Cheryl marks

David Garrett, P.G.

Engineering Geologist

October 4, 1999

Mr. Duane Jarman, Solid Waste Manager
City of High Point, Department of Public Services
P.O Box 230
High Point, North Carolina 27261

RE: Evaluation of Potential Impact on Landfill
Proposed Martin Marietta Aggregates Quarry
High Point, North Carolina

Fac/Perm/Co ID #	Date	Doc ID#
unpermitted	10/11/99	DIN 15379

P1216

Dear Duane:

Pursuant to your request, I am pleased to present the following discussion of my evaluation of the proposed quarry development and its potential impact on the landfill. I met with Mr. Paxton Badham of Martin Marietta on September 28, 1999 to discuss conceptual plans for the quarry. In addition, I met with officials of the Solid Waste Section and the Division of Land Resources, the latter of which is the permitting agency for the proposed facility. In these conversations, I developed an understanding of the planned operations and the history of experience with similar projects.

Please refer to the area topographic map, copied from the City's permit application for the Kersey Valley Landfill Phase 3. The planned quarry is located about 0.6 miles south of the landfill, between Jackson Lake Road and Kersey Valley Road. In plan view, the proposed quarry will be equidistant from the landfill as the existing Jamestown quarry, located northeast of the landfill on Riverdale Drive. This new site was originally permitted in 1989 by the Nello Teer Company, now Benchmark Corporation (Permit #41-18). The permit has now been transferred to Martin Marietta Aggregates.

The attached color map furnished by Martin Marietta shows the current development plan. The quarry property covers about 180 acres, but the actual disturbed area was cited in one of the older permit file documents as less than 60 acres. The actual mine pit will be south of Richland Creek, a local ground water discharge feature. Initially, a 10-acre pit will be opened in the center of the site, and a temporary crusher mill will be located in the southwest corner of the property next to Jackson Lake Road. A permanent crusher mill may eventually be built on a portion of the property north of Richland Creek, utilizing a conveyor system between the mine pit and the processing area.

The mine is planned to be approximately 200 feet deep at the center. Access is currently planned to be limited to Jackson Lake Road (verbal information), although the plan map shows future access to Kersey Valley Road, as well. The planned US 311 Bypass will pass just south of the planned quarry. The rock type is granite. Mr. Badham indicated that the mine may not be opened for 10 to 12 years, as it will serve as a replacement for the existing Jamestown Quarry on Riverdale Road.

1408 Rock Drive, Raleigh, North Carolina 27610
E-mail: david_garrett_pg@mindspring.com **919-231-1818** (Office and Fax) **919-418-4375** (Mobile)

Based on my understanding of quarrying methods, the area geological and hydrogeological characteristics, and conversations with the quarry company and regulatory officials, it is my professional opinion that the proposed quarry will not have an adverse impact on the landfill, either for existing or future expansion phases. The quarry will need to be dewatered and might someday be considered a significant ground water for future solid waste permit applications. However, the pumped ground water will be not be used for human consumption – the water will likely be used in the crushed stone manufacturing process, then discharged to the creek after appropriate treatment.

The radius of influence for ground water draw down in granite and other igneous/metamorphic rock types is typically less than 500 feet. According to Mr. Badham, the quarry industry's rule of thumb is that the extent of the horizontal zone of influence into the bedrock is approximately equal to the depth of the pit. Historically, there have been no documented instances within this state of draw down problems associated with a granite quarry affecting nearby water wells. Considering the area bedrock characteristics and the relatively short-segmented surface and ground water drainage basins, documented in the Solid Waste permit application, it is practically inconceivable that the ground water pumping activities at the proposed quarry will affect the existing or planned landfill expansion sites. Any potential draw down associated with the quarry that could affect the ground water gradients at the landfill would be detected sufficiently early in a number of potable wells in proximity to the quarry, before the landfill was affected (if ever).

Other technical reasons that the quarry will not affect the ability to monitor the landfill include the following:

1. The quarry will be located across two creeks that serve as ground water divides, i.e. the quarry is in a different ground water basin from the landfill. A majority of the ground water flow to the quarry site originates south of the quarry and flows north to Richland Creek. Based on previous studies, a majority of the ground water near the landfill originates to the north of the landfill and flows to the south, toward the unnamed tributary which traverses the landfill property.

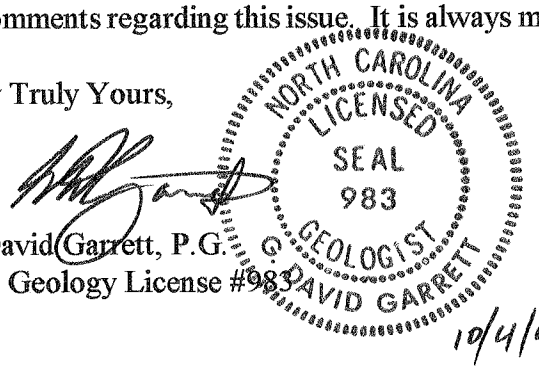
2. The rock within the quarry site is anticipated to be competent and relatively unweathered (hence the siting of the quarry). The fracture pattern is expected to be such that the influx of water and the necessity for pumping is not anticipated to be that significant – water level draw down should be negligible outside a few hundred feet radius from the quarry and, quite likely, immeasurable north of Richland Creek. Please keep in mind that draw down problems at significant distances from quarries have been historically limited to flat lying sedimentary formations such as limestones.

3. The City's first indication of a problem at the landfill, in the unlikely event of a draw down, would be decreasing water levels in the down gradient monitoring wells, located along the unnamed tributary. Note that seasonal and climatic fluctuation is normal. Any potential draw down problems will likely not show up for a few years after the pit is opened. The City's ground water monitoring consultant should watch for any irreversible downward trends in water levels. However, changes in slopes and vegetation cover at the landfill site may also lower the ground water levels.

Blasting at the proposed quarry is neither considered to be a detriment to the landfill. Modern blasting techniques utilize carefully controlled shots to pulverize the rock within a tight grid pattern, designed to loosen approximately 12,000 to 15,000 cubic yards of rock while minimizing the loss of blast energy into the surrounding bedrock or into the air. Every shot is monitored with a seismograph at the nearest occupied dwelling or structure. The regulatory ground vibration limits are 1 inch/sec, which are intended to limit damage to nearby structures and wells. The attenuation of the energy in the ground is such that the vibrations will not be felt at distances more than a few hundred feet. No vibrations from the blasts would propagate the half-mile distance to the quarry.

Please keep in mind no issues pertaining to the quarry are addressed in the Solid Waste Rules. The presence of a quarry is not considered a site suitability issue. The existing quarry north of the landfill has historically posed no negative effects on the landfill. In summary, I see no potential adverse impact on the present or future landfill, whatsoever. Please feel free to contact me with any questions or comments regarding this issue. It is always my pleasure to be of service to the City of High Point.

Very Truly Yours,

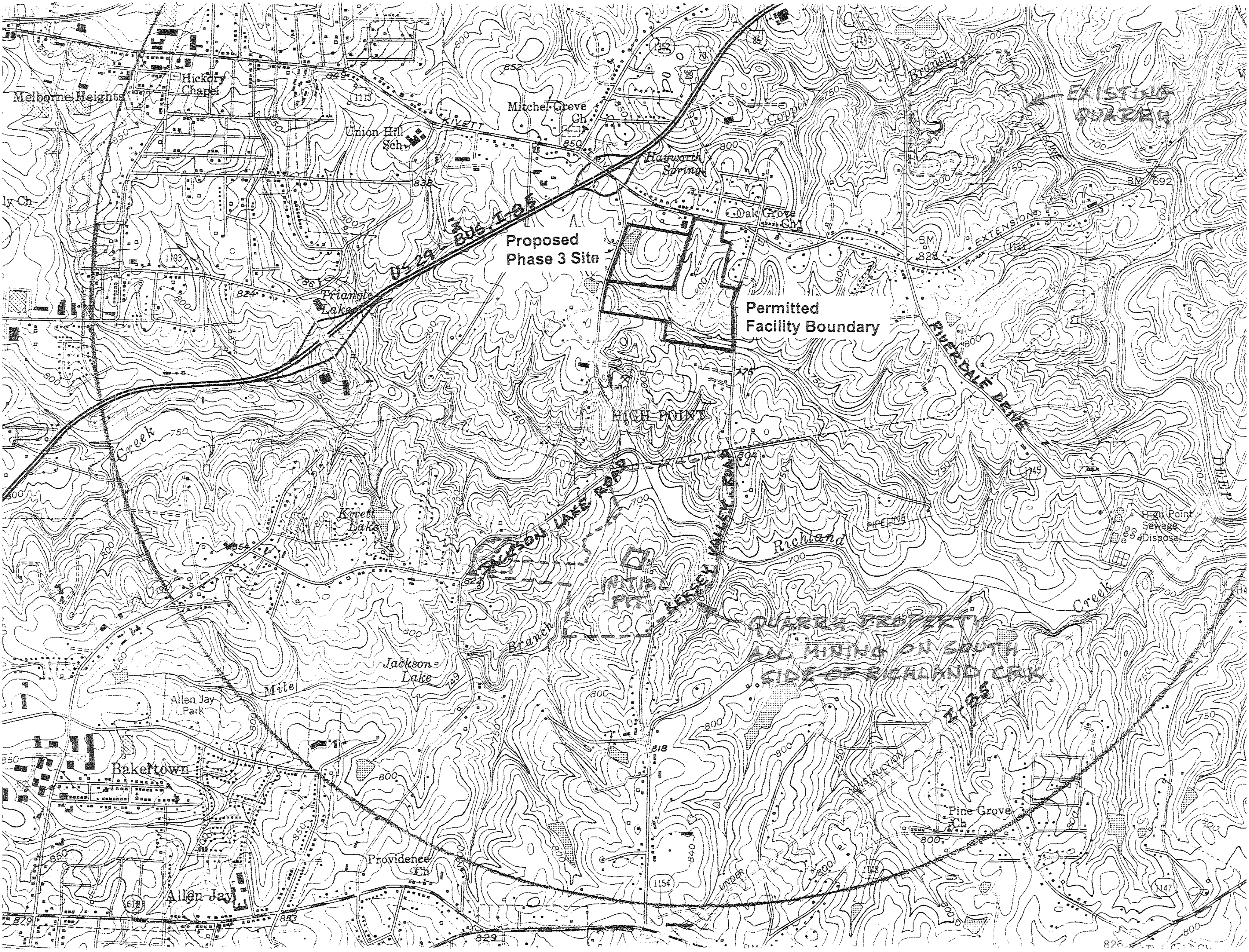


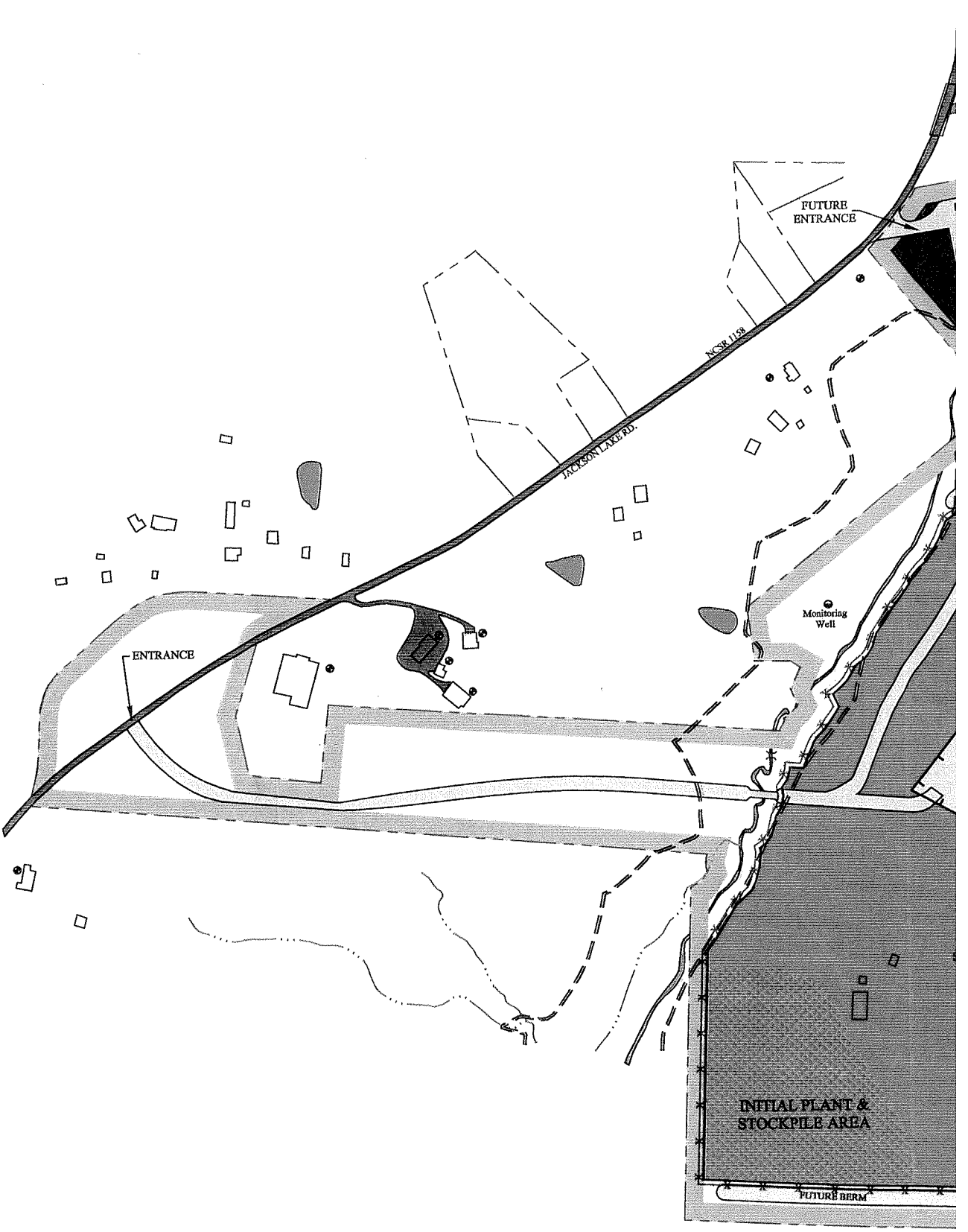
G. David Garrett, P.G.
N.C. Geology License #983

10/4/99

Attachments

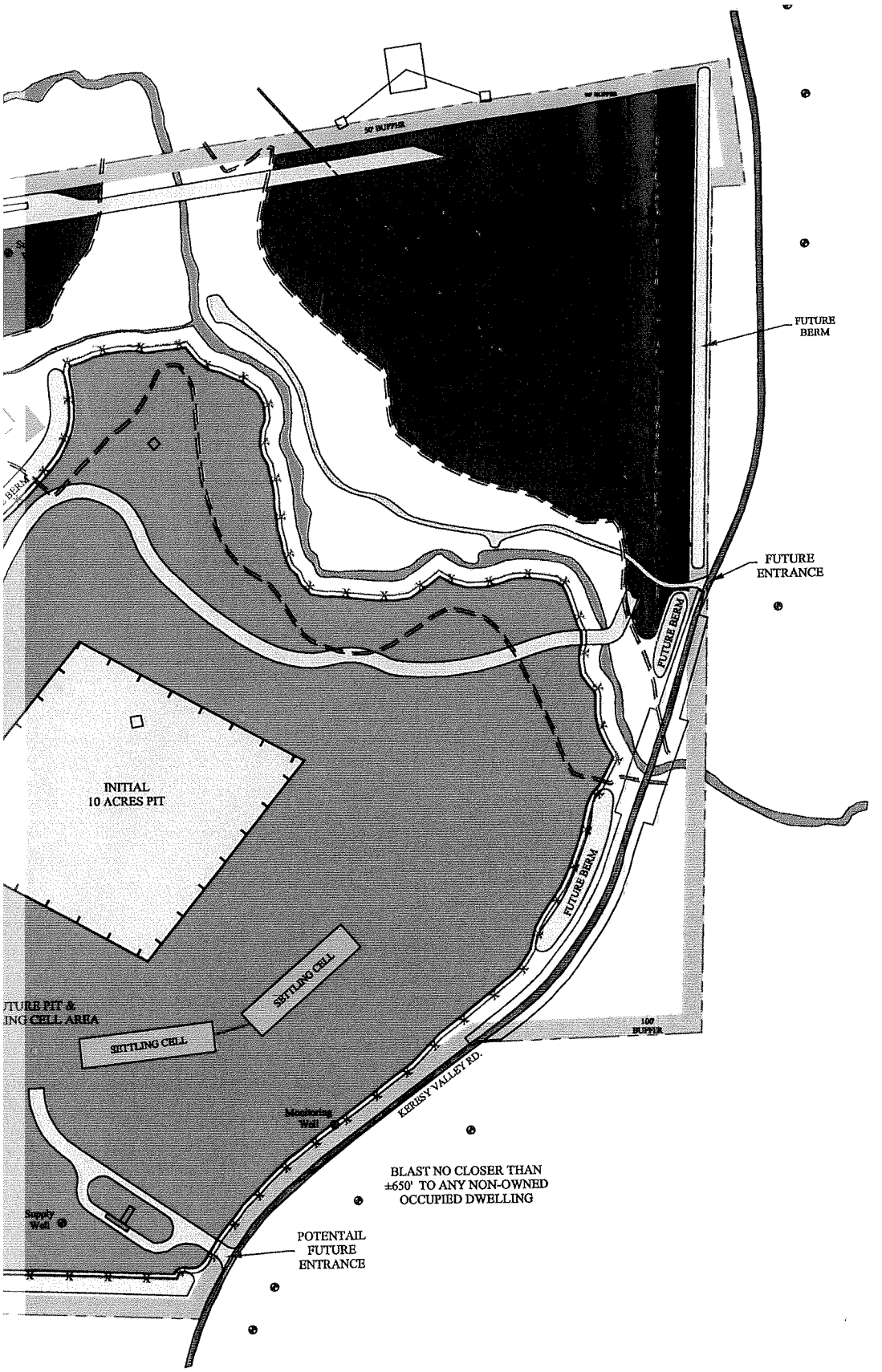
cc: Ms. Cheryl Marks – NC DENR Solid Waste Section


Proposed
Phase 3 Site
Permitted
Facility Boundary
EXISTING QUARRY
RIVERDALE DRIVE
US 29 BUS I-85
JACKSON LAKE ROAD
KERSEY VALLEY ROAD
QUARRY PROPERTY
ALL MINING ON SOUTH
SIDE OF RICHLAND CRK.
I-85
HIGH POINT
Melborne Heights
Hickory Chapel
Union Hill Sch
Mitchel Grove Ch
Hayworth Springs
Oak Grove Ch
Triangle Lake
Kivett Lake
Jackson Lake
Allen Jay Park
Allen Jay
Baker town
Providence Ch
Pine Grove Ch
High Point Sewage Disposal
Richland
Creek
Branch
Mile
KIVETT
EXTENSION
PIPELINE
DEEP



LEGEND:

- PERMIT BOUNDARY
- PROPERTY LINE
- PIT LIMIT
- BERM
- BODY OF WATER
- CREEK
- BUILDING
- CREEK
- 100 YEAR FLOOD PLAIN
- DIRT ROADS
- PAVED ROADS
- APPROXIMATE LOCATION OF WATER SUPPLY WELL
- APPROXIMATE LOCATION OF MONITORING WELL
- BUFFER
- PIT LIMIT
- FUTURE PLANT/STOCKPILE



SCALE : 1" = 400'

0 200 400 800 1600

Martin Marietta Aggregates
RALEIGH, N.C.

SITE PLAN

HIGH POINT QUARRY
GUILFORD COUNTY, N.C.

QUARRY: HIGH POINT

DWN BY: D. BRIGHT | DATE: 7/18/99 | Page No.