# Third Street
# Permeable Pavement Project
# Village of New Albany

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# Village of New Albany, Franklin County

# Third Street: Concepts

- Aesthetics consistent with Historic Village Center
- Third Street must be reconstructed
  - Options explored
    - Overlay (Not Possible)
    - Spot repair (Not Possible)
    - Full depth reconstruction (Standard Section)
    - Reconstruction with considerations for future developments
- Stormwater requirements

# Third Street: Existing Conditions

# Third Street: Concept Plan

# Third Street:
# Green Infrastructure Options Evaluated

- Street Bump-ins
- Silva Cells
- Street Bump-outs
- Pervious Pavers

# Third Street:
# Green Infrastructure Options Evaluated

## Recommended Solution

- Pervious Pavers
  - Most cost effective
  - Functional
  - Aesthetically pleasing
  - Water quality credits per draft OEPA standards
  - Low maintenance

# Pavement Selection – Concrete or Clay?

# Permeable Interlocking Concrete Pavement

- Solid Concrete ( 3-1/8”)
- Can Be Machine Installed
- Can Be Used on Low Volume Streets
- Traffic Calming
- Aesthetic Value
- Life Cycle Cost Savings

# Clay Pervious Pavers

- 2-3/4” Paver
- Better Durability
- Less Likely to Fade
- Installed by Hand
- Aesthetic Value
- Traffic Calming
- Can Be Used on Low Volume Streets
- Life Cycle Cost Savings

# Structural Differences

- Concrete Pavers
  - 8,000 psi (avg)
  - 3 1/8” thickness
- Clay Pavers
  - 14,000 psi (avg)
  - 2 ¾” thickness

# Conventional Street Costs

| | |
|---|---|
| Excavation, Street, Pavement | $191,364 |
| Walks | $28,167 |
| Maintenance of Traffic | $16,200 |
| Storm/Erosion Control | $107,990 |
| Water | $600 |
| Lighting (underground only) | $16,473 |
| Conduit Bank | $13,140 |
| Signs/Pavement Markings | $16,106 |
| Landscaping | $17,415 |
| **Totals:** | **$407,455** |
| Misc. Costs 10 year Maintenance (mill & pave) | $18,597 |

# Clay Paver Cost Estimate

| | |
|---|---|
| Excavation, Street, Pavement | $268,822 |
| Walks | $28,167 |
| Maintenance of Traffic | $16,200 |
| Storm/Erosion Control | $42,152 |
| Water | $600 |
| Lighting (underground only) | $16,473 |
| Conduit Bank | $13,140 |
| Signs/Pavement Markings | $12,882 |
| Landscaping | $17,415 |
| **Totals:** | **$415,851** |

# Bid Information

| | |
|---|---|
| Winning Bid | $424,389 |
| | |
| <u>Clay Paver Section Costs (11,916 sq.ft.)</u> | |
| Clay Paver Installation Cost | $4.90 sq.ft. |
| Clay Paver Material Cost* | $5.85 sq.ft. |
| No. 2/No. 57 Aggregate Cost | <u>$3.54 sq.ft</u> |
| Total | $14.29 sq. ft. |

*Includes extra 10% for future repairs

# Pavement Design

How thick does pavement have to be?

# Structural Design:
# AASHTO Flexible Pavement

- Two Geotechnical Borings
  - CBR of 4.6 and 8.0
  - CBR value of 4.6 used
- Traffic Count of 780 ADT
- 2% Truck Traffic Assumed

**Structural Number Required 2.28**

# Structural Design:
# AASHTO Flexible Pavement

- Stone sub-base and pavement layer coefficient of 0.14 used
- Interlocking Pavement Industry uses 0.44 for pavement course

Required Structural Thickness:

**2.28/0.14 = 16.3”**

# Structural Design: Subgrade Preparation

- Specified compaction of subgrade to ODOT Item 204 specifications
- Permeable geotechnical fabric placed between subgrade and stone sub-base
  - Not accounted for in structural design calculations

# Frost Depth

- Recommended Thickness of Pavement System
  - Pavement + Stone Layer = 0.65 * Frost Depth

    (based on UNH Stormwater Center, 2009)


Source: Floyd (1978)

| Located North of Latitude | Max. Frost Depth (in) | Min. Recommended Thickness (0.65 x Frost Depth) (in) |
|---|---|---|
| 38.3 Ironton | 24 | 16 |
| 38.7 | 26 | 17 |
| 39.0 Cincinnati | 28 | 18 |
| 39.3 | 30 | 20 |
| 39.7 | 32 | 21 |
| 40.0 Columbus | 34 | 22 |
| 40.3 | 36 | 24 |
| 40.7 | 38 | 25 |
| 41.0 | 40 | 26 |
| 41.3 Cleveland | 42 | 27 |
| 41.7 Ashtabula | 44 | 29 |

* Tentative 12/10

# Frost Depth

National Ready Mix Concrete Association recommends ½ of frost depth for drained base

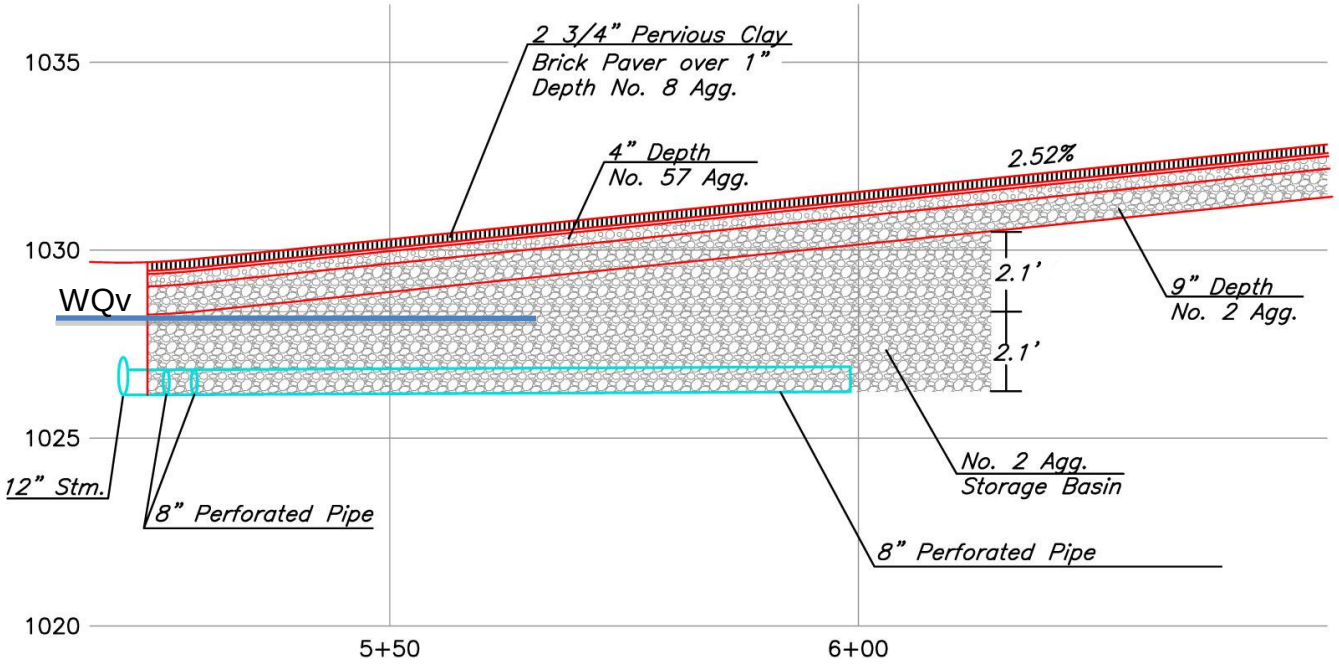
Central Ohio Frost Depth 34”

**Pavement Section = 17”**

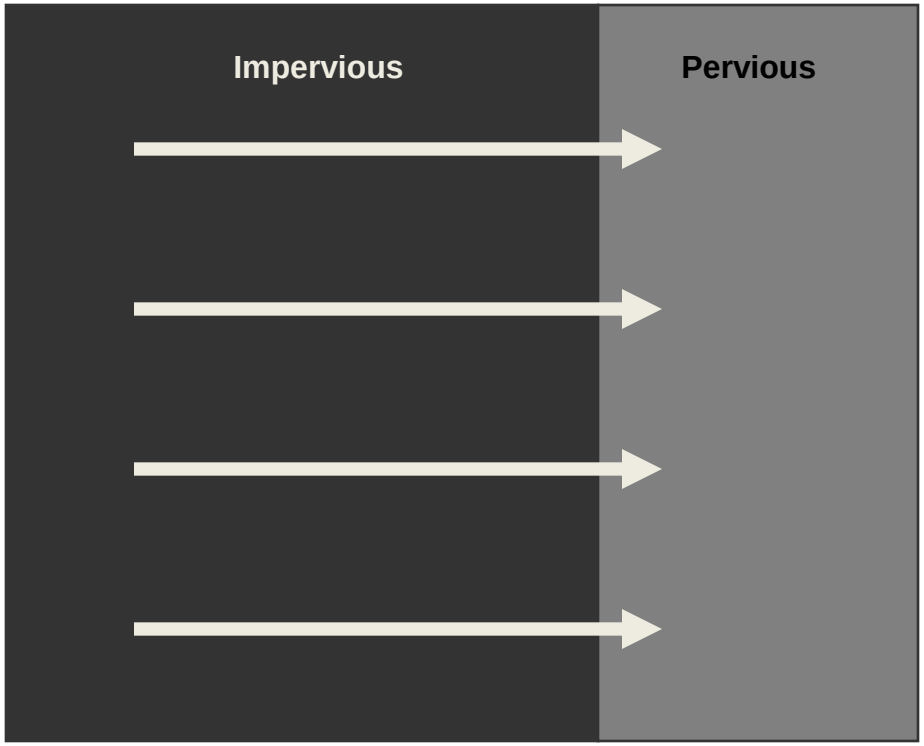
# Water Quality Volume (WQv)

- Full Infiltration of WQv within 48 hours
  - pre- approval from Ohio EPA not required
- No Infiltration of WQv (lined system or compacted subgrade) drain within 24 hours
  - case-by-case, prior approval required by EPA and MS4
- Partial Infiltration of WQv within 48 hours
  - case-by-case, prior approval required by EPA and MS4
- Redevelopment Projects

# Water Quality Design



# Drainage from Adjacent Areas




$$A_{impervious} < 2*A_{pervious}$$

# Construction & Oversight: Lessons Learned 3rd Street New Albany

- Use perforated 6” PVC pipe
  - Protect against collapse during compaction
  - Video inspect after compaction to verify integrity

# Construction & Oversight: Lessons Learned 3rd Street New Albany

- Compaction of Aggregate Layer
  - Use 10-15 ton vibratory roller
  - Try to eliminate settlement of stone layer

# Construction & Oversight: Lessons Learned 3rd Street New Albany

- Compaction of Aggregate Layer
  - ODNR Recommends Lightly Compacted
  - Village of New Albany wanted Full Compaction

# No. 9 Aggregate

# No. 9 Aggregate Screed

# Installation

# Pine Hall Brick – Iron Spot

# White Brick Stop Bar

# Sidewalk Settlement

# Road Salt

# Installation

# Post Sweeping of No. 9 into Voids

# Questions?

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