PDG has proposed a two (2) phase approach for the Graminex plant expansion. Phase 1 of the project included the work necessary to develop a facility concept plan with enough preliminary design work completed to do a building code review to establish allowable building size, height, structure fire rating, hazardous material maximum quantities, life safety requirements, and egress/access requirements. Phase One also included:

- Project budget and a probable construction cost estimate, as well as an integrated project schedule.
- Identification of sources and likely amounts of potential economic development grants, financing, and tax abatement.
- Review of supplemental building system requirements of the building and fire code, review and incorporate the requirements of the Village planning, zoning, and fire department.
- Design of conceptual structural, mechanical HVAC, plumbing, fire protection, and electrical systems.
• Review of the Village utility capacity and regulations in relation to your process needs was also addressed.
• Preparation of preliminary site plans, building floor plans, and elevations.
• Cost/benefit system options to meet the project schedule and budget criteria.
• Preparation of a building Use Group plan showing occupancy separation requirements and adjacency options for coordination with the proposed raw and finished product storage, process flow, and future expansion opportunities.
• Code compliance plan and life safety plan for building permit authority preliminary review.
• Assistance with obtaining soil borings and geotechnical report for use in designing new structure foundations.
PDG has completed engineering design through construction services for all four expansion phases for Vehtek Systems, Inc. Phase II, a 15,000 sq.ft. expansion of the plant, included installation of a 2,000 ton body panel press, 20’ deep concrete press pit and foundation as well as a scrap steel reclaim tunnel.

Phase III included a 50,000 sq.ft. expansion of the plant which included foundations, power distribution and cooling system extension for a robotic welding line for automotive body component sub-assembly. This Phase also included new pits and foundation for a new 600 ton press. Electrical distribution required installation of a new 12.47KV underground distribution system and service to the building. Design included pad mounted switch gear, 15KV underground cabling, switch disconnections and transformers in the plant.

**Location**
- Bowling Green, Ohio

**Services Provided**
- Site/Civil Engineering, Stormwater Drainage Plan, Architectural, Structural, Mechanical, Electrical, Plumbing and Fire Protection Engineering

**Cost**
- $53 million

**Schedule**
- 1996–2013

**PDG Project Team**
- Phillip A. Whaley, P.E., Project Manager

**Project Relevance**
- Multi-Phase Expansion Project
- Phase IV adds 419,000 sq.ft. of new space for a total completed building of 570,000 sq.ft.
- Electrical distribution
PDG recently completed Phase IV of the expansion which houses hot stamping, blanking, and assembly processes, finished goods storage, and a new mechanical and electrical systems room. The low bay assembly and finished goods area was constructed from conventional steel structural systems and has an approximate clear height of 30 ft. with eight truck docks. The expansion also includes a high bay crane building for blanking operations and truck drive through loading bay, hot stamp operations with a mezzanine for the main electrical gear and control panels for the hot stamp lines. A 5,000 sq.ft. office addition and break room was also included in this Phase. Phase IV adds 419,000 sq.ft. of new space for a total completed building of 570,000 sq.ft.

As part of Phase IV, the parking lot was expanded and a heavy-duty roadway around the plant was constructed. It also included coordination of a new intersection located at Poe Road.
TERRA STATE COMMUNITY COLLEGE

PDG and bhdp architecture worked together to renovate Terra Community College’s Industrial Technology Building into a state-of-the-art health technologies and arts facility. The renovated space includes Smart classrooms, as well as patient and model laboratories, nursing labs, and physical therapy rooms for the college’s new and existing allied health programs. It also provides upgraded space for Terra’s music and fine arts programs, including a multi-purpose performance room, practice areas and studio space. Gallery corridors and a central common area have been designed to inspire creativity and promote a community atmosphere. Energy savings and conservation measures were also incorporated into the design.

PDG designed a retrofit of the existing heating hot water system of two (2) existing 80% efficient firetube boilers to three (3) new 1000 MBh 90%+ energy efficient condensing style boilers. The new system was designed to be located in the existing mechanical penthouse, and utilized as much of the existing piping system as feasible to reduce the installation cost. New hot water

“...you and your team have designed a beautiful building that has taken almost everyone by surprise when they walk through the doors. Those that haven’t been surprised still seem to be in a state of shock. For us, it is such a surreal experience, we’re not sure if we are actually in this building yet, or haven’t woken up from our dream. Please share this note with your team.”

Mike Shirtz, Lead, School of Music–Terra Community College
heating piping supply and return piping was designed from the existing main to the new Variable Air Volume (VAV) Boxes for reheat to increase occupant comfort. The system was also designed to feed the two (2) new VAV air handlers that were required due to the occupancy change of the retrofit. The new piping system is a variable primary flow system for increased efficiency. The heating hot water system is monitored and controlled by a building automation system designed by PDG to allow easy viewing and manipulation of the set points. The boilers are sized at 50% capacity each for redundancy and maintenance and each of the two (2) heating hot water pumps are sized for 100% redundancy to assure system operation.
The design of the South Chilled Water Plant, located in the basement of the University Crossings Resident Hall Facility, included the design of the installation of 5 KV switch gear lineup connected to the campus 15 KV loop to service three (3) future chillers to be installed in addition to the original projects, two (2) chillers which are fed at 480 volts. The design required determination of the location and access to the basement area of the residence hall with special regard to National Electric Code clearances and maintenance access. The routing of the 5 KV feeder cables in the mechanical area was a major concern due to limited area due to the mechanical equipment piping.

PDG provided engineering services for the design of a 6000-ton variable primary chilled water plant to serve the University of Toledo's south main campus. The chilled water plant serves several campus buildings through an underground pipe distribution system. The variable primary chilled water system utilizes 1200-ton water cooled centrifugal chillers and 3000-GPM vertical inline pumps, all with variable frequency drives. The project was constructed through several phases, with the first phase being the installation of two of the 1200-ton chillers and reuse of the existing cooling towers and electrical service,
which were all field verified and calculated to serve the initial chiller installation. The next phase will replace the existing cooling tower system with a new larger tower system to serve the next phase of chillers. The electrical service will also be upgraded in a future construction phase. The project was completed in 3D AutoCAD for coordination and interference checks. The initial project design was completed within two months and required extensive field work to modify an existing residential hall basement mechanical room into a 6000-ton chilled water plant.