Engineering/Construction:
Case Study:
Flagstaff Runway Extension (CM@ Risk Project)

Presented to:

Federal Aviation Administration (FAA) Western- Pacific Region 4th Annual Airports Conference

Date: May 6, 2008

FLAGSTAFF PULLIAM AIRPORT

Kimley-Horn and Associates, Inc.

Ames Construction, Inc.

PANEL:

- John Lauher – Flagstaff Airport Manager
- Daniel Holmes – Flagstaff Public Works
- Steve Reeder – Kimley-Horn and Assoc.
- Jerry Miller – Ames Construction

John Lauher

- Mechanical Engineer
- Air Force fighter pilot
- Second Career as Flagstaff Airport Manager

Flagstaff Runway Extension

- BACKGROUND – PROJECT NEED
  - Airfield Elevation
  - Existing Runway 7,000’ Long
  - Limited Commercial Options
  - Flying Safety

SPONSOR'S CONCERNS

- Short Construction Season
- Predictable Project Costs
- Air Traffic Disruption
- Construction Safety
- Airfield Security

Daniel Holmes

Flagstaff Public Works

Daniel Holmes

- Senior Project Manager
- Bachelor's degree in civil engineering from Colorado State University in 1975.
- Responsible for delivery of all airside and landside aviation projects at Flagstaff Pulliam Airport for last 13 years

What is CM @ Risk?

- Qualifications Based Selection Process for Contractor Selection
- Open Book Process Throughout
- Design Phase Services
- Separate Construction Phase Services (If GMP agreed)

When Should Sponsor Engage CM @ Risk?

- Any time during design phase up to 100% plans
- The earlier the better to realize maximum benefit

Why Was CM @ Risk Chosen for this Project?

- Partnership desired
- Single season project, limited construction season (April-November)
- Time Savings
- Cost control and savings
- Claim avoidance

Why Was Ames Construction Selected as CM @ Risk

- Proposal showed most complete understanding of project
- Blasting capabilities
- Experience on our airport, with our conditions and personnel

PROJECT CHRONOLOGY

CM @ Risk engaged at 30% Submittal

- Review conceptual design with Design Professional and Sponsor
- Provide input on design concepts
- Provide input on value engineering
- Look at geotech report and cores
- Prepare construction phasing plans
- Look at means and methods
- Start the RELATIONSHIP

PROJECT CHRONOLOGY

60% Plan Review Meeting

- First cost estimate and schedule
- Approximate $ 4 million funding shortfall identified
- Value engineering/scope reductions
- Construction water source
- Evaluated use of on-site aggregates
- Design revisions evaluated
- Build the RELATIONSHIP

PROJECT CHRONOLOGY

60% - 90% Value Engineering/ Cost Reduction Meeting

- Line by line Cost model Reviewed
- Some items eliminated
- Some items negotiated reduced price
- Some quantities adjusted
- All quantities verified, agreed
- Approximately $ 2 million reduction in estimated cost.
- Strengthen the RELATIONSHIP

PROJECT CHRONOLOGY

90% Plan Review Meeting

- Finalize Cost Model and Schedule Reviewed
- Detailed Plan and Specification Review by All (Buy In)
- Request Final GMP
- Schedule Final Completion of Plans and Specifications
- Schedule Start Of Construction
- Maintain The RELATIONSHIP

PROJECT CHRONOLOGY

Design Phase Complete

- Present GMP to City Council
- Secure FAA & ADOT Approval
- Final Plans snd Specs Delivered
- Permits In Hand
- Pre-Construction Conference
- Design Phase Complete in 8 Months
- RELATIONSHIP Established

PROJECT CHRONOLOGY

CONSTRUCTION PHASE

- Began on schedule late March 2007
- Hit the ground running (design phase planning pays off)
- Airport impacts minimized (planned phasing)
- On-going value engineering, cost savings
- Congenial relationships maintained during construction
- Schedule maintained as planned
- Completion in 8 months, 2 weeks early and $ 500,000 under GMP

Benefits of the Method to Airport Sponsor

- Knowledge of and trust in key players
- Respect for all project participants by all involved
- No attorneys
  - Plans and specs bought into by CM@Risk, shared ownership of project
- Designer not defending from claims
- CM@Risk concentrating on building the project, not building claims
- Resident engineer can concentrate on project, not defending potential claims

Benefits of the Method to Airport Sponsor

- Adequate time to plan and phase the work
  - Landside work maximized
  - Period of relocated threshold minimized
  - Financial and operational impacts on airport minimized
  - Time available to rectify funding shortfall
- Cost Savings
  - Construction water source
  - Pavement section re-evaluation
  - P-208 substitution
  - Efficient use of All Funds

Benefits of the Method to Airport Sponsor

- Time Savings
  - No advertise, bid, award phase (saved 2 ½ - 3 months, salvaged single season job)
  - GMP provided at 90% plan preparation, saving one month
  - Time is money, two season job would have cost ?? more
- No Bid Opening Day
  - No cost surprises, GMP known in advance
  - No low bidder surprises
  - No need to revise scope/plans and re-bid to meet budget

Benefits of the Method to Airport Sponsor

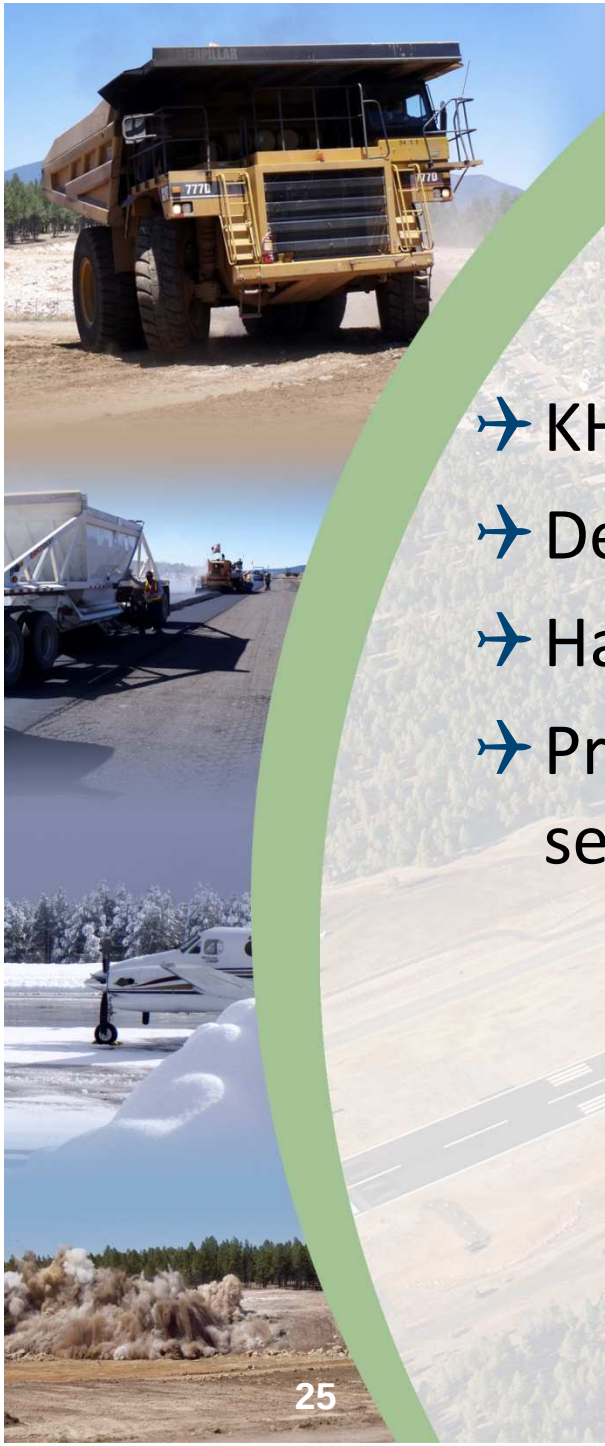
- Flexibility
  - Buy back PFC, runway painting
  - Electrical diagnostics and repair
  - Earthwork Quantities
- Customer Satisfaction
  - CM@Risk wants a happy Sponsor
  - Designer wants a happy Sponsor
- Changes in industry attitude

Steve Reeder

Kimley-Horn and Associates

Steve Reeder

- Associate with Kimley-Horn
- University of Wyoming
- Project Manager on airside projects
- Designed over $750M in improvements



Design Perspective

- KHA Selected in July 2005
- Designed roadway project at the airport
- Had worked on other CM@R projects
- Provided guidance on the CM@R selection process

KHA Responsibilities

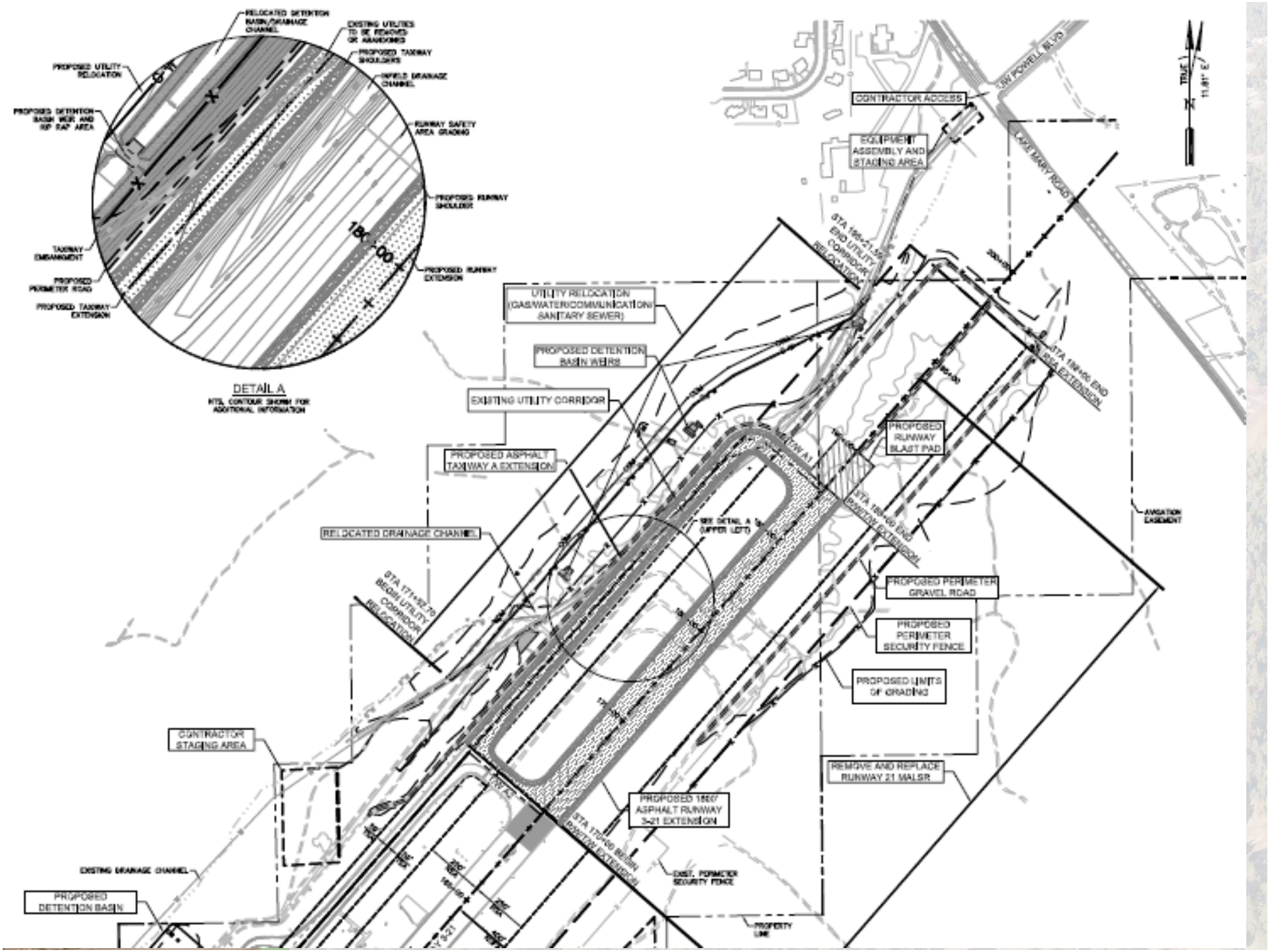
- Design Runway/Taxiway extension
- Master Drainage Plan Update
- Major Earth Moving Project
- Relocate Utility Corridor
- NAVAID Replacement (MALSR, PAPI)
- 404 Permit – Relocate Waters of the US

Pre – Design Effort

- Survey
  - Ground
  - Aerial
- Geotechnical Investigations
  - Embankment
  - Borrow Areas
  - Utility Corridor and Drainage Channel

KHA Responsibilities

- White Papers- Studies
  - Displaced Threshold
  - ILS Critical Area Grading
  - Coordination of Utility Corridor/Future Access Road/ Drainage Channel
  - Timber Area Removal Limits
  - Borrow Area Locations
  - Slope Protection/Vegetation Criteria
  - Hold line Location


RELOCATED DETENTION BASIN/DRAINAGE CHANNEL
EXISTING UTILITIES TO BE REMOVED OR ABANDONED
PROPOSED TAXIWAY SHOULDERS
INFIELD DRAINAGE CHANNEL
PROPOSED UTILITY RELOCATION
PROPOSED DETENTION BASIN WEIR AND RIP RAP AREA
RUNWAY SAFETY AREA GRADING
PROPOSED RUNWAY SHOULDER
TAXIWAY EMBANKMENT
PROPOSED PERIMETER ROAD
PROPOSED TAXIWAY EXTENSION
PROPOSED RUNWAY EXTENSION
18'-00"
DETAIL A
NTS, CONTOUR SHOWN FOR ADDITIONAL INFORMATION
CONTRACTOR ACCESS
SW POWELL BLVD
EQUIPMENT ASSEMBLY AND STAGING AREA
LAKE MARY ROAD
TRUE
11.81° E
STA 166+21.52 END UTILITY CORRIDOR RELOCATION
UTILITY RELOCATION (GAS/WATER/COMMUNICATION/ SANITARY SEWER)
PROPOSED DETENTION BASIN WEIR
STA 184+00 END RWY EXTENSION
EXISTING UTILITY CORRIDOR
PROPOSED RUNWAY BLAST PAD
PROPOSED ASPHALT TAXIWAY A EXTENSION
TWY A1
SEE DETAIL A (UPPER LEFT)
AVIGATION EASEMENT
RELOCATED DRAINAGE CHANNEL
STA 171+62.70 BEGIN UTILITY CORRIDOR RELOCATION
STA 184+00 END RWY EXTENSION
PROPOSED PERIMETER GRAVEL ROAD
PROPOSED PERIMETER SECURITY FENCE
PROPOSED LIMITS OF GRADING
CONTRACTOR STAGING AREA
REMOVE AND REPLACE RUNWAY 21 MALSR
PROPOSED 1860' ASPHALT RUNWAY 3-21 EXTENSION
TWY A2
STA 170+00 BEGIN RUNWAY EXTENSION
EXIST. PERIMETER SECURITY FENCE
EXISTING DRAINAGE CHANNEL
PROPOSED DETENTION BASIN
PROPERTY LINE

Design and Review Process

- Design Review meeting
  - Client Meeting every three weeks
  - Internal group meetings every week
  - Meet with CM@R as needed

Design and Review Process

- Submittal schedule
  - Notice to Proceed on July 28, 2006
  - 30%, 60%, and 90% submissions
  - Cost Estimate Review
    - KHA developed quantities - Provided to contractor
    - Discussed amount of swell potential
    - Reviewed quantities together
    - Reviewed and negotiated GMP proposal
  - Final Plans dated March 7, 2007

During Construction

- Provided Construction Administration services
- Field Observation and Testing Overview
- Key project milestones
  - Start work / blasting
  - Reduced Runway Length
  - Electrical Work
  - Final Switch Over
  - Flight check
  - Publications
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Keys Of Success (From Designer's Point Of View)

- Past Experience
- Owner Involvement
- Ownership in Project w/o Being Married To It



Jerry Miller

Ames Construction

Jerry Miller

- Program Manager at Ames Construction
- 13 years experience leading infrastructure construction
- Over 250 million of aviation projects using both hard bid and alternative delivery methods

RELATIONSHIPS

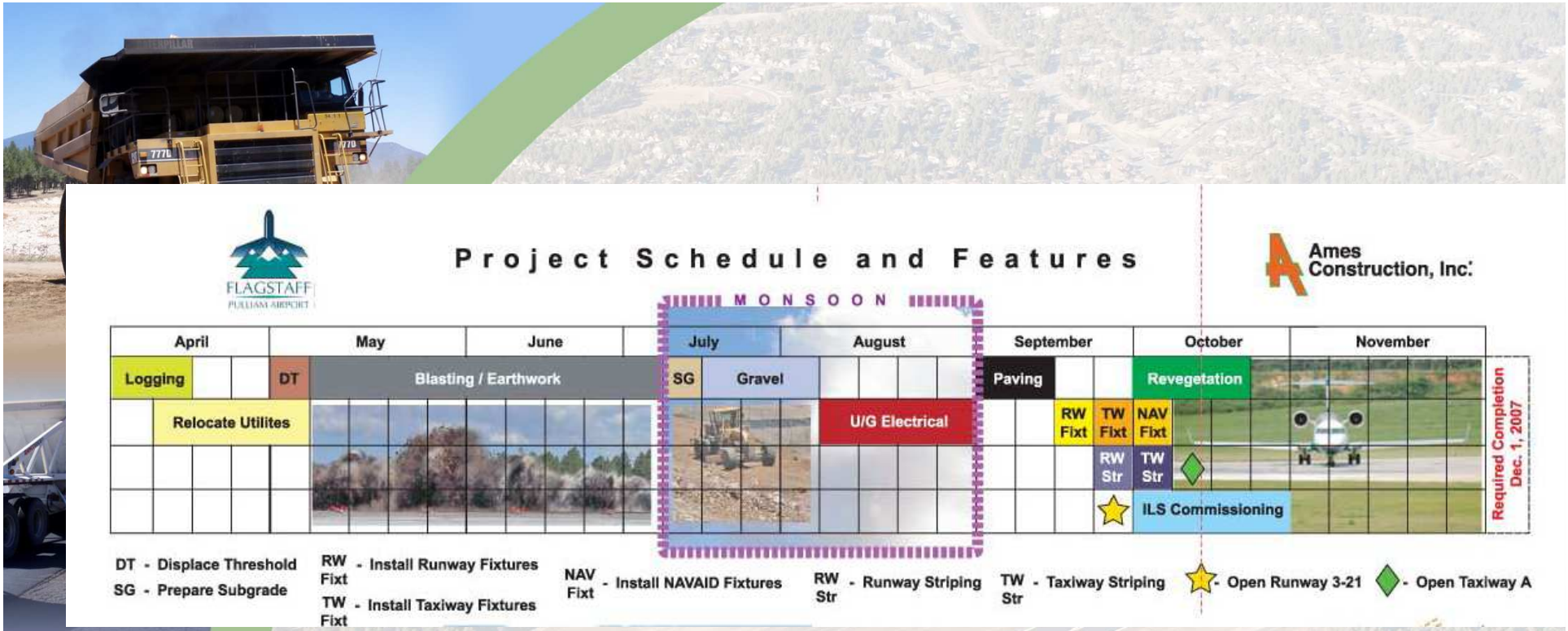
- **Traditional Hard bid mentality**
  - Bid it as we see it
  - Build it as we see it
  - You bid it you build it
  - Hard market to break in, reputation
- **CM@Risk**
  - Selection based on qualifications
  - Professional Trusting
  - Staffing, mentality shift from hard bid
  - Team environment from the start
  - Mutual goals and agendas
  - Top to Bottom

QUALITY

- **Quality**
  - Not just construction or design
    - Service, valued input, difficult specification issues
    - We were able what the needs and requirements REALLY were
  - Ownership of project equals higher product quality
    - QA/QC/CM all work together

SCHEDULE/FAST TRACK PROS

- **Schedule/Fast Track**
  - Master project delivery schedule @ 30%
  - One season project
  - Design and GMP milestones
  - Start Date maintained
  - Need for double shift was realized
  - Demand Performance of All



- Original Owner Program of 24 Months
- Project Delivered Design to Construction 16 Months
- Eliminated the Risk of a 2 Season Project

COST CERTAINTY

- **Cost Certainty**
  - Cost Modeling @ 60% and 90%
  - GMP based on 95%
  - Negotiated GMP units and costs
  - Subcontractor bid packages
  - No surprises or project claims
  - Minimize changes due to constructability, access, quantities, or scope.

RISK MANAGEMENT

- Risk Management
  - Assign risk to party(s) with the best ability to control
  - One season project
  - Water availability during drought
  - Production, and earthwork properties
  - Operational airfield safety
  - User issues
  - Permitting
  - Safety

CONTRACTOR CONS

- Openness Culture
  - Comfort level to disclose estimated costs
  - Details of estimates, open book
  - Openly discuss project problems on the lowest level
  - No leverage on contract documents “WE HELPED PRODUCE THEM”
  - Up front and honest about schedule

Questions and Opinions Session