

2005 Tri-Service Infrastructure Conference

St. Louis, MO

Dr. Michael J. O'Connor
Director, Research & Development



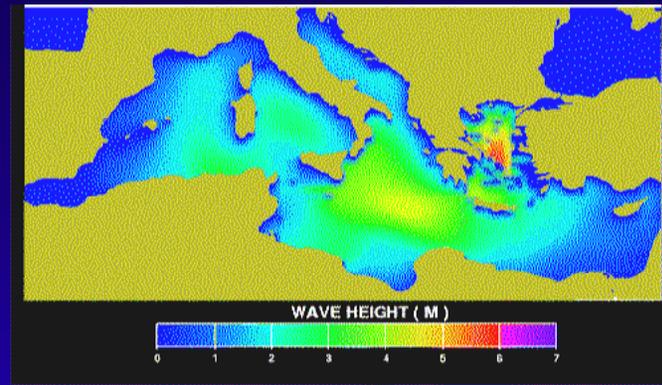
US Army Corps
of Engineers®

Directorate of Research and Development

Water Resources



Physical Models



Numerical Models



Coastal Engineering



Navigation

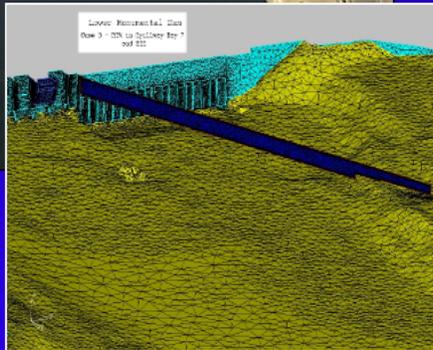


Flood Control

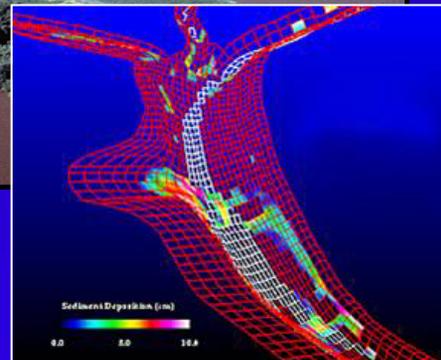
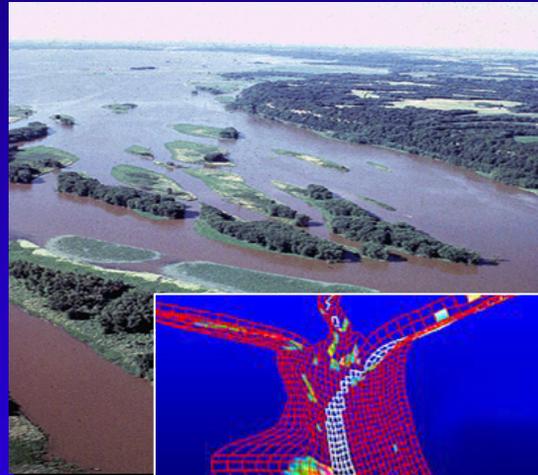


System-Wide Water Resources Management

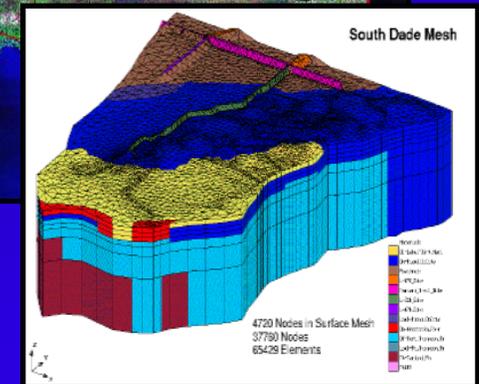
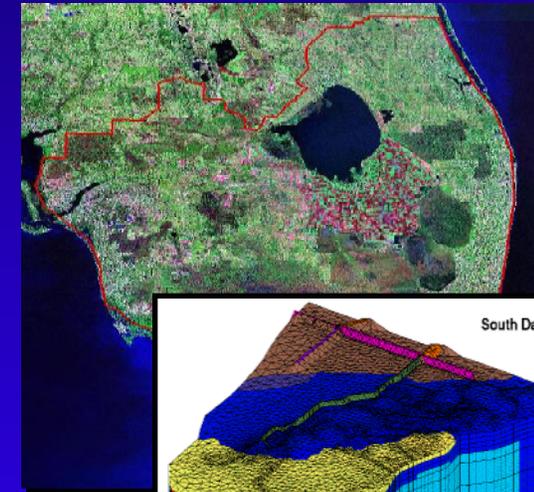
- Spiral Product Development and Annual Fielding
- Demonstration of Capabilities for Key Water Resources Projects



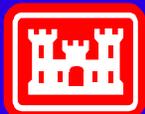
Columbia River



Upper Mississippi River



Everglades



System-Wide Water Resources Management

Problem: USACE requires tools and techniques to assess project alternatives and forecast project effects on regional and basin scales



US Army Corps
of Engineers®

Directorate of Research and Development

Flood Fighting Structures Demonstration Program

- **Funding: \$5 Million (Flood Control & Coastal Emergencies (FCCE))**
- **Concurrent with Lab Tests, 4 Systems to be Constructed**
 - Sand bag levee
 - RDFW (mandated by Congress)
 - 2 other vendor products
 - 100' river face with up to 50' tie back to higher ground
 - Exact location and timing dependent upon river stages
- **Monitor, Evaluate, and Document**
 - Operational criteria (resources, construction time, repair, dismantling, reusability)
 - Performance – flows, levels, seepage, stability
 - Public posting of results
- **Field PDT including POC referenced by RDFW concur with site, test plan, and vendor selection criteria**
- **Completion: 2007**



Lab and Field Tests of 3 Vendor Levee Raising Products + Sand Bags



Portadam

MAY 13 2004



Sand Bags



Hesco Bastion



Rapid Deployment Flood Wall (RDFW)

Flood Fighting Structures Demonstration PILOT Program - Preliminary Findings

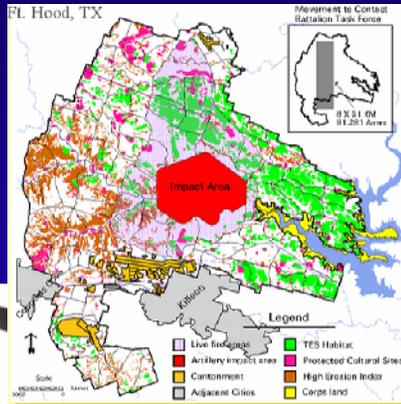
Pre-position material at up to 3 demonstration sites in different regions with different flood conditions, with products from 3 vendors, in cooperation with levee and drainage districts/ municipalities/ local governments, and with ERDC Guidance and Technical Support

- **Seepage**
 - Hesco Bastion leaked the most, need to redesign seam between units
 - Second highest leakage rate were for the sand bags, primarily at point of structure raising
 - Third RDFW
 - Least was Portadam after water level raised sufficiently to seal (lab performance unknown)
- All vendor products have survived lab and field testing process (maintained structural integrity but some repairs required)
- Lab Tests - Sand bags failed during overtopping test, damaged during wave loading

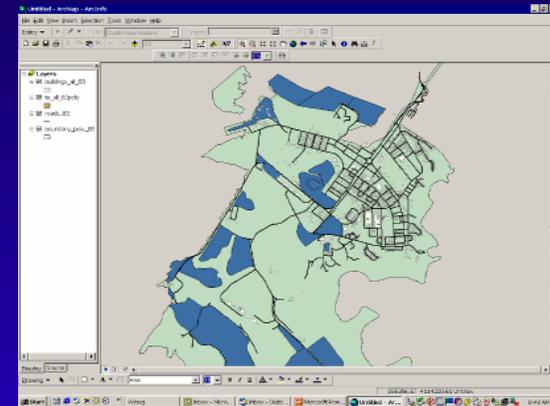
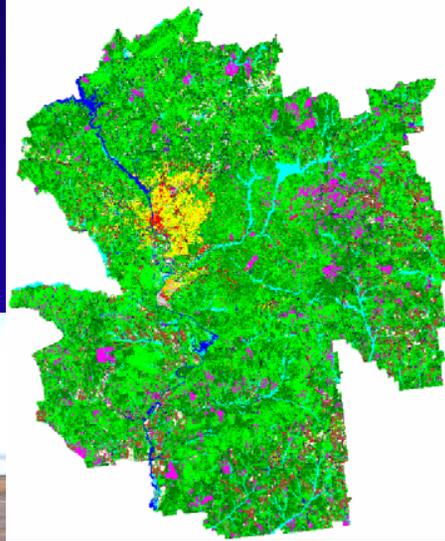


Support to Army Transformation

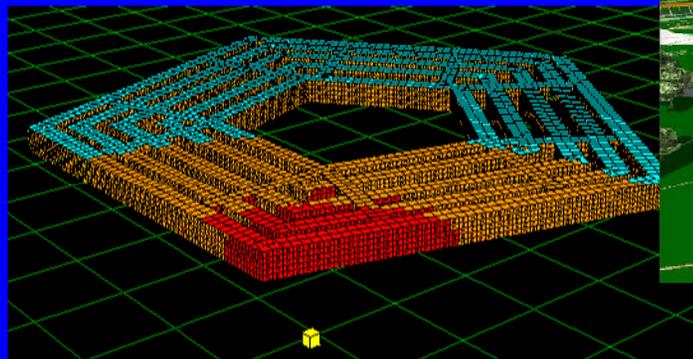
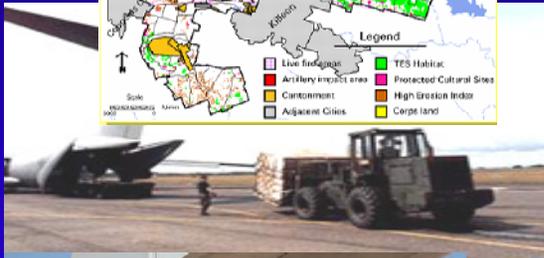
Power Projection



Encroachment Tools



Installation
Master
Planning



Facility Composer

Force Protection Tools

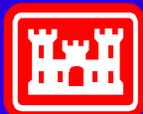
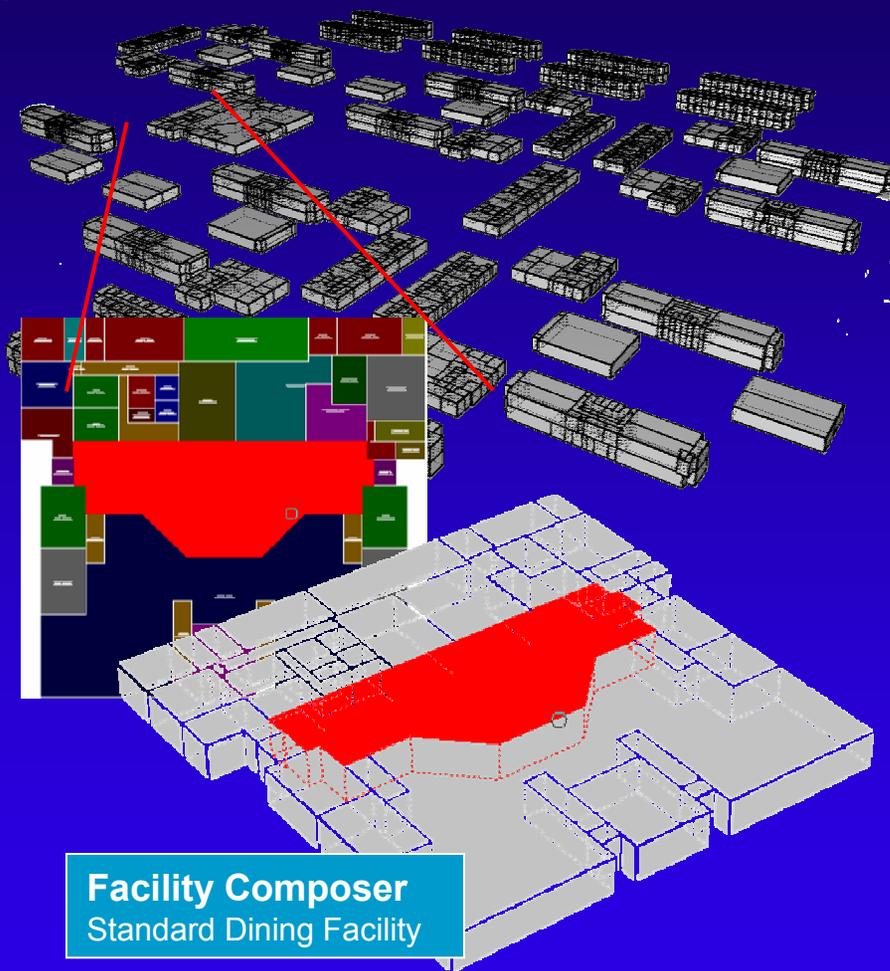


US Army Corps
of Engineers®

Directorate of Research and Development

Facility Composer

- Standard facility libraries with current and complete Army design and construction criteria/requirements
- Rapid generation of parametric construction cost estimates
- Rapidly layout facility functions and cost during planning charrettes
- Ensure DD1391 always starts with current and complete standard Army criteria/requirements
- Manage standard facility criteria and requirements in a computable format for populating industry standard (IFC) object model



ERDC POC: Beth Brucker (217-373-7293) or Susan Nachtigall (217-373-4579)

US Army Corps
of Engineers®

Directorate of Research and Development

IMA Furniture Wizard

- Created in response to inconsistent furniture costs included in DD1391's.
- Building Category Codes (facility types) included based on the President's Budget through 2011.
- Furniture costs included were based on information from COE, AF & Navy designers, & Standard Facility Criteria Points of Contact.

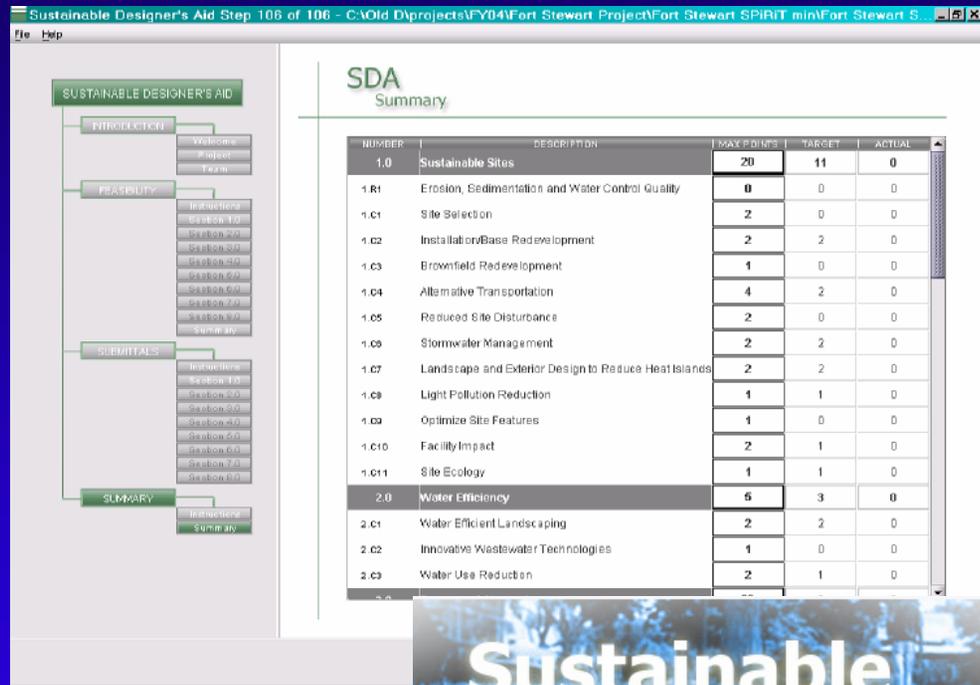


ERDC POC: Beth Brucker (217-373-7293) or Susan Nachtigall (217-373-4579)
LRL POC: Larry Cozine (502-315-6250) or Karen Gallman (502-315-6224)

Sustainability Analysis

Sustainable Designer's Aid

- Process tool helps teams use SPiRiT successfully
- Records SPiRiT goals, strategies and decisions
- Can reuse strategies in subsequent projects
- Generates SPiRiT goal, intermediate and final rating
- Pilot tested at Fort Stewart (UA4) & POD
- Possible DD1391 link
- Available free on the web



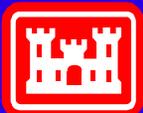
The screenshot shows the 'Sustainable Designer's Aid' software interface. On the left is a navigation tree with categories: INTRODUCTION (Welcome, Project, Team), FEASIBILITY (Introduction, Region 1.0, Region 2.0, Region 3.0, Region 4.0, Region 5.0, Region 6.0, Region 7.0, Region 8.0, Summary), SUSTAINABLE SITES (Introduction, Region 1.0, Region 2.0, Region 3.0, Region 4.0, Region 5.0, Region 6.0, Region 7.0, Region 8.0, Summary), and SUMMARY (Introduction, Summary). The main window displays the 'SDA Summary' table.

NUMBER	DESCRIPTION	MAX POINTS	TARGET	ACTUAL
1.0	Sustainable Sites	20	11	0
1.01	Erosion, Sedimentation and Water Control Quality	0	0	0
1.01	Site Selection	2	0	0
1.02	Installation/Base Redevelopment	2	2	0
1.03	Brownfield Redevelopment	1	0	0
1.04	Alternative Transportation	4	2	0
1.05	Reduced Site Disturbance	2	0	0
1.06	Stormwater Management	2	2	0
1.07	Landscape and Exterior Design to Reduce Heat Islands	2	2	0
1.08	Light Pollution Reduction	1	1	0
1.09	Optimize Site Features	1	0	0
1.010	Facility Impact	2	1	0
1.011	Site Ecology	1	1	0
2.0	Water Efficiency	5	3	0
2.01	Water Efficient Landscaping	2	2	0
2.02	Innovative Wastewater Technologies	1	0	0
2.03	Water Use Reduction	2	1	0



• <https://eko.usace.army.mil/fa/sdd/>

• <http://ff.cecer.army.mil/SDA>



US Army Corps
of Engineers®

ERDC POC: Annette Stumpf 217-373-4492 Annette.L.Stumpf@erdc.usace.army.mil

Directorate of Research and Development

SPIRiT to LEED Transition

CERL Project Objective: Support ACSIM in transitioning from SPIRiT* to LEED® as the Army's Green Building Rating System.**

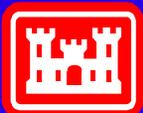
Products:

- **Army Implementation Guidance for:**
 - **LEED® NC2.2 (New Construction)**
 - **LEED® H (Homes)**
 - **LEED® EB (Existing Buildings)**
- **SDD Guidance for the transition from SPIRiT to LEED**

*SPIRiT = Sustainable Project Rating Tool

**LEED = Leadership in Energy and Environmental Design (by the USGBC)

<https://eko.usace.army.mil/fa/sdd/>



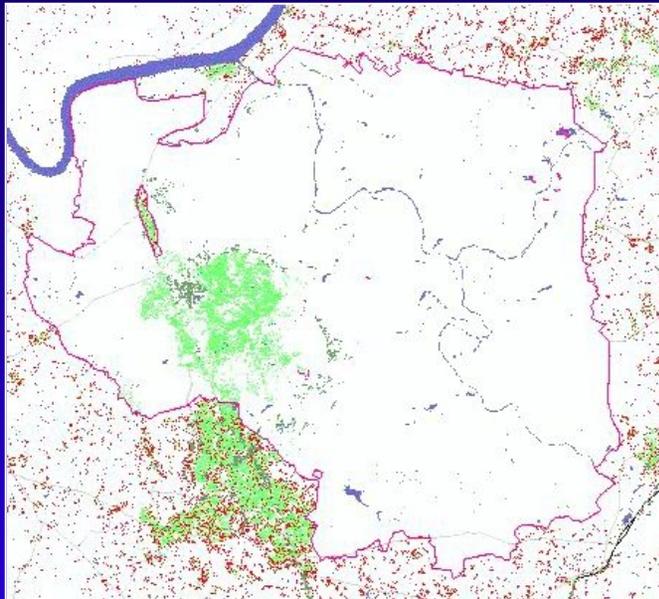
ERDC POC: Richard Schneider 217-373-6724 Richard.L.Schneider@erdc.usace.army.mil

US Army Corps
of Engineers®

Directorate of Research and Development

Predicting Encroachment

Impact of Today's Planning on Tomorrow's Ranges

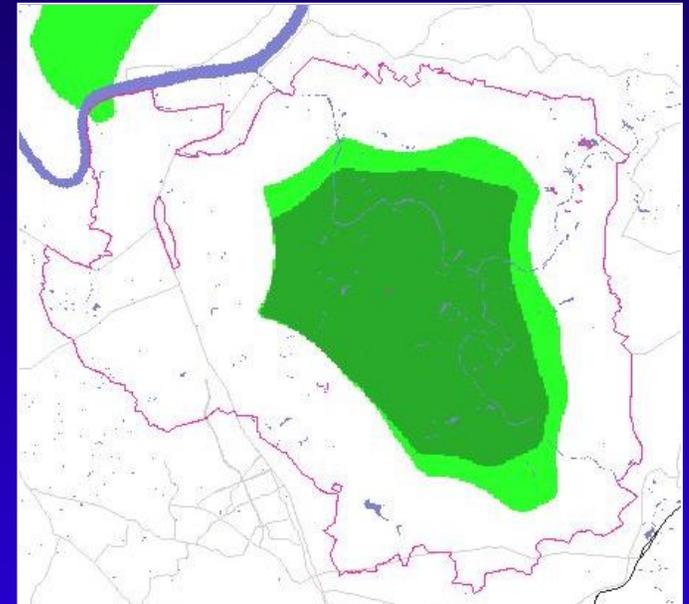


Fort Knox

Projected regional urban development



Projected loss of artillery training opportunity



- Regional planning impacts future training opportunities
 - Highways, utilities, zoning, property purchases

- LEAM tools predict ...
 - Land development attractiveness
 - Future urban patterns
 - Opportunities to train within those patterns

SERM: <https://eko.usace.army.mil/fa/serm/>

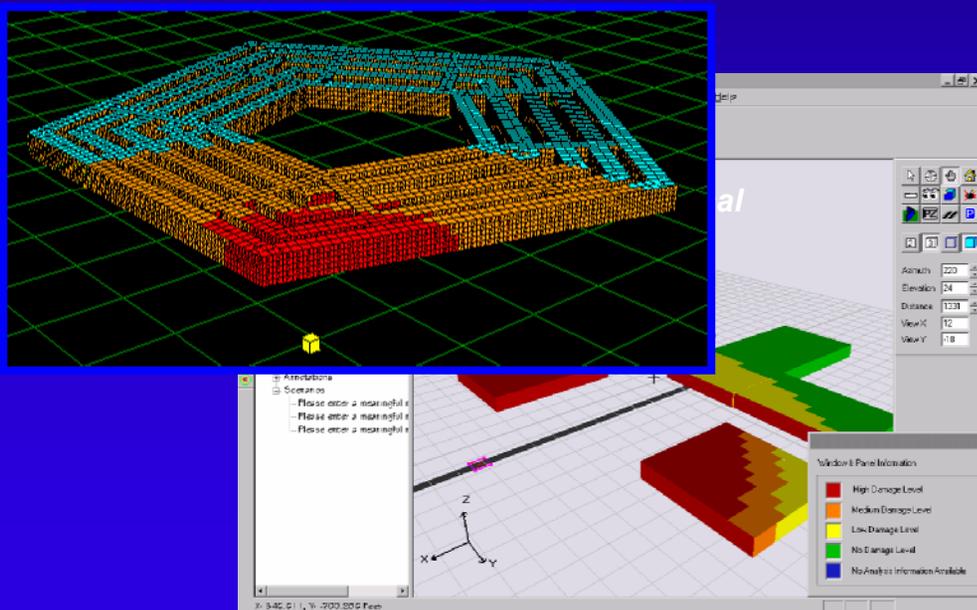
ERDC POC: Dr. Jim Westervelt; 217 373-4530; james.d.westervelt@erdc.usace.army.mil

Force Protection Tools

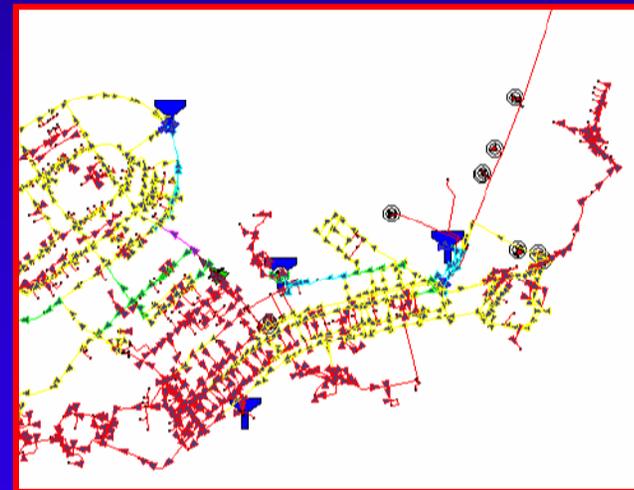
- Determine infrastructure vulnerability to blast or CBR attack
- Assess impact of attack on human life and mission
- Assist in siting of new facilities



Airborne CBR attack



Facilities



Water system CBR attack

Requirement: Meet new security threats

Minimum AT Standards for Buildings Wizard

DoD Minimum Anti-Terrorism Standards

Project Category
Analysis
Verify Answers
View Reports
Export Report

Step 2 - Answer questions to determine project category.
Select the correct answer to the question below to appropriately determine the category of the project.

Does project meet building type requirements for [Full Force Protection Exemption?](#)

Building types for exemption include:

- family housing with 12 units or fewer per building
- gas stations and car care centers
- recruiting stations in leased spaces
- other building types as dictated by DoD.

Yes
 No

< Back Next > Cancel

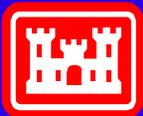
Aids facility planners and designers to comply with UFC 4-010-01 DoD Minimum AT Standards for Buildings

- Steps user through yes/no questions
- Minimizes need to manually cross-reference UFC document
- Identifies site layout requirements
- Provides design/construction requirements and recommendations



ERDC POC: ERDC CERL Dave Bailey (217-373-6781)

QUESTIONS?



US Army Corps
of Engineers®

Directorate of Research and Development