



# STANDARDIZED 3D MODELING

THE GIS ADVANTAGE IN TRAFFIC NOISE ABATEMENT

**JACOBS**

MILES CHEANG

Improving DOT Performance with ArcGIS  
ESRI USER CONFERENCE, JULY 2019



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# ONE CITY, TWO QUESTIONS



**Just 1 to 2 decibels! Can a redo change my outcome?**

**No.**



**Wall is 20% smaller than before! Why?**

**Because it's  
"optimized."**



**Maybe,  
maybe not.**

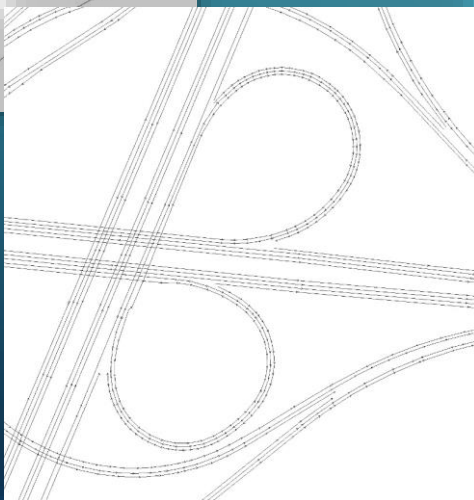
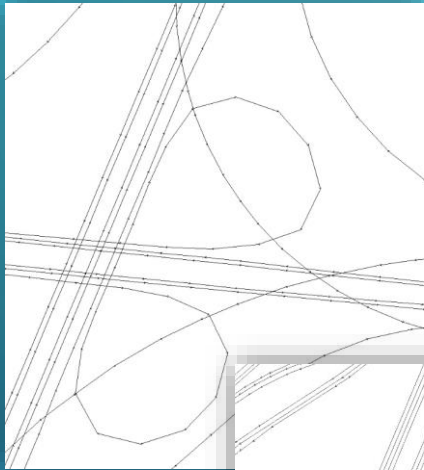
**They did a  
bad job.**



# WHAT I SAW

For noise barrier design projects, the vertical precision of terrain lines should be  $\pm 1$  foot to yield noise-level results that are in the range of  $\pm 1$  to  $\pm 2$  dB.

## WAS IT ACCURATE?



CAD

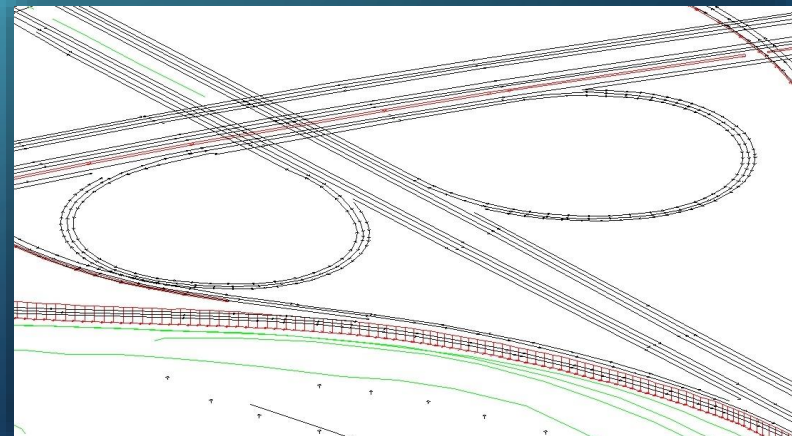
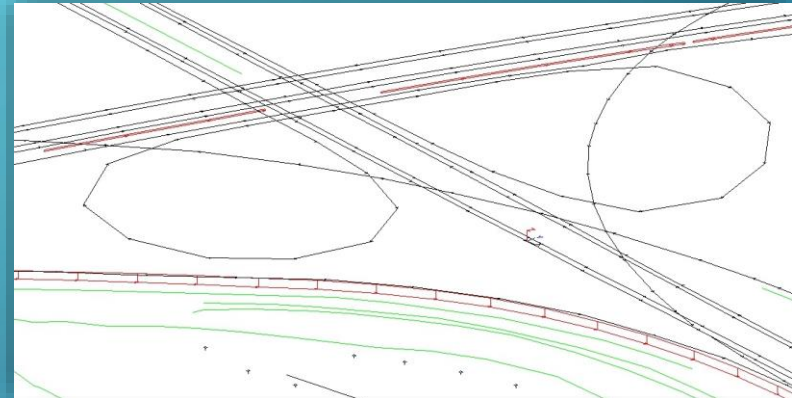
Blind Sampling  
Every 150 feet

GIS

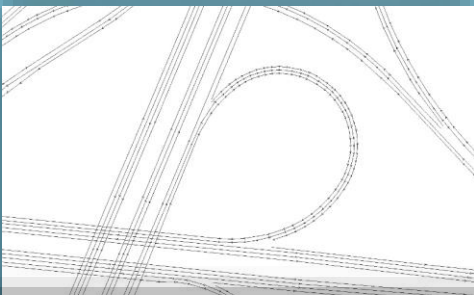
Precise Compression  
1-foot resolution



## WAS IT OPTIMAL?



# REAL-WORLD CONSEQUENCES



Walls that could have been

**Model precision**

Unproductive or wasteful investment

**Panel optimization**

Bad PR, public confusion and complaints

**QA-QC Intelligence**

**(Quality Assurance) (Quality Control)**



# QA-QC INTELLIGENCE

## QA

Developing  
Processes

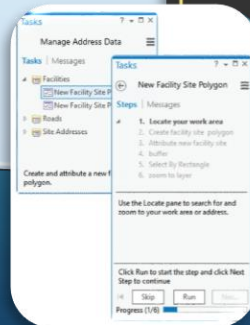
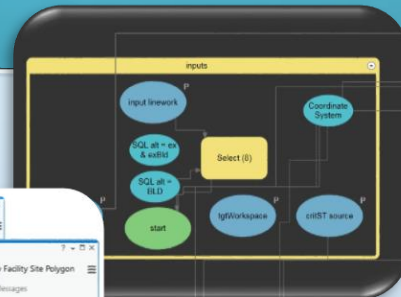
- Database
- Automation



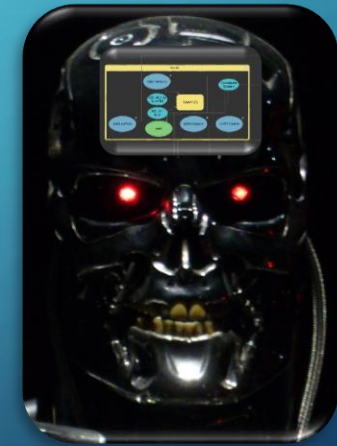
## QC

Implement  
QA

- ModelBuilder
- Tasks



## “SMALL AI”

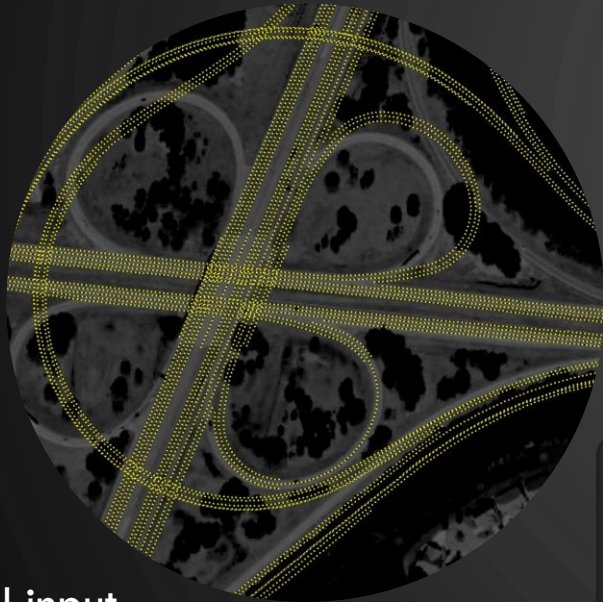


## STANDARDIZED

PROJECT TO PROJECT

YEAR TO YEAR

CONSULTANT TO CONSULTANT



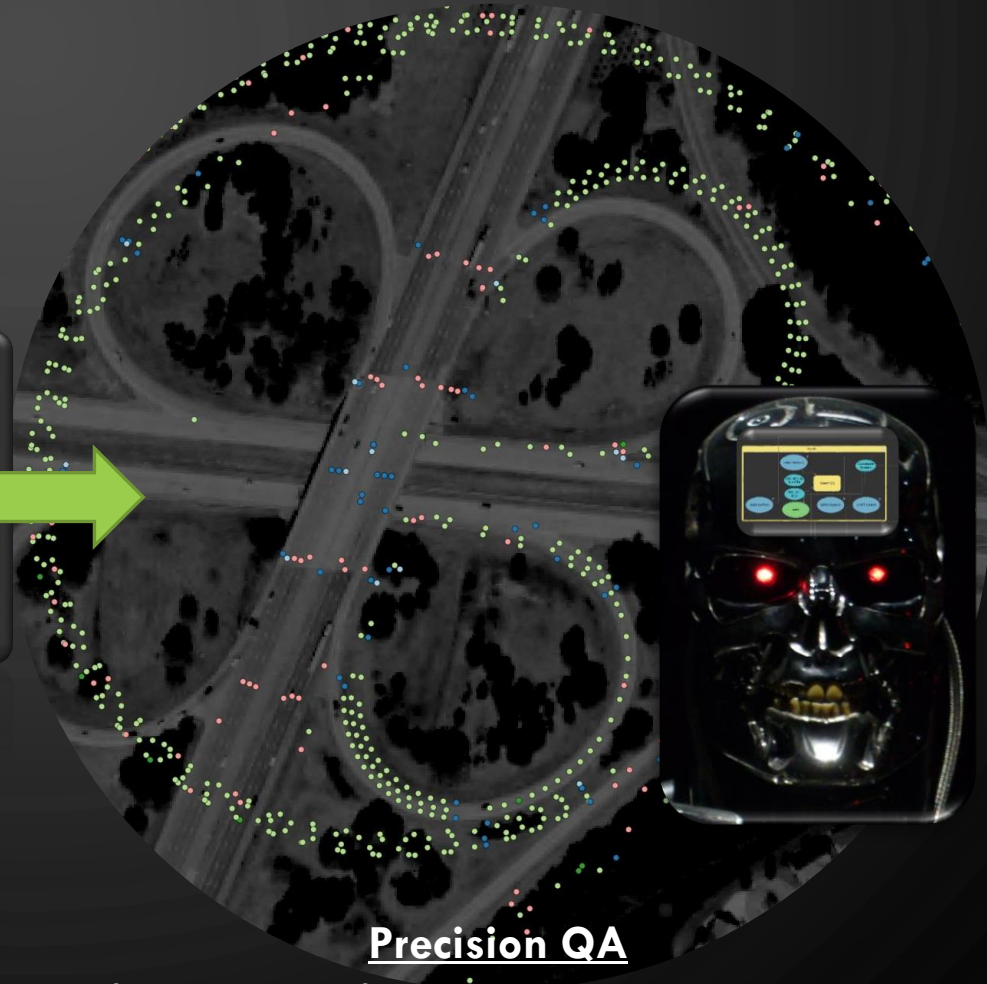
Spatial input



Conditions

●	epxy	critEP critXY
●	epxyz	critEP critXY critZ
●	xy	critXY
●	xyz	critXY critZ
●	z	
●	st	critST
●	fc	critFC
●	p	critP
●	ri	critRI
●	vi	critVI
●	vi	critVI

Conditions



**Precision QA**

Simplify data to 1 foot resolution, or model explodes  
Not just spatial compression, but “conditional”  
No standard tools exist



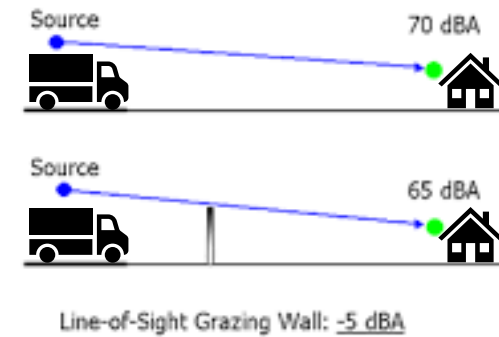
## Optimization QA

Not all panels perform equally

Best performance for least cost

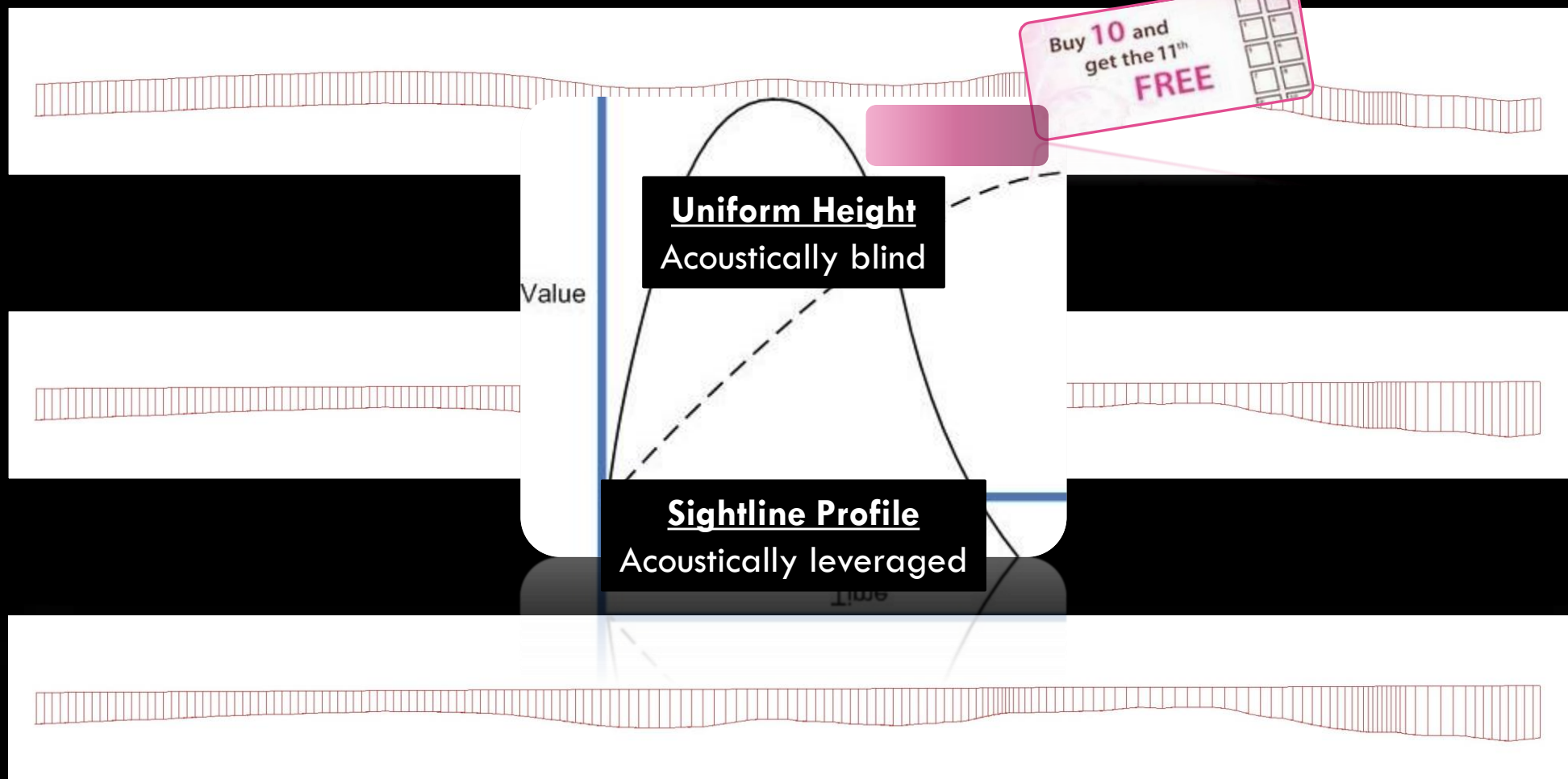


### Importance of Breaking the Line of Sight



“Seeing is hearing.”





**Iteration #1 defines optimization**



Small AI

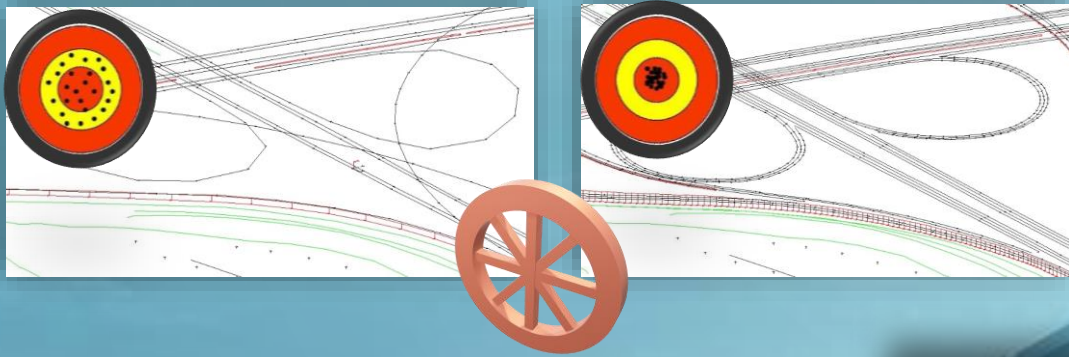


- Standardize
- Consistent QA-QC
- Refine over time
- Transparent
- Automated & Fast
- Scalable
- Platform-agnostic

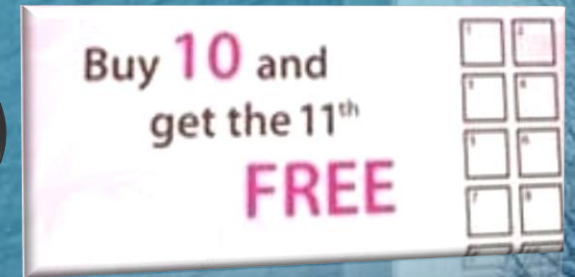


# Lessons Learned

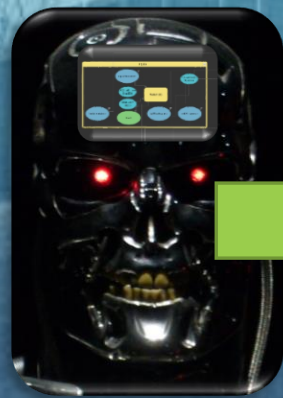
Only one way to do it right



Only DOT can enforce



## Never Settle







**Questions?  
Feedback?**

**Get at  
me.**

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