

ABRAHAM DRAINAGE & EXCAVATING

DRAINAGE • EXCAVATION • OHIO

VETERAN-OWNED & OPERATED

CAPABILITY STATEMENT

DRAINAGE RISK & MITIGATION FOR RENEWABLE ENERGY PROJECTS

PREPARED FOR EPCS & RENEWABLE ENERGY DEVELOPERS

Abraham Drainage & Excavating LLC (ADE) is the **drainage risk and mitigation partner** for renewable energy projects. ADE collaborates with developers and EPCs early in the project lifecycle to identify drainage risk, define the right scope, and carry that solution through design, construction, and long-term operations — so drainage does not become a hidden source of **cost, delay, claims, or asset underperformance**.

14.2M

FEET OF PIPE INSTALLED

21K

ACRES EVALUATED

291

PROJECTS DELIVERED

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SERVICE AREA

Ohio & the Midwest

— WHO ADE SERVES

01 / Engagement

A PARTNER TO THE TEAMS THAT CARRY UTILITY-SCALE DRAINAGE RISK

ADE collaborates with teams responsible for delivering large, utility-scale renewable energy assets — where drainage failure creates cost, schedule, and reputational risk. As partners, we serve four groups:

A • EPCs**UTILITY-SCALE SOLAR & WIND EPCS**

That need constructable, defensible civil scopes — and fewer field surprises once crews mobilize.

B • Developers**DEVELOPERS**

That want to embed the right drainage decisions during design layout, interconnection planning, and permitting — instead of correcting problems after notice to proceed.

C • Owners**OWNERS & ASSET MANAGERS**

Accountable for long-term performance, operations and maintenance cost, and landowner relationships across the life of the asset.

D • Procurement**PROCUREMENT TEAMS**

That need a way to identify true value, evaluate beyond the lowest bid, and compare proposals on actual risk coverage.

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— THE DRAINAGE PROBLEM IN RENEWABLE PROJECTS

02 / Context

DRAINAGE IS DECIDED TOO LATE — AND THE COST IS BUILT IN EARLY

Often, renewable energy projects are **scoped, priced, and awarded** before anyone with real drainage expertise has verified how water moves through the site, how existing systems function, or how the project may affect neighboring land.

By the time drainage is taken seriously, the site layout is often advanced, the scope has been simplified, and bids are being compared primarily on price. **That sequence embeds hidden risk and higher cost into the project before construction even begins.**

HOW THE RISK SHOWS UP

- ✓ Failed outlets and poor discharge paths.
- ✓ Wet work areas, erosion, sediment movement, and unstable access.
- ✓ Slow or impossible vegetation growth.
- ✓ Offsite impacts and homeowner / landowner complaints.
- ✓ Flooding or saturation around array structures and electrical infrastructure.
- ✓ Long-term O&M burden caused by drainage being treated as a short-term construction line-item.

“DRAINAGE GETS TAKEN SERIOUSLY ONLY AFTER THE LAYOUT IS FIXED, THE SCOPE IS SIMPLIFIED, AND BIDS ARE COMPARED ON PRICE.”

— ADE'S STRATEGIC ROLE**03 / Positioning**

NOT ANOTHER DRAINAGE CONTRACTOR INSIDE A PREWRITTEN SCOPE

ADE serves as the specialist that helps developers and EPCs understand the **real drainage problem** before it gets locked into the wrong scope, the wrong design assumptions, and the wrong award decision. Our role is larger than installation: ADE functions as a **drainage risk identification, mitigation, design, and execution partner** — from early development through construction, energization, and long-term operational performance.

— CORE CAPABILITY

A full-solution drainage **risk-avoidance strategy** built around the entire project lifecycle rather than a narrow construction scope. Key elements:

01 EARLY RISK IDENTIFICATION & SCOPING
Bringing drainage expertise into development and early design so risk is defined before pricing and award.

02 HOLISTIC, WATERSHED-BASED SYSTEM DESIGN
Designing around how water enters, moves through, and exits the site — not just where legacy tile happens to exist.

03 CONSTRUCTABLE, RENEWABLE-AWARE REMEDIATION LAYOUTS
Aligning drainage systems with piles, collection systems, roads, and foundations for minimum conflict and maximum flexibility.

04 FIELD-VERIFIED DESIGN & AS-BUILT DOCUMENTATION
Using structured in-field investigation, survey data, and mapping to anchor decisions in actual site conditions and investigative findings.

05 LIFECYCLE PROTECTION & OPERATIONAL SUPPORT
Designing to protect access, vegetation, infrastructure, and neighboring properties over the life of the asset.

— ADE METHODOLOGY**04 / Process • 1 of 2**

SURFACE RISK EARLY. VERIFY IT IN THE FIELD. CONVERT IT TO SCOPE.

ADE's process is built to surface risk early, verify it in the field, and convert it into clear design and scope decisions that EPCs and developers can confidently price and build.

01 HISTORICAL AERIAL REVIEW & WATERSHED MODELING

ADE begins with detailed site topography and watershed modeling, then overlays proposed solar or wind infrastructure on historical aerial imagery to understand how the site has historically drained, how crops and vegetation have performed, and how water moves across project boundaries.

02 ENHANCED & INFERRED IMAGERY ANALYSIS

Enhanced imagery is used to detect subtle soil-moisture variation and vegetation patterns that often indicate buried mains and laterals which may not appear in existing records.

03 PRELIMINARY REMEDIATION PLANNING

Before field mobilization, ADE develops a preliminary remediation concept that identifies anticipated mains, submains, laterals, and potential outlet locations — so field work is targeted and efficient.

04 IN-FIELD INVESTIGATION & PHYSICAL VERIFICATION

ADE schedules field investigation to maximize useful site conditions, including post-rain observations when appropriate. Drone reconnaissance, tile probing, selective excavation, and survey-grade data collection verify alignment, depth, material, condition, and flow direction of existing systems.

— ADE METHODOLOGY

04 / Process • 2 of 2

FROM VERIFIED DATA TO A BUILDABLE, DOCUMENTED PACKAGE

05 SYSTEM PERFORMANCE ANALYSIS

ADE evaluates soil classifications, hydrologic soil groups, existing system capacity, outlet conditions, and watershed behavior to determine how the drainage system should perform under both current and future project conditions.

06 REMEDIATION & PROTECTION DESIGN

Using verified field data, ADE designs new mains, submains, laterals, perimeter systems, and outlet strategies that restore or improve drainage performance while remaining compatible with renewable energy infrastructure.

07 CONFLICT & CROSSING MANAGEMENT

Drainage alignments and design elements are coordinated with electrical infrastructure, foundations, roads, and access corridors to minimize conflicts and manage unavoidable crossings correctly.

08 DELIVERABLES & DOCUMENTATION

ADE produces project-specific design packages — narrative findings, mapped drainage systems, design recommendations, crossing matrices, supporting imagery, scope-aligned documentation, and as-built records — that EPCs can integrate into engineering, procurement, construction planning, and production support records.

OUTPUT

A defensible package that ties every recommendation to **observed, in-field site conditions** — not assumptions.

HANDS OFF TO

Engineering, procurement, construction planning, and long-term **production support records**.

— TECHNICAL SPECIALIZATIONS

05 / Capabilities

STRENGTHS AIMED AT THE FAILURES THAT THREATEN RENEWABLE SITES

ADE's technical strengths align directly with the drainage issues that most often threaten renewable energy projects.

01

AGRICULTURAL DRAINAGE ASSESSMENT & REMEDIATION

Evaluation of existing mains, submains, laterals, ditches, swales, channels, waterways, and other drainage features.

02

WATERSHED-BASED DESIGN FOR UTILITY-SCALE PROJECTS

Design based on the full contributing watershed, not just isolated field conditions.

03

SOLAR- & INFRASTRUCTURE-AWARE DRAINAGE LAYOUTS

Planning that accounts for arrays, inverter pads, roads, collection systems, and future flexibility.

04

OUTLET REHABILITATION & DISCHARGE MANAGEMENT

Identifying nonfunctional or undersized outlets and designing workable long-term discharge conditions.

05

FIELD VERIFICATION OF UNDOCUMENTED SYSTEMS

Locating and interpreting legacy drainage infrastructure that would otherwise stay hidden until construction.

06

STAKEHOLDER & LANDOWNER PROTECTION

Developing solutions that help protect neighboring properties and reduce claim exposure.

— RISK THEMES ADE HELPS CONTROL

06 / Risk

FOUR RECURRING CATEGORIES OF PROJECT RISK

ADE's work helps EPCs, developers, and owners manage four recurring categories of project risk.

01 HIDDEN PRE-BID RISK

- Drainage expertise is not involved early enough.
- Scope is developed before real drainage conditions are understood.
- Bids are compared on price before risk is properly defined.

02 CONSTRUCTION & SCHEDULE RISK

- Failed outlets and poor discharge paths.
- Wet work areas, erosion, sediment movement, and unstable access.
- Design changes and rework caused by differing field conditions.

03 STAKEHOLDER & THIRD-PARTY RISK

- Damage to non-participating landowner fields.
- Damage to neighboring homes and downstream properties.
- Community concern and reputation risk when projects create visible water problems.

04 ASSET & OPERATIONS RISK

- Flooding or saturation around arrays, structural pilings, and in-ground and enclosure electrical infrastructure.
- Vegetation stabilization and maintenance issues caused by chronic wetness.
- Long-term O&M burden from drainage treated as a short-term scope.

— BENEFITS BY AUDIENCE

07 / Value • 1 of 2

WHAT EACH STAKEHOLDER GETS

FOR EPC EXECUTIVES

ADE helps reduce management burden by converting unknown drainage conditions into **defined, remediated, and manageable scopes** that fit into construction schedules, plans, and budgets.

- ✓ Fewer surprises and change orders, through early verification of outlets, legacy systems, and watershed behavior.
 - ✓ More defensible scopes and pricing, through clear, data-backed drainage recommendations.
 - ✓ Reduced field firefighting, because drainage risk is addressed before it becomes a construction problem.
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FOR DEVELOPERS

Developers use ADE to embed stronger drainage decisions into **site layout, permitting, and array structures** while these are still flexible.

- ✓ Better alignment between drainage realities and project layout.
- ✓ Lower risk of landowner issues, offsite impacts, and claims.
- ✓ Stronger project defensibility with stakeholders, partners, and long-term owners.
- ✓ Reputation protection across the communities a project touches.

— BENEFITS BY AUDIENCE

07 / Value • 2 of 2

PROTECTING THE ASSET — AND THE PROCUREMENT DECISION

FOR OWNERS & ASSET MANAGERS

Owners and asset managers engage ADE to avoid inheriting drainage failures that **quietly increase costs** long after turnover.

- ✓ Protection of long-term operations and maintenance budgets.
- ✓ Improved access, vegetation performance, and infrastructure stability.
- ✓ Reduced neighbor conflict and reputational risk.

FOR PROCUREMENT TEAMS

Procurement teams use ADE's work to compare **more than the visible bid number**.

- ✓ Clearer bid instructions and evaluation criteria.
- ✓ Better visibility into proposals that are low because underlying risk was never properly defined.
- ✓ A stronger record for defensible procurement decisions.

NET EFFECT

Across every audience, ADE converts **unknown drainage conditions** into defined, priced, and buildable scope — earlier, when decisions are still cheap to change.

EVIDENCE OF CAPABILITY**08 / Track Record**

LARGE, COMPLEX SITES — HIDDEN FAILURE POINTS FOUND

ADE's renewable energy work demonstrates the ability to evaluate large and complex sites, identify hidden drainage failure points, and develop remediation strategies that support both construction and long-term asset performance.

This evidence includes large-footprint site investigations, in-field verification of deteriorated legacy drainage infrastructure, design of new subsurface drainage systems, outlet design and remediation strategy development, and coordination with project layouts, civil work sequencing, and utility conflicts.

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ENGAGEMENT MODELS

EPCs, developers, and owners typically engage ADE in one of three ways:

01**EARLY-STAGE RISK SCAN & CONCEPT STUDY**

Desktop review plus targeted field assessment to inform site planning, layout, and early civil decisions.

02**FULL DRAINAGE RISK & DESIGN PACKAGE**

Comprehensive field verification, analysis, remediation design, documentation, and scope definition.

03**CONSTRUCTION & OPERATIONAL SUPPORT**

Design verification, quality oversight, corrective-action planning, and post-construction drainage performance support.

— POSITIONING STATEMENT

DRAINAGE EXPERTISE **BEFORE** LOW-COST ASSUMPTIONS HARDEN INTO LONG-TERM PROBLEMS.

ADE brings drainage expertise into the project before low-cost assumptions harden into long-term problems and cost overruns. ADE helps renewable energy projects **identify and solve drainage risk at the front end** — instead of remediating throughout construction and at the back end.

— START THE CONVERSATION

BOOK A PRE-CONSTRUCTION DRAINAGE **CONSULTATION.**

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