

ORDINANCE NO. 85, 1999

AN ORDINANCE OF THE TOWNSHIP OF CENTRE, BERKS COUNTY, PENNSYLVANIA, SETTING FORTH A PLAN FOR STORM WATER MANAGEMENT IN THE TOWNSHIP; SETTING FORTH GENERAL PROVISIONS, DEFINITIONS, REQUIREMENTS FOR STORM WATER MANAGEMENT AND PROCEDURES, INSPECTION REQUIREMENTS, PROVISIONS FOR FEES AND EXPENSES, ENFORCEMENT AND PENALTIES

BE IT ENACTED AND ORDAINED by the Board of Supervisors of the Township of Centre, Berks County, Pennsylvania, and it is hereby enacted and ordained by the authority of the same as follows:

Section 1. Title. This Ordinance shall be know as the Centre Township Storm Water Management Ordinance.

Section 2. Statement of Findings. The governing body of the Township of Centre (the "Township") finds that:

(a) Inadequate management of accelerated runoff of storm water resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control storm water, undermines flood plain management and flood control efforts in downstream communities, reduces groundwater recharge and threatens public health and safety.

(b) A comprehensive program of storm water management, including reasonable regulation of development and activities causing accelerated erosion, is fundamental to the public health, safety and welfare and the protection of the people of the Township and all of the people of the Commonwealth of Pennsylvania, their resources and the environment.

Section 3. Purposes. The purpose of this Ordinance is to promote public health, safety and welfare by minimizing the damages described in Section 2 of this Ordinance by provisions designed to:

(a) Control accelerated runoff and erosion and sedimentation problems at their source by regulating activities which cause such problems.

(b) Utilize and preserve the desirable existing natural drainage systems.

(c) Maintain the existing flow and quality of streams and water courses in the Township and in the Commonwealth of Pennsylvania.

(d) Preserve and restore the flood carrying capacity of streams.

(e) Provide for proper maintenance of all permanent stormwater management structures which are constructed in the Township.

(f) Insure adequate drainage of all low points along the line of streets.

(g) Intercept stormwater runoff along streets at intervals related to the extent and grade of the area drained.

(h) Establish criteria for computing stormwater runoff.

(i) Provide positive drainage away from on-site sewage disposal facilities and buildings.

Section 4. Statutory Authority. The Township is empowered to regulate these activities by the authority of the Act of October 4, 1978, P.L. 864, No. 167, known as the "Storm Water Management Act", and pursuant to the express and implied powers granted under the Second Class Township Code.

Section 5. Applicability. The following activities are included within the scope of this ordinance:

(a) Land development.

(b) Subdivision.

(c) Construction of new or additional impervious or semi-pervious areas which total ten thousand (10,000) square feet or more from the effective date of this Ordinance.

(d) Diversion or piping of any natural or man-made stream channel.

(e) Installation, alteration, modification or removal of stormwater systems or appurtenances thereto.

(f) Any other activity where the Township determines that said activity may adversely affect any existing watercourses, stormwater management facilities or stormwater runoff patterns.

Section 6. Modifications.

(a) Modification of These Provisions by the Township Supervisors.

The provisions of this Ordinance are intended as minimum standards for the protection of the public health, safety and welfare. The Township Supervisors may modify or extend said provisions in individual cases as may be deemed necessary in the public interest as set forth hereinafter; provided, however, that such variation shall not have the effect of nullifying the intent and purpose of this Ordinance. If the literal compliance with any mandatory provisions of these regulations is shown to be unreasonable as applied to a specific property, the Township Supervisors may grant a waiver, which is defined herein.

(b) Modification to Approved Plans.

No changes, erasures, modifications or revisions shall be made in any documentation after approval has been made by the Township Supervisors, unless said documentation is first resubmitted to and approved by the Township Supervisors. In all cases "as built" plans must be provided prior to final release of security during the improvements phase.

Section 7. Warning and Disclaimer of Liability. The degree of stormwater protection sought by the provisions of this Ordinance is considered reasonable for regulatory purposes and is based on acceptable engineering methods of study. THIS ORDINANCE DOES NOT IMPLY THAT AREAS SUBJECT TO THE STORMWATER MANAGEMENT REQUIREMENTS OF THIS ORDINANCE WILL BE FREE FROM FLOODING OR FLOOD DAMAGES. The making of an administrative decision shall not constitute a representation, guarantee or warranty of any kind by the Township, or by any official, employee or agent thereof, of the practicability or safety of any proposed structure or use with respect to damage from erosion, sedimentation, stormwater runoff or floods, and shall not create liability upon, or cause of action against, the Township, its officials, employees or agents.

Section 8. Definitions and General Statement. Words used in the present tense shall include the future tense. Words in the singular shall include the plural and words in the plural shall include the singular. The word "shall" and "will" are mandatory; the word "should" and "may" are permissive. Terms not defined in this Ordinance shall have the meaning customarily assigned to them.

Unless otherwise expressly stated, the following words shall, for the purpose of this Ordinance, have the meaning herein indicated:

(a) **Accelerated Erosion.** The removal of the surface of the land thorough the combined action of man's activities and natural processes at a rate greater than would occur because of the natural process alone.

(b) **Conservation District.** The Berks County Conservation District.

(c) **County.** The County of Berks, Commonwealth of Pennsylvania.

(d) **Culvert.** A pipe, conduit or similar structure including appurtenant works which carries surface water under or through an embankment or fill.

(e) **Design Storm.** The magnitude of precipitation from a storm event measured in probability of occurrence (e.g., 50-year storm) and duration (e.g. 24-hour), and used in computing stormwater management control systems.

(f) **Detention Basin.** A basin designed to retard storm water runoff by temporarily storing the runoff and releasing it at a predetermined rate.

(g) **Developer and/or Subdivider.** A person or persons, partnership, association, corporation or other entity, or any responsible person therein or agent thereof, that undertakes the activities covered by this Ordinance. In this Ordinance a developer and subdivider are used interchangeably.

(h) **Drainage Easement.** A right granted by a landowner to a grantee, allowing the use of private land for stormwater management purposes.

(i) **Erosion.** The removal of soil particles by the action of water, wind, ice or other agents.

(j) **Grade.** The inclination, with the horizontal, of a road, unimproved land, etc., which is generally expressed by stating the vertical rise or fall as a percentage of the horizontal distance.

(k) **Impervious Surface.** A surface which prevents the percolation of water into the ground.

(l) **Improvements.** Those physical additions and changes to the land that may be necessary to produce usable and desirable lots.

(m) **Infiltration Structures.** A structure designed to direct runoff into the ground, e.g. french drains, seepage pits and seepage trenches.

(n) **Land Disturbance.** Any activity involving grading, tilling, digging or filling of ground, or stripping of vegetation, or any other activity which causes land to be exposed to the danger of erosion.

(o) **Lot.** A designated parcel, tract or area of land established by a plan or otherwise as permitted by law and to be used, developed or built upon as a unit.

(p) **Owner.** Any person, firm, association, syndicate, co-partnership or corporation having proprietary interest in any land sought to be subdivided or developed pursuant to this Ordinance.

(q) **Parcel.** See Lot above.

(r) **Peak Discharge.** The maximum rate of flow of water at a given point and time resulting from a specified storm event.

(s) **Retention Basin.** A basin designed to retain stormwater runoff with its primary release of water being through the infiltration of said water into the ground.

That part of precipitation which flows over the land.

(t) **SCS.** Soil Conservation Service, U.S. Department of Agriculture.

(u) **Sediment.** Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site or origin by water.

(v) **Storm Sewer.** A system of pipes or other conduits which carries intercepted surface runoff water, or drainage, but excludes domestic sewage and industrial wastes.

(w) **Swale.** A wide, shallow ditch which carries surface water runoff.

(x) **Township.** The Township of Centre, Berks County, Pennsylvania.

(y) **Planning Commission.** The Joint Planning Commission of the Township of Centre and the Borough of Centerport.

(z) **Waiver.** A dispensation, granted by the Township Supervisors, from the terms and conditions of this Ordinance where literal enforcement would cause greater economic, planning or site management difficulties than the strict enforcement of this Ordinance would accomplish and when granting of the dispensation would not be contrary to the public interest.

Section 9. Submissions. When subdivision or land development plans as defined by the Municipalities Planning Code are submitted, whether preliminary or final or for approval in sections, or any other plans are submitted as required by this or any other Ordinance, a storm water management plan in accordance with this Ordinance for the entirely developed project shall be submitted. A note stating that a residue parcel is for "Future Development" or will remain as "agriculture" must be supported with data regarding these uses. If temporary facilities are required for construction of a section, such facilities shall be included in the plans submitted.

Section 10. Applicable Regulations. Where applicable, storm water management facilities shall comply with the requirements of Chapter 105 of Title 25, or any successor title or chapter of rules and regulations of the Pennsylvania Department of Environmental Protection, as set forth in the Pennsylvania Code and any and all other State and Federal regulations which may apply. Approval of a storm

water management plan by the Township shall not be construed as an indication that the plan complies with the standards of any agency of the Commonwealth of Pennsylvania.

Storm water management plans which involve a State highway shall be subject to the approval of the Pennsylvania Department of Transportation.

Section 11. Storm Water Calculations and Plan and Report Requirements.

(a) A plan indicating the pre-developed drainage areas and time of concentration flow paths used shall be submitted. This plan shall indicate the pre-developed contours of the site in such detail as to be field verified, and shall show all existing stormwater facilities within two hundred feet (200') of the property being developed.

(b) A plan indicating the post-developed drainage areas, time of concentration flow paths, and all drainage facilities shall be submitted. This plan shall indicate the post-developed drainage areas, time of concentration flow paths, and all drainage facilities, including plan and profile views of the facilities. This plan shall indicate the post-developed contours of the site. All facilities shall be labeled in an easily understandable manner consistent with the storm water management report.

(c) A storm water management report including all assumptions, methods, references and calculations for all storm water drainage facilities shall be submitted.

(d) The methodology for calculating storm water runoff shall be either the Soil Cover Complex Method or the Rational method.

(e) Runoff coefficients utilized in all calculations shall be those as shown in Appendix A attached hereto and made a part hereof.

(f) For pre-development computations, all runoff coefficients shall be based on actual land use assuming summer or good land cover conditions.

(g) For post-development computations, all runoff coefficients for cultivated land and fallowed fields shall be based on a winter or poor land cover condition.

(h) Pre-developed runoff shall be calculated for the 2, 10, 25, 50 and 100 year storm events.

(i) Post-developed runoff rates shall be restricted as follows for each pre-developed drainage area:

(1) The post-developed 10 year storm event peak discharge shall not exceed the pre-developed 2 year storm event peak discharge.

(2) The post-developed peak discharge for the 10, 25, 50, and 100 year storm events shall not exceed the peak discharge for the corresponding pre-developed storm events. In order to achieve this, it is recommended that methods be considered that will direct runoff from impervious areas to pervious areas or infiltration trenches, that will retain/detain the runoff, or, by some other means suitable to the Township Engineer, reduce the post-developed runoff rate to the pre-developed runoff rate as required.

(3) The post developed 25 year storm event peak discharge shall not exceed the capacity of the receiving storm water facilities. Calculations shall be provided indicating pre and post developed 25 year peak discharge for all receiving stormwater facilities.

(j) Stormwater runoff shall discharge to an existing watercourse with defined bed and barriers or an existing storm drainage system. Stormwater shall not be concentrated onto adjacent properties such that the velocity of the flow for a 25 year storm event peak discharge would be increased beyond that existing prior to subdivision, land development or the commencement of land disturbance activities unless written approval is given by the adjacent property owners to the proposed discharge of surface runoff and the written agreements are approved by the Township. Calculations shall be provided indicating pre and post developed 25 year peak discharge velocities for all receiving stormwater facilities.

(k) When storm drainage will be directed into an adjacent municipality, all provisions for accommodating such storm drainage shall be submitted to the governing body of that municipality for review.

Section 12. Swales, Pipes, Culverts and Other Conveyance Facilities.

(a) All storm water conveyance facilities that service drainage areas within the project site shall be designed based on the 25 year storm event peak discharge to the facility.

(b) All storm water conveyance facilities that convey offsite stormwater through the project site shall be designed based on the 50 year storm event peak discharge to the facility.

(c) All stormwater conveyance facilities shall, however, be designed such that the runoff from the 100 year storm event will be able to be conveyed within defined facilities without causing any damage to the public and private property.

(d) All storm water pipes to be maintained by the Township shall be reinforced cement concrete pipe.

(e) All pipes shall have a minimum diameter of fifteen inches (15"), and a minimum slope of 0.35%. The crown of the pipe shall be at least twelve inches (12") below the subgrade elevation.

(f) Changes in horizontal or vertical direction of pipes shall be accomplished by installing an inlet, manhole or junction box.

(g) All stormwater facilities and appurtenances shall be in accordance with PennDOT Form 408, as amended, and in accordance with the requirements of PennDOT's Standards for Roadway Construction, as amended.

(h) All storm sewer crossings of streets shall be perpendicular to the street centerline.

(i) Trench excavations within street right-of-way areas shall be backfilled with suitable stone aggregate materials from the bottom of the trench to the subgrade elevation; all other areas shall be backfilled with suitable stone aggregate materials from the bottom of the trench to the pipe spring line elevation.

(j) Inlets shall be utilized at all inlet ends of pipes within street right-of-ways. Inlets shall also be placed on both sides of the street at low points, at a maximum of six hundred feet (600') apart, and at points where the flow in gutters exceeds three inches (3"). Inlet capacity information shall be provided for all inlets. All inlets shall have bicycle-proof inlet grates.

(k) Where headwalls are utilized, protective grating shall be provided in a manner similar to the detail provided in Appendix B attached hereto and made a part hereof.

(l) Endwalls and endsections shall be used where stormwater runoff discharges from a stormwater pipe or culvert. Outlets shall be protected with grating of sufficient sizing to prevent the entrance of a six inch (6") diameter or larger sphere.

(m) The capacities of swales and open channels shall be computed from the Manning Equation. Verification that the velocity in the swale does not exceed the permissible velocity for the design swale lining shall be provided. The Pennsylvania DEP Soil Erosion and Sedimentation Control Manual shall be utilized for this purpose. Swales within Township rights-of-way shall be designed such that they can be maintained with existing Township equipment and resources. All such swale linings and configurations shall be subject to review and approval by the Board of Supervisors. Rip-rap lined swales within Township rights-of-way shall be avoided, but may be allowed if specifically approved by the Township Board of Supervisors.

(n) Storm water velocities at pipe outlets shall be calculated. Outlet protection consisting of a rip-rap apron or other suitable control measure shall be

provided in accordance with the Pennsylvania DEP Soil Erosion and Sedimentation Control Manual.

(o) When drainage swales are traversed by driveways or other crossings, design and construction details of the crossings shall be provided, and calculations indicating that the swales will continue to function in accordance with the swale design shall be provided.

Section 13. Basins.

(a) Retention/detention facilities shall be designed such that the post-development to pre-development requirements set forth herein are met.

(b) All swales, pipes, culverts and other conveyance facilities associated with a basin shall fall under the jurisdiction of Section 12 of this Ordinance.

(c) Basins shall be designed with an emergency spillway, located in virgin ground, capable of handling the entire 100 year post-developed flow assuming all other outlet facilities are completely blocked. The emergency spillway water discharge elevation shall be at an elevation at least one foot (1') below the top of the basin berm, and the emergency spillway elevation shall be at least six inches (6") above the highest principal outlet.

(d) The top of the berm shall be at least twelve inches (12") above the peak water elevation for the 100 year storm event.

(e) Compaction requirements and berm material requirements for the impoundment embankment shall be provided to demonstrate that the embankment will be structurally sound under all probable operating conditions.

(f) Pond retention times shall not exceed twenty-four (24) hours after the end of the design storm events.

(g) Maximum water depth shall not exceed six feet (6').

(h) Minimum top width of embankments shall be three feet (3').

(i) Determination of the need for protection around the perimeter of basins shall be the responsibility of the applicant, and shall be subject to review by the Township.

(j) Minimum grades for turf areas inside detention basins shall be one percent (1%) and basin bottoms shall include low flow channels.

(k) Maximum side slopes of detention basins shall be three (3) horizontally to one (1) vertical.

(l) A cutoff trench of impervious material shall be provided.

(m) Properly spaced and sized concrete cutoff collars or factory welded anti-seep collars shall be provided.

(n) Drainage easements, with complete dimensions, shall be provided, at a minimum, corresponding to the 100 year water elevation.

Section 14. Maintenance.

(a) All plans shall clearly indicate on the plan(s) to be recorded the ownership and maintenance responsibility of all storm water facilities.

(b) When any stormwater management facility is located on an individual lot, and when maintenance thereof is the responsibility of that landowner, a description of the facility or systems and the terms of the required maintenance shall be incorporated on a plat of the property. The plat shall be recorded with the Berks County Recorder of Deeds. In addition, the Township may require as a condition of approval that any deed conveying any interest in such lot contain language indicating that the conveyance is subject to an express covenant by the grantee that the grantee will maintain the stormwater management facility.

(c) Maintenance of Natural Drainage Ways. All natural streams, channels, swales, drainage systems and/or areas of surface water concentration shall be maintained in their existing condition unless an alteration is approved by the Township. All encroachment activities shall comply with the requirements of Chapter 104 (Water Obstructions and Encroachments) of Title 25, Rules and Regulations of the Pennsylvania Department of Environmental Protection, or any successor provision.

(d) There shall be provided a drainage easement that conforms substantially with the line of any pond, lake, watercourse, drainage way, channel, storm drainage system or stream of such width as will be adequate to preserve the unimpeded flow of drainage and to provide for widening, deepening, relocation, improving or protecting such features or drainage facilities. Minimum easement width shall be ten feet (10') from each side of the watercourse, waterbody, stream, pond or lake, but the Township may require a greater easement when necessary. Bearings and distances shall be provided for the boundaries of easements.

(e) Storm water facilities to be maintained by non-municipal entities shall be provided with adequate easements accessible from public roads over which the Township shall have right of access to correct or maintain such facilities if necessary in the public interest. In such cases, the lot owner shall be responsible for

all costs of the Township. Responsibility of such privately maintained facilities shall be conspicuously noted on the plan to be recorded. Areas within easements shall be kept as lawn or in natural condition to allow maintenance and entrance, and shall not be altered in any way from the approved design and shall be maintained to retain the design capacity.

(f) If the Township determines at any time that any permanent stormwater management control facility has been eliminated, altered or improperly maintained, the owner or private entity which owns the property shall be advised of corrective measures required and given a reasonable period of time to take necessary action. If such action is not taken by the property owner, the Township may cause the work to be done and charge all costs against the property in accordance with applicable law.

Section 15. Repealer. Any ordinance of the Township inconsistent with any of the provisions of this Ordinance is hereby repealed to the extent of the inconsistency only.

Section 16. Severability. Should any article, section, subsection, paragraph, clause, phrase or provision of this Ordinance be declared, by final unappealed judgment or order of a court of competent jurisdiction, to be invalid, such judgment or order shall not affect the validity of this Ordinance as a whole or any part or provision thereof other than the part so declared to be invalid or unconstitutional.

Section 17. Compatibility with Other Permit and Ordinance Requirements. Approvals issued pursuant to this Ordinance do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act or ordinance. If more stringent requirements concerning regulation of stormwater or erosion and sedimentation control are contained in the other code, rule, act or ordinance, the more stringent regulation shall apply.

Section 18. Presubmission. The Township Engineer shall be afforded the opportunity to review the proposed methodology prior to official submission of the storm water management report, especially where non-conventional methods are proposed. (i.e., infiltration trenches, retention ponds, etc.).

Section 19. Schedule of Inspections. The Township Engineer shall inspect all phases of development of the site, and shall be notified of the commencement of such work at least five (5) business days prior to commencement. It is the responsibility of the owner, subdivider, developer or his agent to notify the Township Engineer twenty-four (24) hours in advance of the completion of each identified phase of development.

Any portion of the work which does not comply with the approved plan must be corrected by the developer. No work may proceed on any subdivision, land development or building construction until the required corrections have been made.

If at any state of the work, the Township or its Engineer determines that the soil or other conditions are not as stated or shown on the plan, it may refuse to approve further work, and the Township or its designee may revoke existing approvals until a revised plan is submitted and approved.

Section 20. Penalties. Any person violating any provision of this Ordinance shall, for each and every such violation, upon conviction thereof, be sentenced to pay a fine of not less than Three Hundred Dollars (\$300.00) and not more than One Thousand Dollars (\$1,000.00), plus costs of prosecution. Each day that any such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such hereunder. Any violation of any provision of this Ordinance that shall also constitute a violation of a specific provision of the laws of the Commonwealth of Pennsylvania or of any regulation of any department or agency thereof having the effect of law shall be prosecuted under said State law or regulation and not under this Ordinance.

Section 21. Effective Date. The effective date of this Ordinance shall be the earliest date permitted by law.

ENACTED AND ORDAINED by the Board of Supervisors of the Township of Centre, Berks County, Pennsylvania this 14th day of June, 1999.

TOWNSHIP OF CENTRE

Ronald E. Knepp
Ronald E. Knepp, Chairman

Larry C. Zimmerman
Larry C. Zimmerman

Wilmer H. Phillips
Wilmer H. Phillips

Attest:

Ruth A. Borkey
Ruth A. Borkey, Secretary

SEAL

APPENDIX A

RUNOFF COEFFICIENTS "c" FOR RATIONAL METHOD

| Soil Group | A | | | B | | | C | | | D | | |
|-----------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| | 0 - 2 | 2 - 6 | 6 + | 0 - 2 | 2 - 6 | 6 + | 0 - 2 | 2 - 6 | 6 + | 0 - 2 | 2 - 6 | 6 + |
| Slope % | | | | | | | | | | | | |
| Land Use | | | | | | | | | | | | |
| Cultivated Land | | | | | | | | | | | | |
| Winter | 0.14 | 0.23 | 0.34 | 0.21 | 0.32 | 0.41 | 0.27 | 0.37 | 0.48 | 0.34 | 0.45 | 0.56 |
| Summer | 0.10 | 0.16 | 0.22 | 0.14 | 0.20 | 0.28 | 0.19 | 0.26 | 0.33 | 0.23 | 0.29 | 0.38 |
| Fallowed Fields | | | | | | | | | | | | |
| Poor | 0.12 | 0.19 | 0.29 | 0.17 | 0.25 | 0.34 | 0.23 | 0.33 | 0.40 | 0.27 | 0.35 | 0.45 |
| Good | 0.08 | 0.13 | 0.16 | 0.11 | 0.15 | 0.21 | 0.14 | 0.19 | 0.26 | 0.18 | 0.23 | 0.31 |
| Forest/Woodland | 0.08 | 0.11 | 0.14 | 0.10 | 0.14 | 0.18 | 0.12 | 0.16 | 0.20 | 0.15 | 0.20 | 0.25 |
| Grass Areas | | | | | | | | | | | | |
| Good | 0.10 | 0.16 | 0.20 | 0.14 | 0.19 | 0.26 | 0.18 | 0.22 | 0.30 | 0.21 | 0.25 | 0.35 |
| Average | 0.12 | 0.18 | 0.22 | 0.16 | 0.21 | 0.28 | 0.20 | 0.25 | 0.34 | 0.24 | 0.29 | 0.41 |
| Poor | 0.14 | 0.21 | 0.30 | 0.18 | 0.28 | 0.37 | 0.25 | 0.35 | 0.44 | 0.30 | 0.40 | 0.50 |
| Impervious | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Stone Covered | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |

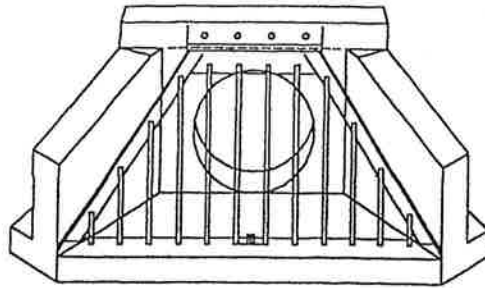
RUNOFF CURVE NUMBERS "CN" FOR SCS METHOD

| Soil Group | A | | | B | | | C | | | D | | |
|-----------------|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|
| | 0 - 2 | 2 - 6 | 6 + | 0 - 2 | 2 - 6 | 6 + | 0 - 2 | 2 - 6 | 6 + | 0 - 2 | 2 - 6 | 6 + |
| Slope (%) | | | | | | | | | | | | |
| Land Use | | | | | | | | | | | | |
| Cultivated Land | | | | | | | | | | | | |
| Winter | 48 | 60 | 75 | 62 | 73 | 82 | 68 | 78 | 90 | 77 | 88 | 95 |
| Summer | 35 | 54 | 58 | 48 | 55 | 65 | 57 | 65 | 73 | 64 | 69 | 79 |
| Fallowed Fields | | | | | | | | | | | | |
| Poor | 45 | 54 | 65 | 56 | 63 | 73 | 64 | 74 | 81 | 69 | 77 | 87 |
| Good | 30 | 44 | 48 | 43 | 48 | 55 | 48 | 54 | 63 | 56 | 60 | 68 |
| Forest/Woodland | 30 | 40 | 43 | 42 | 46 | 50 | 45 | 50 | 53 | 50 | 56 | 61 |
| Grass Areas | | | | | | | | | | | | |
| Good | 35 | 51 | 53 | 48 | 54 | 63 | 56 | 59 | 73 | 62 | 63 | 79 |
| Average | 45 | 53 | 58 | 52 | 55 | 65 | 60 | 63 | 75 | 65 | 69 | 82 |
| Poor | 48 | 55 | 57 | 56 | 67 | 77 | 66 | 74 | 85 | 73 | 81 | 90 |
| Impervious | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| Stone Covered | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |

APPENDIX B

HEADWALL TRASH RACK DETAIL

NO SCALE



-ISOMETRIC-

