

Perry Memorial Conservation Area Range Complex Renovation, Metal Recycling, and Soil Stabilization

Dale Parsons, P.E. – Missouri Department of Conservation
Ken Ewers, R.G.-GREDELL Engineering Resources, Inc.



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

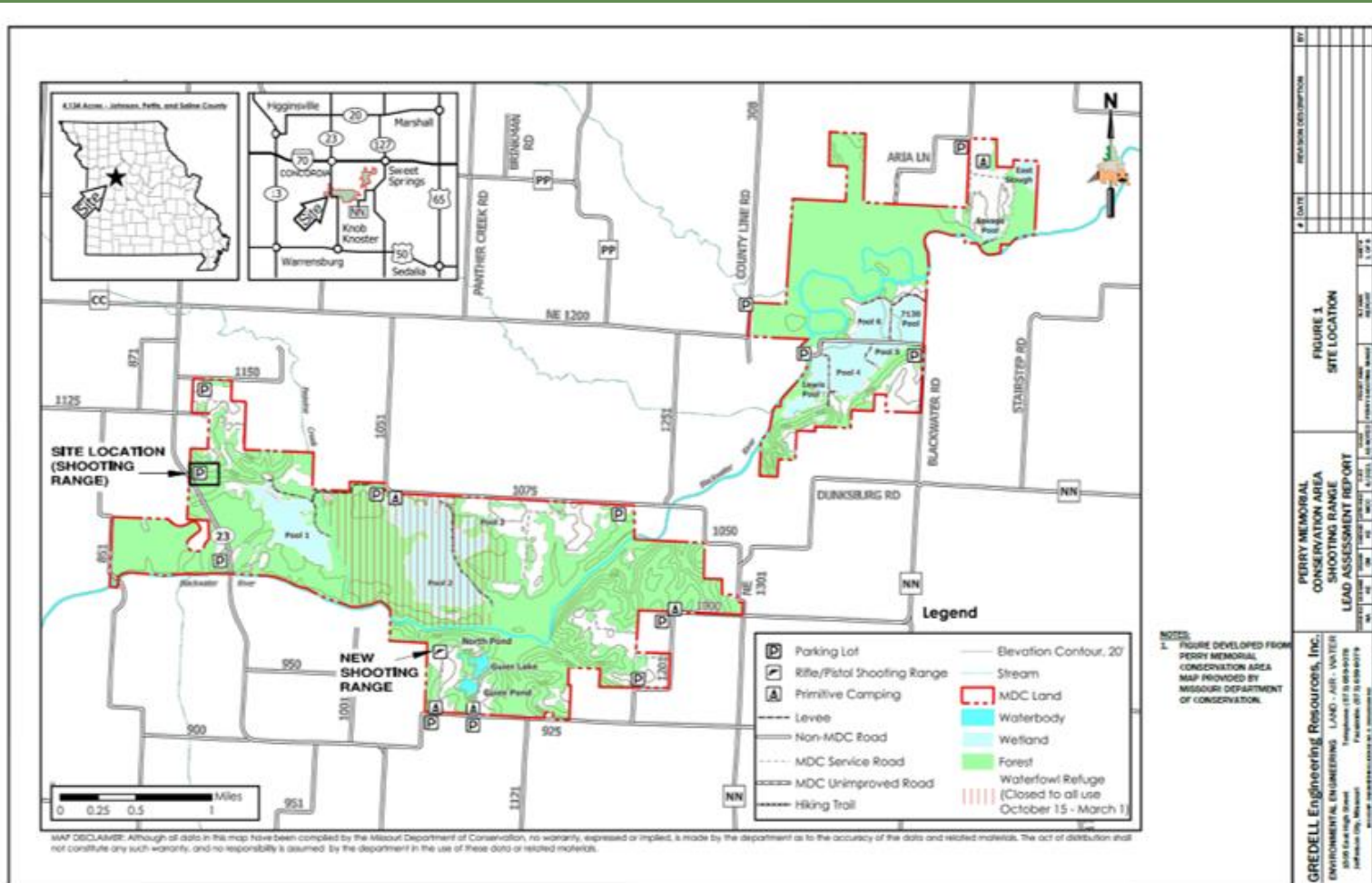
LAND - AIR - WATER

Project Summary

- Build a New Range with updated environmental and safety features on the same Conservation Area at a different location.
- Close Old Range once the New Range is built.
- Assess site conditions at the old range.
- Recycle metals, and stabilize the soil from the old range.
- Use the stabilized soil to enlarge the backstop and side berms of the New Range.



Old Perry Range



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

Old Perry Range

- South of Concordia on State Highway 23.
- Located on the Ralph and Martha Perry Memorial Conservation Area.
- Three shooting positions-25 yard, 50 yard, and 100 yard.
- Backstops consisted of pushed up dirt piles approximately 10' tall and 25' wide with a face of lime screenings behind the target stands.
- One concrete shooting bench at each position.



Old Perry Range



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

Why move the Range?

- Common shooting range construction methods were used to build the range in the 80's .
- The Backstops are inadequate.
- Over the years usage has increased and the size was could not serve the shooting public.
- There is no ADA accessibility.
- Low sight distance from the parking area to the highway.
- There is a waterfowl wetland refuge directly down range.
- Prone to flooding.



Why move the Range?



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

Why move the Range?



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

Why move the Range?



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

Feasibility Study-Four Options

- Do nothing and keep using the range as is.
- Upgrade Existing Range.
- Close Existing Range.
- Relocate to a new site and close existing range.

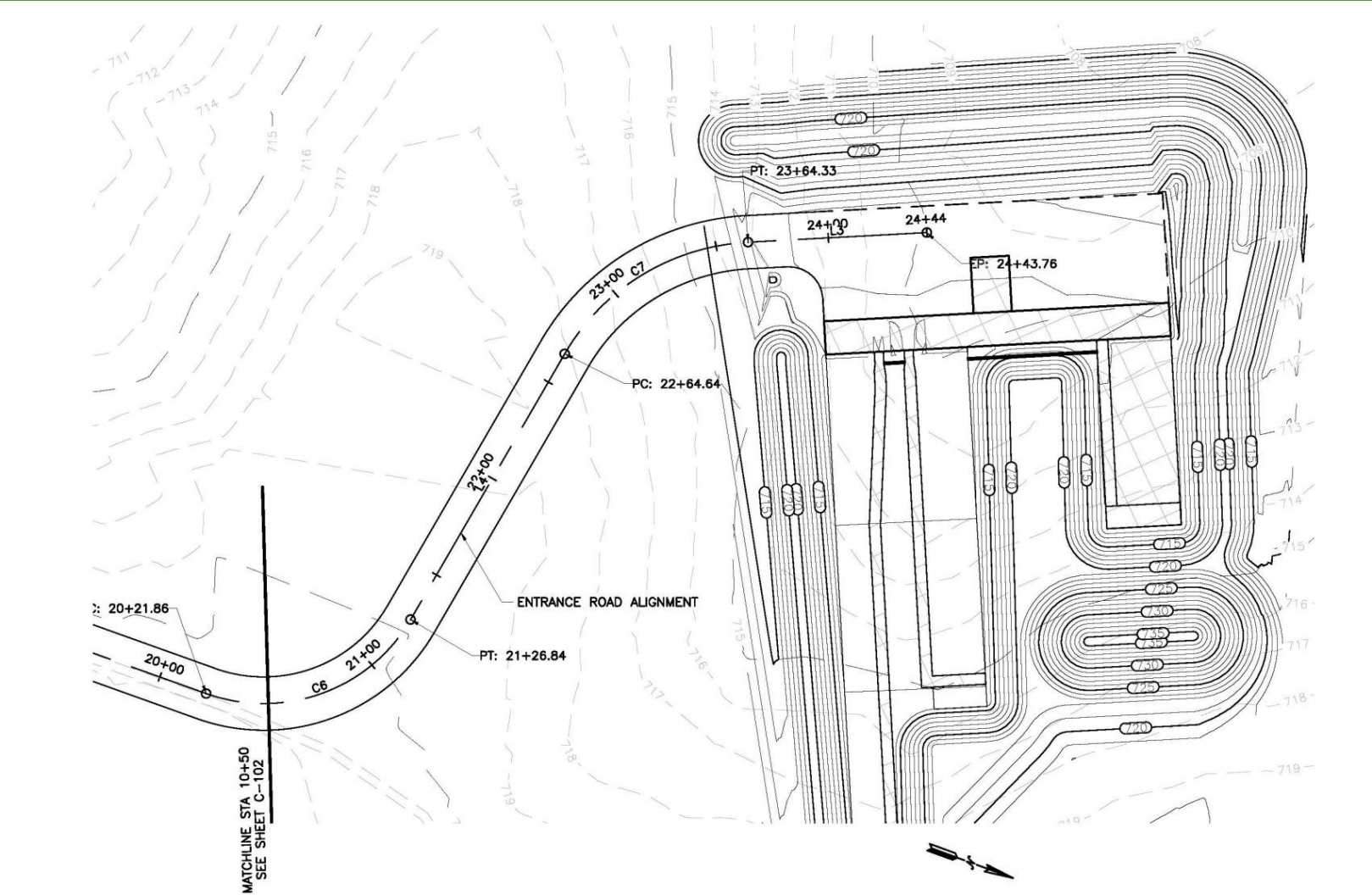


New Range-What is needed?

- Must be larger to accommodate increasing demand.
- Must keep vast majority of projectiles in the range and any that escape the range stay on the Conservation Area.
- Must be out of the 100 year flood zone.
- Must not affect refuge wetlands.
- Must have sound attenuating features
- Must be ADA accessible.
- Must have a safer entrance and exit to the road.
- Must keep lead particles in the range.



New Range-What is needed?

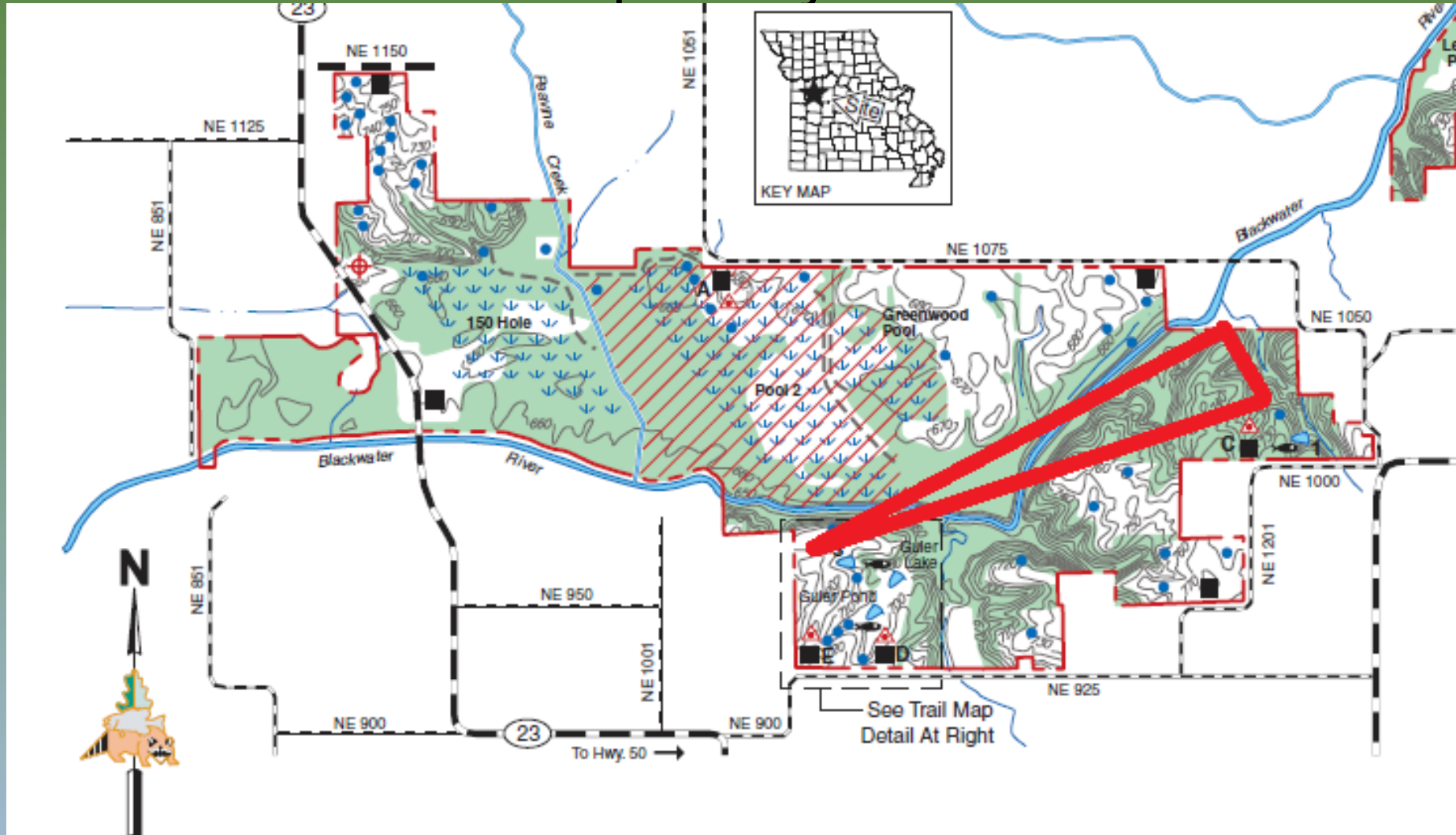


GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

New Location-Keep Projectiles in the Range



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

New Range-Keep Projectiles in the Range

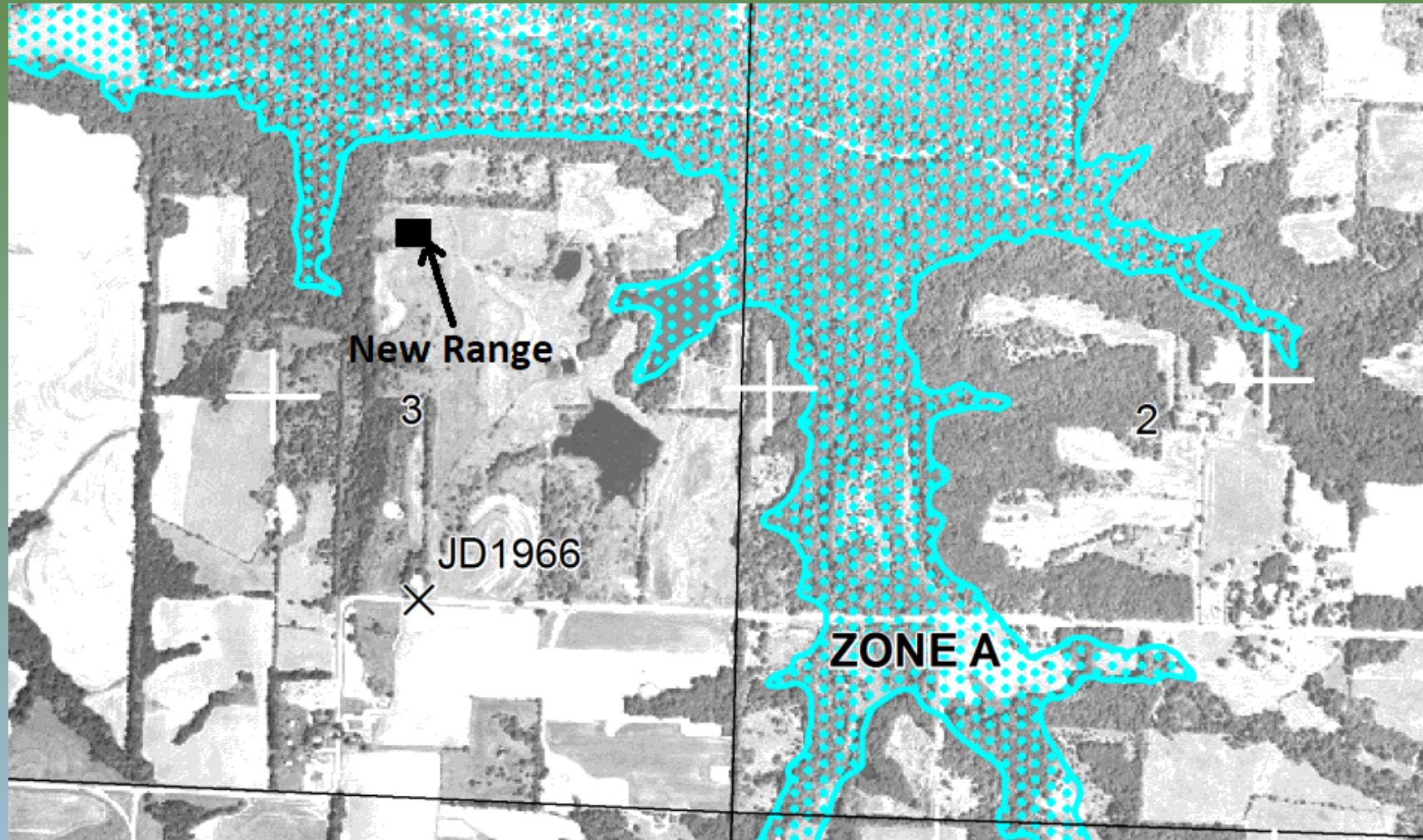


GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

New Range-Out of 100 Year Flood Zone



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

New Range-Out of the Wetlands



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

New Range-Sound Attenuation

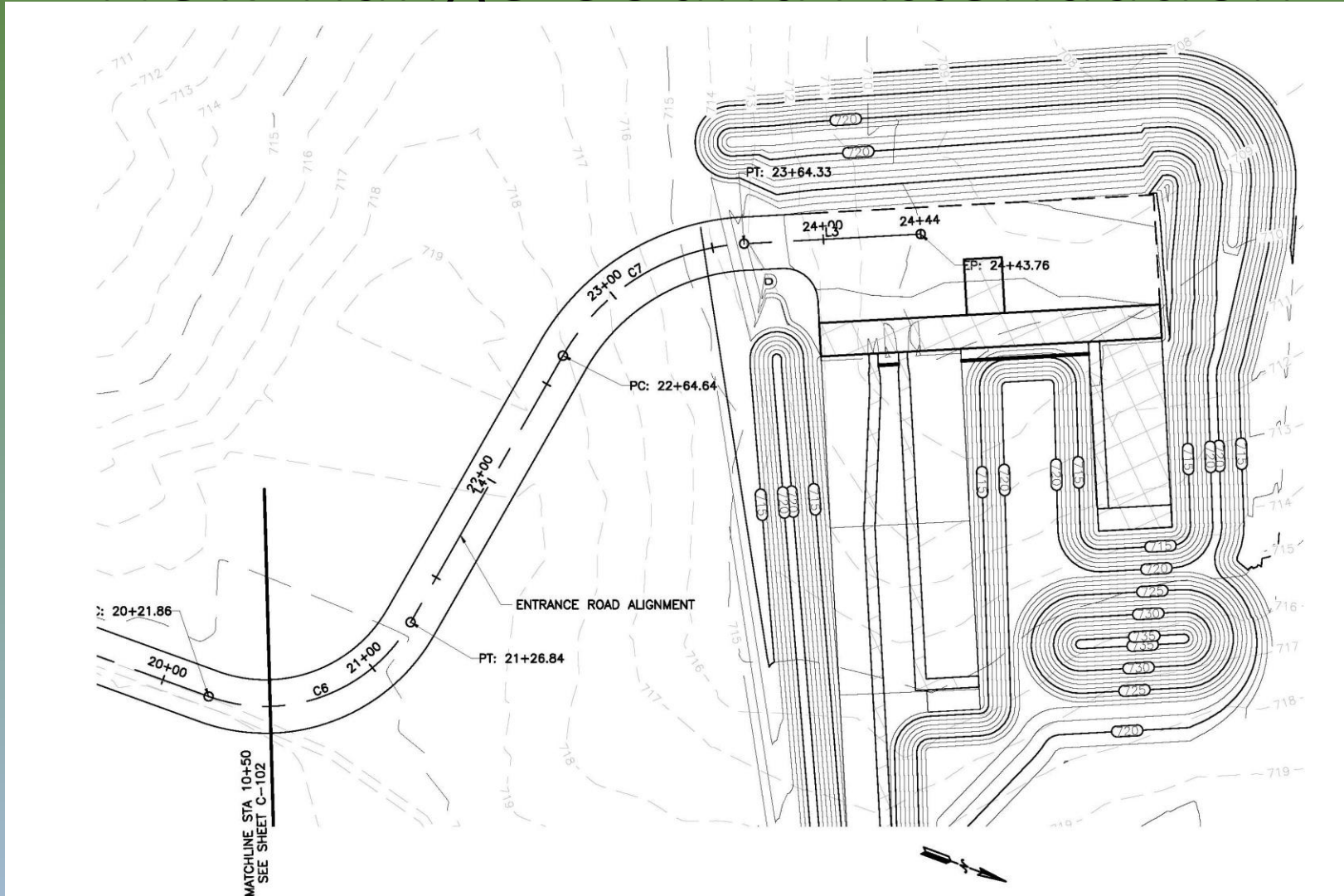


GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

New Range-Sound Attenuation



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

New Location-ADA Accessible



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER

New Location-Safer Entrance and Exit

- The entrance/exit of the Old Range exited uphill onto State Highway 23 with a speed limit of 55 mph and both vertical and horizontal curves that had a site distance of less than 400’.
- The entrance/exit of the New Range exits level onto a flat gravel county road with a speed limit of 25 mph and a site distance of 460’.



New Location-No Lead can Leave the Range

- Rainwater from the range drains towards the firing line where it is captured by a limestone aggregate french drain system.
- The limestone aggregate raises the pH of the water and any causes any dissolved lead in the limestone aggregate to drop out of solution.
- The drained water is then routed to another limestone aggregate field before leaving the site.
- Additionally, the backstops are made of waste lime screenings a foot thick to further immobilize particulate lead.



Ken Ewers-Gredell Engineering Resources



GREDELL Engineering Resources, Inc.

ENVIRONMENTAL ENGINEERING

LAND - AIR - WATER