REPORT ON EXCAVATION AND QUARRY SETBACKS

Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333-0017

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Contact: Andrew Fisk, Director
Bureau of Land and Water Quality
Phone (207) 287-77671
Email Andrew.C.Fisk@maine.gov

EXECUTIVE SUMMARY

- P.L. 2007 Chapter 364 required the Department of Environmental Protection (DEP) to review setback and buffer standards for excavations and quarries, including how setbacks and buffers for areas of steep slopes are addressed, and required the DEP's findings and recommendations to be addressed in this report.

- In 1993, the Maine Legislature established a new program (P.L. 1993 Chapter 350) for regulating gravel pits between 5 and 30 acres in size. This law established a registration process that emphasizes technical assistance and compliance review by the DEP rather than requiring a full application review process for each new small pit. In 1995, the Legislature further expanded the program to include gravel pits larger than 30 acres, excavations for topsoil, clay and silt, as well as quarries (excavation of blasted rock). To date, the program has been very successful as an alternative regulatory process.

- Buffer zones, particularly forest buffers, are crucial in protecting water quality of the State's rivers and streams.

- In 1993, DEP conducted a survey and review of other state regulatory programs for sand and gravel mining. The primary purpose of this review was to compare and evaluate regulatory approaches and standards used by other states. A review of the data from this report reveals that the required setbacks for rivers and streams in other states range from 25 feet to 100 feet.

- Over the last decade, DEP has supported changes addressing concerns regarding buffer strips and setbacks for mining activity. To maintain consistency between local and State regulation, the Legislature enacted P.L. 1995 Chapter 287 which revamped the buffer strip requirement for protected natural resources near gravel pits. The performance standards are now similar to both the standards for gravel extraction under the Mandatory Shoreland Zoning Act and the general standards under the Natural Resources Protection Act. P.L. 2007 Chapter 364, enacted in 2007, increased buffers on portions of the Kennebec River to 100 feet.

- DEP is aware of at least six slope failures associated with licensed gravel pits. Five of these six have occurred on the Kennebec River between Solon and Augusta. This number of failures represent less than one percent of the gravel pits licensed under the 1993 performance standards program.

- Currently a joint project between the Maine Emergency Management Agency (MEMA) and the Maine Geological Survey (MGS) is underway to identify susceptible areas for landslides in Maine. A joint effort between the DEP and MGS would be a mechanism to evaluate areas susceptible to landslides along the Kennebec River. This information would be useful for planning and decision making not only for mining activities along the Kennebec River, but for other types of development as well.

RECOMMENDATION

- Amend 38 MRSA §490-D sub-§9 to state that measures must be taken to prevent stormwater from ponding at the base of a reclaimed slope or a working face that is adjacent to steep slopes and a protected natural resource. The suggested implementing legislative language is included as Attachment B.

INTRODUCTION

In 1993, the Maine Legislature established a new performance based program for regulating gravel pits between 5 and 30 acres in size with the enactment of P.L. 1993 Chapter 350. This law established a registration process that emphasizes technical assistance and compliance review by the Department of Environmental Protection (DEP) rather than requiring a full application review process for each new small pit. In 1995 the Legislature further expanded the program to include gravel pits larger than 30 acres, excavations for topsoil, clay and silt, as well as quarries (excavation of blasted rock).

To date, the program has been very successful as an alternative regulatory process. In addition to the 675 "Notices of Intent to Comply" that DEP has received in this program, approximately 139 active mine sites remain under the original Site Law requirements.

In 2007, the Legislature enacted P.L. 2007 Chapter 364 "An Act to Protect the Scenic Value of the Kennebec River." This law in part required the DEP to review the setbacks and buffers for excavations and quarries, including how setbacks and buffers for areas of steep slopes are addressed. DEP developed this report in accordance with the above mandate.

IMPORTANCE OF BUFFERS

Buffer zones, particularly forest buffers, are crucial in protecting water quality of the State's rivers and streams. Buffers moderate water temperature by providing shade, thereby enhancing fisheries. Buffers also provide for bank and stream channel stability, flood control, and wildlife corridors. Numerous scientific studies[1] on buffers suggest that buffers must be at least 50 feet wide to provide water quality enhancements.

OTHER STATE BUFFER REQUIREMENTS FOR MINING ACTIVITY

In 1993, the DEP, with the assistance of the Interstate Mining Compact Commission (IMCC), conducted a survey of other state regulatory programs for sand and gravel mining. The primary purpose of the review of other state regulatory programs was to compare and evaluate other regulatory approaches and standards for sand and gravel mining. In 1996 and 2001, IMCC updated their Non-Coal Mineral Report to reflect changes to state regulation[2]. A review of the entire report compiled by IMCC is beyond the scope of this report. However, it is important to note that question #6 of IMCC's report deals specifically with setbacks and buffers for non-coal mining. The report summarizes the lateral distance prohibitions for property lines, roads, wells, rivers and streams. A review of the data from the report reveals that the setbacks for rivers and streams range from 25 feet to 100 feet in other jurisdictions outside of Maine.

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[1] `Seth Wenger, A Review of the Scientific *Literature on Riparian Buffer Width, Extent and Vegetation*, University of Georgia Office of Public Service & Outreach, Institute of Ecology (1999). <http://agecon.lsu.edu/WaterEconomics/pdf/buffer_litreview.pdf.>

[2] Interstate Mining Compact Commission, *Non-Coal Report*, Online, 5 July 2001, <http://www.imcc.isa.us/NonCoal/NC6.htm>

SUMMARY OF MINING BUFFERS AND SETBACKS

Over the last decade, DEP has supported changes addressing concerns regarding buffer strips and setbacks for mining activity. Provided below is a historical summary of the changes to the DEP mining program concerning buffer strip requirements for protected natural resources:

1972 – 1993 Site Location of Development Law (the "Site Law"): Buffer strips between excavations and water bodies were applied on a case by case basis according to the guidelines stated in Chapter 375 Section 9 of the DEP's Site Law rules. These setbacks are based on the average percent of slope. Based on the DEP's research of Site Law Orders for gravel pits, the buffer requirement ranged from 25 feet to 100 feet for rivers and streams.

October 1993. Enacted P.L. 1993 Chapter 350 as performance standards for medium borrow pits. This new law and amendments to the Site Law required medium sized pits previously unlicensed under the Site Law to file a "Notice of Intent" to comply with standards under a new borrow pit law. The standard for the buffer requirement between an excavation and protected natural resource was 75 feet plus 4 times the average slope. This standard was derived from the DEP's 1991 expedited review regulations titled "Performance Standard Review of Borrow Pits and Topsoil Mining Operations" under the Site Law. A review of DEP records reveals that the DEP never reviewed a gravel pit under this new review process.

June 1995. Enacted P.L. 1995 Chapter 287 and P.L. 1995 Chapter 460 which replaced the previous standard addressing protected natural resources. In an effort to maintain consistency between local and state regulation, this law revamped the requirement for buffer strips for gravel pits near protected natural resources. The existing performance standards were made similar to both the standards under the Mandatory Shoreland Zoning Act for gravel extraction and the standards under the Natural Resources Protection Act (NRPA). See Table 1 below. These changes were developed through a stakeholder process with representatives from industry (Maine Aggregate Association), the Maine Water Utilities Association, citizens and municipal officials. The previous standard used a setback standard of "75 feet plus 4 times the average slope." The new standards for excavations use different setbacks depending upon the resource type, ranging from 75 feet to 100 feet.

March 2001. LD 612 "An Act to Permit Excavations within 25 Feet of Streams" was presented by the Maine Aggregate Association to the Legislature. DEP testified in opposition to the bill. In both 1993 and 1996, the Legislature specifically considered the matter whether to allow for a variance for excavating within the 75-foot stream buffer. On both occasions, the Legislature determined that the State's interest was in protecting water quality and wildlife and ultimately voted not to reduce the buffer standard.

August 2001. Rulemaking for Chapter 375, No Adverse Environmental Effect Standard of the Site Location Law, Section 9 Buffer Strips. The change to Chapter 375 eliminated the discrepancies between the buffer strip standards contained under the Performance Standards for Excavations, 38 MRSA §490-D and those contained in the Site Law rules for gravel pits. The amendments created consistency and predictability between the programs. The standards under the Performance Standards for Excavations are 75 feet to a stream and 100 feet to a great pond.

June 2007. **Legislature enacts P.L. 2007 Chapter 364, "An Act to Protect the Scenic Value of the Kennebec River."** An additional section of the Kennebec River is designated as an Outstanding River Segment from Bay Point in Georgetown to its confluence with the Sebasticook River in Winslow. In addition, the law increased the buffer requirement along this segment of the Kennebec River from 75 feet to 100 feet. Table 1 summarizes the setbacks and buffers required under the current DEP mining program.

Table 1 Gravel Pit and Quarry Buffer Requirements

	REQUIRED BUFFER	**REDUCTION ALLOWED?**	**MINIMUM ALLOWED**
LAKES	100ft	No	N/A
RIVERS	Flowing to great pond – 100ft Kennebec River (Outstanding River segment) – 100ft Any other river – 75ft	No	N/A
ROADWAYS	Scenic highway – 150ft Public road – 100ft Public ROW not containing road – 50ft Private road – 50ft	Buffer to public road may be reduced if a variance is granted by DEP. Buffer to private road may be reduced with written permission from landowner.	Public road – 50ft Private road – not specified in standards
PROPERTY LINES	Gravel pit – 50ft Quarry – 100ft	With written permission from affected abutter.	Property line 10ft Eliminate between pits

BUFFER REQUIREMENTS FOR STEEP SLOPES

In 1993, under the Performance Standards for Excavations, the standard setback for a protected natural resource was 75 feet plus 4 times the average slope. This standard was problematic in two ways. First, the standard was not consistent with other DEP programs such as Shoreland Zoning and NRPA. Second, on extremely steep slopes this required a very large setback which could limit the amount of excavation within the gravel deposit, particularly an esker deposit which is steeply sided and usually very narrow in width. The new standard established in 1995 required setbacks ranging from 75 feet to 100 feet depending on the resource type.

SUMMARY OF MINING SLOPE FAILURES

The DEP is aware of at least six slope failures associated with registered gravel pits. Four of these failures have occurred along the Kennebec River between Solon and Augusta (see Attachment A). These failures represent less than one percent of the registered gravel pits under the performance standards. The common factors involved in these failures include significant storm events, steep slopes, mining and the presence of glacial marine deposits. Based on compliance inspection results, no slope failures have occurred in any registered quarry.

Figure 1. Slope Failure, Augusta

Landslides in the United States occur in all fifty states.[3] Many factors contribute to slope failures and landslides. Heavy precipitation is a significant and common factor in landslides. Water affects the stability of the slope by reducing the strength of the soil material. When the resisting force is reduced, the driving force, which is gravity, exceeds the shear strength of the material and the slope becomes unstable and begins to move. Mass movement occurs more frequently on steep slopes than shallow slopes. A variety of causes can promote failures on slopes. Infiltration from storm events is a primary reason for slope movement[4]. Other factors that influence mass movement are slope material, vegetation and climate. Any man-made construction activity can promote slope instability. These activities include excavation of slope, loading of slope, deforestation, irrigation, mining and artificial vibration. Historic landslides in Maine include Rockland (1996), Brunswick (1997) and Wells (2005).[5] More recent landslides have occurred in Cumberland (2006) and Greenbush (2006). The primary culprits in these landslides are high precipitation events and steep slopes. A recent landslide in Bethel (July 2007) caused considerable damaged to the town's water supply.

Figure 2. Ponding & infiltration on a steep slope.

[3] United States Geological Survey, Landslide Types and Processes, Fact Sheet 2004-3072, <http//pubs.usgs.gov/fs/2004/3072/fs-2004-3072.html>(December 2007)

[4] Coates, D.R. 1990, The relation of subsurface water to downslope movement and failure: U.S. Geological Survey Special Paper 252, 52 p.

[5] Maine Geological Survey, *Case Histories of Maine Landslides, 6 October 2005,* <*http://www.maine.gov/doc/nrimc/mgs/explore/hazards/landslides/case/case.htm* >*(December 2007)*

INLAND LANDSLIDE INVENTORY AND HAZARD ASSESSMENT FOR EMERGENCY MANAGEMENT

Currently a joint project between the Maine Emergency Management Agency and the Maine Geological Survey (MGS) is underway to identify susceptible areas for landslides in Maine. This work is being performed in conjunction with the National Landslide Hazards Mitigation Strategy. Information and data obtained from the mapping program is used in planning and decision- making for all types of development located in delineated landslide areas. MGS is currently mapping some areas of the state prone to landslides. Landslide mapping has been completed for four communities; Wells, Cumberland, Bangor and Greenbush. Additional work is proposed for other towns in York County, Cumberland County and Penobscot County.

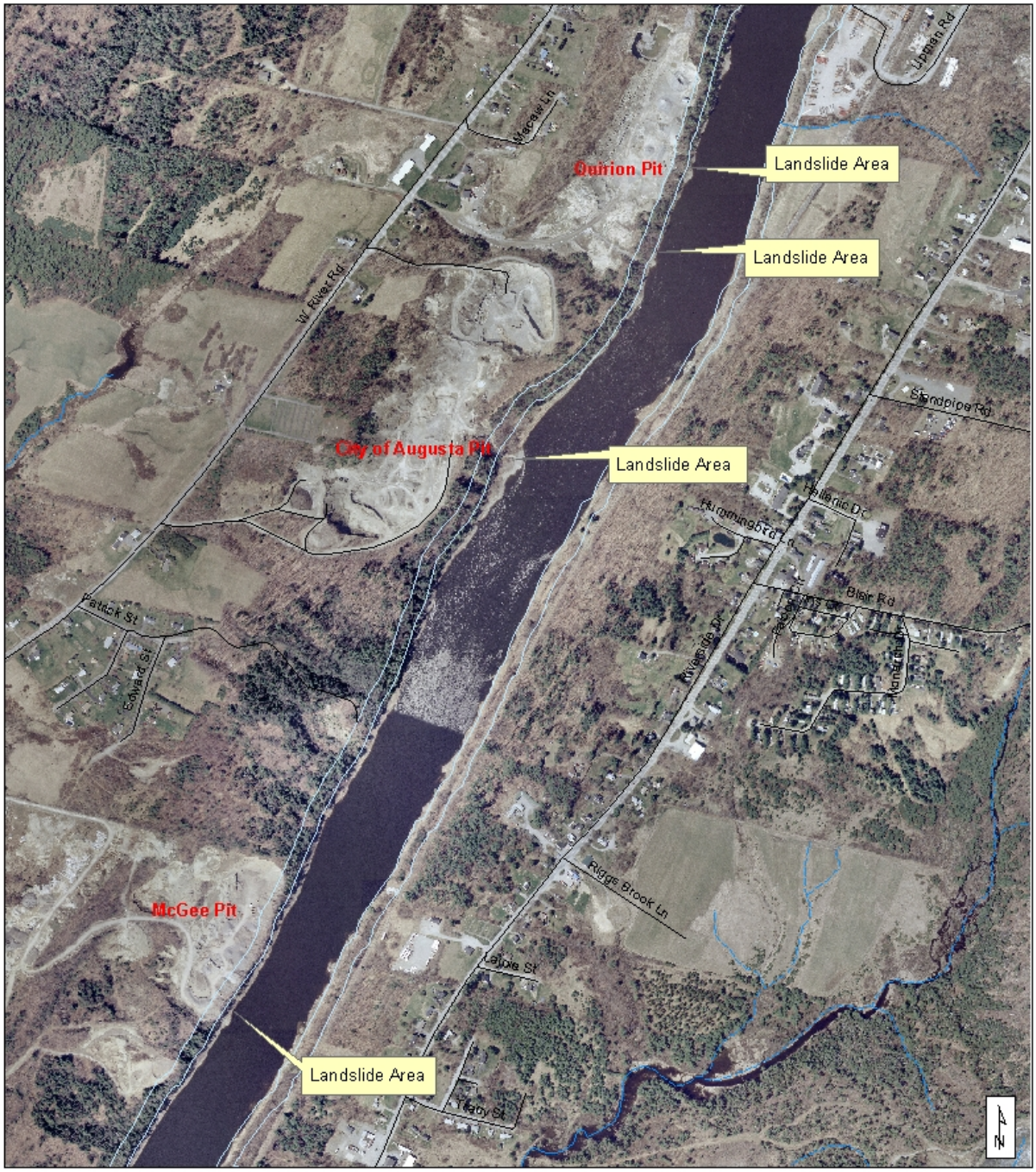
CONCLUSIONS AND RECOMMENDATIONS

In order to minimize the potential for slope failure in gravel pits, the DEP recommends adding a performance standard under 38 MRSA §490-D sub-§9 requiring that measures must be taken to prevent stormwater from ponding at the base of a reclaimed slope or a working face that is adjacent to steep slopes and a protected natural resource (as defined in Title 38).

Other than this proposed change, the DEP's opinion is that no other changes are necessary to the current performance standards.

Because some areas adjacent to the Kennebec River appear to be prone to landslides, a local or regional scale mapping program to identify these areas would be prudent. A joint effort between the DEP and the Maine Geological Survey would be a mechanism to evaluate areas susceptible to landslides along the Kennebec River. As stated above, this information would be useful for planning and decision making not only for mining activity along the Kennebec River, but for other types of development as well.

Landslide Sites for Gravel Pits Adjacent to the Kennebec River



Background hydrologic, topographic and political features are from MEGIS data layers with an accuracy of +/- 40 feet.
All spatial data is projected to NAD 1983 UTM Zone 19.
Map Prepared by Department of Environmental Protection, Mining Unit: Mark Stebbins, December 2007
Aerial Photo Data: April 2003

660 330 0 660 1,320
Feet

ATTACHMENT B

38 MRSA §490-D, sub-§9 as enacted by PL 2005, c.158, §5, is amended to read:

9. Water quality protection and storm water management. Standards of the laws governing storm water management and waste discharge must be met as provided in this subsection.

A. A variance must be obtained and storm water standards adopted pursuant to section 420-D must be met for any part of a project, other than the working pit area, that is not naturally internally drained if that part of the project would require a storm water management permit pursuant to section 420-D but for the exception for certain excavations in section 420-D, subsection 5. A storm water management permit pursuant to section 420-D is not required.

B. A waste discharge must meet standards and obtain authorization if required pursuant to section 413.

C. Measures must be taken to prevent stormwater from ponding at the base of a reclaimed slope or a working face that is adjacent to steep slopes and a protected natural resource.