developing) _____

Effluent standards before discharge to RI's _____

Reason for RI discharge (ammonia, phosphorus) _____

Effluent chemical characteristics:

$CBOD_5$ _____
Phos _____
TOC _____
Kj-N _____
NH_4 _____
NO_3 _____
Fecals _____

Is the BOD influent loading less than 115 lbs/acre/day _____

Contents:

wq-wwtp5-65

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SITE CHARCTERISTICS

SURFACE

Does the site show signs of disturbance compaction? _____

Are there any pipelines, cables, tile, etc. going through the site? _____

Location and direction of any residences _____

Is a statement made that it is the contractor's responsibility to determine to his/her satisfaction to the location and nature of all surface and subsurface soil and water conditions which will be encountered during construction? _____

Landscape position _____

General description of elevations and contours of the sites and adjacent area. _____

Average Slope _____

Is the pond located in a drainageway that will receive significant amounts of runoff? _____

Are there adequate provisions to divert storm water around the ponds? _____

Karstification

Is the pond site located over Karst areas? _____

REMARKS Ponds shall not be located on sites which show evidence of karstification (ie sinkholes). If site is located in SE MN it shall be subject to siesmic and resistivity studies. The MPCA must be included in the scope of this study prior to commencement. If ponds are approved in SE MN they may be required to use additional lining materials.

Bedrock

Is there a separation distance of 10 feet between the top of seal and bedrock? _____

WATER TABLE DETERMINATION

Has a hydrogeologist either from the agency or consultant assessed the site from a groundwater perspective? _____

Depth to water table from natural soil surface:

Soil survey:

soil series	W.T. depth	W.T. kind	extent %

Soil borings:

# of acres of site _____ # of borings _____

bor #	locat	obser elev/surf	mott elev/GW	elev/GW	Elev/pond	bott	net

Is the field tile drained? _____

Are there at least 3 piezometers installed in bore holes to collect data over an extended period of time, particularly in the spring? _____

Installed _____

Readings:

Date	Site	Site	Site	Site

REMARKS Data may be collected by the owner.

Are the piezometer readings identified in the P&S _____

Is it specified that the piezometers be backfilled according to code? _____

Is there a minimum separation of 4 feet between the top of the pond seal and the maximum high water table? _____

Is tile drain proposed under the pond to permanently lower the groundwater table? _____

If tiled, is the tile lowering the readings in the piezometers? _____

Groundwater depth? (10 feet from bottom of system) _____

GROUNDWATER IMPACTS:

Are there any regional long term groundwater fluctuations that may affect the system over the 20 year life? _____

Has the hydraulic conductivity of the aquifer been determined? _____

Are there any compacted or differing soil conditions downgradient which could change G.W. flow direction or impede flow? _____

Has the groundwater flow direction been determined? _____

Are there any drawdown or artificial recharge (other onsites) that could be affecting GW flow direction? _____

Has the GW discharge area been identified? _____

By what method? _____

If in inland area, a GW study must be conducted to determine deleterious effects _____

Any wells between the RI's and the discharge point? _____

What is the expected GW mound height? _____

How determined? _____

Basins constructed long and narrow to minimize mounding? _____

Can the system be managed to minimize mounding if necessary? _____

Will mounding of one basin cause hydraulic problems in adjacent basins? _____

What is the travel time of the pollutants? _____

What is the configuration of contaminant plume? _____

Has a survey been done to determine the characteristics of the nearby drinking water wells? _____

What is the capacity of the aquifer to dilute the effluent? _____

Have nearby wells been tested to determine if GW drinking standards have already been exceeded? _____

Can GW drinking standards be met at the property boundary? _____

What affects will there be on receiving surface waters (NH4 and P)? _____

Has a monitoring scheme been developed to determine GW flow direction and its fluctuations throughout the seasons? _____

Is this determination influenced by the GW mound? _____

Location, proximity and direction of water supplies _____

Are any wells within ¼ mile of the proposed site? _____

Ground water flow/relation to possible contamination _____

Soils –

Soil series at site _____

Landscape position _____

Number of borings _____

Type of borings _____

Number of pits _____

Quality of descriptions _____

Estimated seasonal watertable height _____

Any observed standing water in hole _____

Bedrock:

Depth: _____
Type:
Geophysical data needed? _____

Flooding Potential _____

Estimated hydraulic conductivity _____

Conducted on the most limiting soil layer above the limiting layer (WT/BR) _____

Test used _____

In site _____

Correct Procedure _____

Do the test results compare well to the soil texture estimation of _____

Water movement? _____

Depth to restricting layers _____

Any lithogical discontinuities/abrupt textural changes? _____

Suitable soil textures? _____

Chemical analysis conducted on the soils for effectiveness of treatment? (ie phosphorus removal) _____

Loading rate calculated taking into account the test method? (EPA Design Manual) _____

Are soil borings located in relation to the pond location on the plan sheet? _____

Are soil borings located in the Plans & Specs? _____

Are the cross sections shown on the plans sheet? _____

BASIN DESIGN

Is the total square feet of basin bottom adequate? _____

Is the number of basins adequate for dosing and resting? (2"/day, load 1 to 2 days, rest 5 to 7 days) (minimum of three ponds) _____

Are there enough basins so one is always available for loading? _____

Is the height of the basins such that there will be 1 foot of freeboard? _____

Is the size of the basins such that the basins will completely fill? (typical size ½ to 5 acres) _____

Are spillways designed in the dikes to allow for emergencies? _____

Will the dikes be rip rapped? _____

Can the basins be accessed for maintenance? _____

Is the configuration such to allow for easy maintenance with equipment? (ie corners) _____

Are the dike slopes 1:1 or 2:1? _____

Are the bottoms of the basins to be covered with gravel? (not acceptable) _____

Is loading less than 400 gallons/acre/year _____

Is loading less than 2.5 to 3 inches per day? _____

If flooding around the basins is expected, is the outside of the dike going to be rip rapped? _____

CONSTRUCTION

General description of work? _____

Is it specified that erosion control be practiced so that no fines enter the basins during construction? _____

Is it specified that topsoil will be removed from the entire pond site? _____

Is it specified where the topsoil will be disposed of? _____

Has an earthwork balance been done? _____

borrow needed? _____

Has a borrow/disposal area been identified on the plan sheet? _____

BASIN BOTTOM:

Do the plans and specifications indicate that the basin bottom not be compacted during construction? _____

If filling is needed to reach subgrade elevation how will the fill material be placed/compacted to provide stability but not lower the permeability?

Is it specified that any proposed borrow material areas have been identified on the plan sheet? _____

UNIFORMITY OF COMPLETED POND BOTTOM

Is it specified that finished elevations of the pond bottom and 6 inch seal lifts shall not be more than 0.2 foot from the average elevation of the bottom? _____

Is it specified that pond bottom uniformity will be verified by a minimum of one spot elevation per 5,000 square feet? _____

Is it specified that deviation from stated tolerance shall be corrected prior to prefilling? _____

EMBANKMENTS

SUBGRADE

Will vegetation, topsoil and other unsuitable materials be removed from the area upon which the embankment is to be placed? _____

Is it specified that the subgrade will be scarified and compacted to a depth of 6 inches? _____ ,

compacted by what method? _____

If dikes will be built into natural slopes, is it specified that the slope be benched or flattened
to less than 4:1? _____

DIKE CORE MATERIALS:

PLANNING:

Has relatively incompressable material free of organic matter, debris, and rocks been located? _____

Is excessive volume shinkage anticipated due to a high percentage of rocks which will diminish the usable material for construction? _____

Is adequate material available on site or is borrow needed? _____

Has it been tested for opt. moisture and density? _____

Contractor responsible for tests? _____

SPECIFICATIONS:

Is it specified that the soil to be used be relatively incompressible and tight? _____

Is it specified that the material be free of organic matter, vegetation debris, and rocks? _____

Is it specified that topsoil will not be used for more than the outside of the 1:1 slope down and outward from the shoulder lines? _____

Has a maximum rock size been specified? _____

Is a cross section drawn on the plans, showing what materials will be placed in what parts of the dike? _____

CONSTRUCTION SPECIFICATIONS:

Is a density specified? _____

Is a moisture specified? _____

Do the specifications generally agree with MN DOT 2105.3? _____

Is a maximum lift thickness specified? _____

Is there any settlement time specified before structure placement? _____

Is it specified that the outside of the dike will be covered by topsoil for seeding purposes? _____

INSPECTION/TESTING:

What is the required testing while the material is being placed? _____

What is specified for inspection while the material is being placed? _____

SEEDING:

Is it specified that 4 inches of fertile topsoil will cover all disturbed areas? _____

Is topsoil defined? _____

Specs included for: Vegetative type? _____

Seeding rate _____ Seeding date _____

Fertilization N _____ P _____ K _____

Mulch? _____ Weed control? _____

Is the watering schedule specified? _____ with what water? _____

by whom? _____

Is it specified that vegetation will be established from the outside toe to the minimum pond operating depth? _____

Is the area to be reseeded shown on the plans? _____

Explained in the specifications? _____

Is erosion control specified during construction? _____

Will additional erosion control be necessary on the exterior dike slopes to protect from sever flooding? _____

Is it planned for? _____

TESTING REQUIREMENTS

Is it specified that all soil test results: density, permeability, moisture on all the dikes be submitted for approval? _____

Is it specified that the results of a survey of the pond bottom indicating that the level is within the proper tolerances be submitted for approval? _____

Is a seepage test specified to determine seepage performance? _____

Is an acceptable seepage rate given? _____

Does the plan sheet agree with the specifications? _____
Facility Plan? _____
Soil Firm Recommendations? _____

OPERATION & MAINTENANCE, MONITORING, AND PERMIT REQUIREMENTS

Is the GW monitoring adequate? _____

Are piezometers located in the basins to check for GW mounding? _____

Does the permit indicate monitoring frequency for wells and piezometers? _____

Does the permit indicate maximum GW mounding and max. contaminant concentrations at the property boundary? _____

Does the permit specify effluent quality into the ponds? _____

Is equipment available to maintain the basin bottom? _____

Does the O & M Manual state that the basin bottom be scarified every 6 months to a year? _____