# Oakland County
# Department of Information Technology
# Project Scope and Approach

**Project Name: FMO Replace Building Management System Phase 3** **Project ID: D10147BM**

| | | | | | |
|---|---|---|---|---|---|
| **Leadership Group: Land** | | | | | |
| **Department: Facilities Management** | | | **Division: Facilities Maintenance and Operations** | | |
| **Project Sponsor: Penny Knope** | | **Date Requested: 3/6/20** | | **PM Customer No. 147** | |
| **Request Type:** | ***New Development*** | Enhancement | Customer Support | Planned System Maintenance or Upgrade | |
| **IT Team Name: Infrastructure and GIS** | | | **IT Team No: 1** | | |
| **Project Manager/Leader: Scott Kaiser** | | | | | |
| **Account Number:** | **21080** | **Account Description:** | **FM&O BLDG MGMT SYS REP PH 2** | **Customer Name:** | **Facilities Mgmt** |
| **Grant Funded?** | Yes ***No*** | | **Mandate?** | Yes ***No*** | |
| | | | **Mandate Source:** | | |

## Project Goal

To continue to implement a new Facilities Management Building Management System (BMS) for HVAC so that the current system can be modernized.

## Business Objective

Improve productivity and overall response time by monitoring various HVAC alarms and systems with a new secure and high availability Building Maintenance System for all County buildings.

**Major Deliverables**

- Detailed Project Plan
- Technical Design & Architecture Documentation
- Implementation Plan
- Implement Phase 3 of the BMS
- Implement Smart Metering solution/integration with BMS
- Service Level Agreement
- Disaster Recovery Toolkit
- Service Center Knowledge Documents

**Project Name: FMO Replace Building Management System Phase 3** **Project ID: D10147BM**

**Approach**

- Develop Detailed Project Plan with Integrator
- Review current business process and conduct needs assessment with customer, ensuring current manual processes are refined and automated
- Assess User Hardware and Software Requirements
- Order hardware and software, if needed
- Work with software vendor to determine implementation
- Acquire User Acceptance Sign off
- Conduct Change Control
- Develop/Update User Documentation, SLA, Disaster Recovery Toolkit, Service
- Center Knowledge Documents
- Retire existing Wonderware system

## Research & Analysis

**Gartner Research Recommendation** - Previous research identified that the industry standard was to implement an open Tridium based system

## Benefits

***See Return on Investment (ROI) Analysis Document***

## Impact

**Number of Users** 60

**Divisions** Facilities Management - Facilities Maintenance

**Leadership Groups** Land

## Risk

**Business Environment** Medium – Project will require some changes to existing business processes.

**Technical Environment** Medium – Previously implemented technologies with new aspects and/or new requirements.

**Project Name: FMO Replace Building Management System Phase 3** **Project ID: D10147BM**

## Assumptions

**Staffing** IT Staffing: resources will be available for the hours indicated per the attached project plan.

Other Staffing: additional staffing will be available as follows:

| Role: | Name | Hours per Day |
|---|---|---|
| Project Sponsor: | Penny Knope | As Needed |

**Facilities**

- All JACE locations will be within 300' of a network switch
- Power is already available for each JACE

**Technical**

- There are available ports on each network switch, in every building
- Building locations within scope of this project will be on Oakland County network/fiber

**Funding**

- Facilities Management

**Other**

- None

**Priority**

- TBD

## Constraints

- None

## Exclusions

- None

# Oakland County
# Department of Information Technology
# Project Scope and Approach

**Project Name: FMO Replace Building Management System Phase 3** **Project ID: D10147BM**

## PROJECT PHASE AUTHORIZATION

| | | |
|---|---|---|
| **Phase(s): PROJECT MANAGEMENT, IMPLEMENT VENDOR APPLICATION, IMPLEMENTATION PHASE, & POST IMPLEMENTATION SUPPORT** | | |
| **Total Estimated Application Services** | **Hours:** 407 | |
| **Total Estimated Technical Systems** | **Hours:** 102 | |
| **Total Estimated CLEMIS** | **Hours:** | |
| **Total Estimated Internal Services** | **Hours:** | |
| **IT Application Services Division Manager Approval:** | | **Date:** |
| **IT Technical Systems Division Manager Approval:** | | **Date:** |
| **IT CLEMIS Division Manager Approval:** | | **Date:** |
| **IT Internal Services Division Manager Approval:** | | **Date:** |
| **IT Management Approval:** | | |
| Approved: Yes No | | Date: |
| Reason: | | |
| **Project Sponsor Approval: Penny Knope** | | |
| Title: | | Date: |

## PROJECT SUMMARY

| | | |
|---|---|---|
| **Authorized Development (see above)** | **Hours:** | |
| **Preliminary Estimated Development for Future Phases** | **Hours:** | |
| **Grand Total Estimated Developmen** | **Hours: 509** | **Cost:** $83,985 |

# Oakland County
# Department of Information Technology
# Project Scope and Approach

**Project Name: FMO Replace Building Management System Phase 3** **Project ID: D10147BM**

**PROJECT COMPLETION AUTHORIZATION**

| | |
|---|---|
| **Customer Acceptance of Product:** | |
| Title: | Date: |
| **Project Office Review:** | Date: |

FMO BMS - 2021/22 Implementation Phase 3 - Size Estimate (+/- 10% to 50%)

| | Type | ID | Task Name | Estimated |
|---|---|---|---|---|
| 2 | | | | Hours |
| 3 | **Phase** | **000000** | **PROJECT MANAGEMENT** | **159** |
| 4 | **Phase** | **100000** | **DEVELOP RFP & SELECT VENDOR** | |
| 5 | **Phase** | **200000** | **DEFINE BUSINESS REQUIREMENTS** | |
| 6 | **Phase** | **300000** | **DESIGN SYSTEM ARCHITECTURE** | |
| 7 | **Phase** | **400000** | **IMPLEMENT VENDOR APPLICATION** | **128** |
| 8 | **Phase** | **500000** | **IMPLEMENTATION PHASE** | **165** |
| 9 | **Phase** | **600000** | **POST IMPLEMENTATION SUPPORT** | **57** |
| 10 | | | | 509 |

Project ID: D10147BM

# FMO Replace Building Management System Phase 3

Return on Investment Analysis

As Of: 3/6/2020

Project Summary

| Description | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Total |
|---|---|---|---|---|---|---|---|
| **Benefits/Savings:** | | | | | | | |
| Tangible Benefits Subtotal: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cost Avoidance Subtotal: | 30,240 | 30,845 | 92,554 | 94,405 | 96,293 | 98,219 | 442,556 |
| **Costs:** | | | | | | | |
| Development Services Subtotal: | 83,985 | 8,498 | 8,752 | 9,015 | 9,285 | 9,564 | 129,099 |
| Hardware Subtotal: | 46,080 | 47,462 | 0 | 0 | 0 | 0 | 93,542 |
| Software Subtotal: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Infrastructure Subtotal | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Training Subtotal: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Subtotal: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Annual Statistics:** | | | | | | | |
| Annual Total Savings | 30,240 | 30,845 | 92,554 | 94,405 | 96,293 | 98,219 | 442,556 |
| Annual Total Costs | 130,065 | 55,960 | 8,752 | 9,015 | 9,285 | 9,564 | 222,642 |
| | | | | | | | |
| Annual Return on Investment | (99,825) | (25,115) | 83,802 | 85,390 | 87,008 | 88,655 | 219,914 |
| Annual Costs/Savings Ratio | 430.11% | 181.42% | 9.46% | 9.55% | 9.64% | 9.74% | |
| **Project Cumulative Statistics:** | | | | | | | |
| Cumulative Total Savings | 30,240 | 61,085 | 153,639 | 248,044 | 344,337 | 442,556 | 442,556 |
| Cumulative Total Costs | 130,065 | 186,025 | 194,777 | 203,792 | 213,078 | 222,642 | 222,642 |
| | | | | | | | |
| Cumulative Return on Investment | (99,825) | (124,940) | (41,139) | 44,252 | 131,259 | 219,914 | 219,914 |
| Cumulative Cost/Savings Ratio | 430.11% | 304.54% | 126.78% | 82.16% | 61.88% | 50.31% | 50.31% |
| | | | | | | | |
| Year Positive Payback Achieved | | | | Year 4 | | | Year 4 |
| State or Federal Mandate? | | | | | | | |
| **Signatures:** | | | | | | | |
| | | | | | | | |
| Benefits Reviewed By Project Sponsor | | | | Date: | | | |
| | | | | | | | |
| Costs (including IT Resources) Reviewed By Information Technology Project Manager | | | | Date: | | | |

# FMO Replace Building Management System Phase 3



Return on Investment Analysis

Savings Detail

| Benefit/Savings Description | Project Savings Category | Budget Category/ Funding Source | Unit Desc | Units | Rate per Unit | Total Savings | Annual Multiplier |
|---|---|---|---|---|---|---|---|
| Kors support would no longer be needed. | Cost Avoidance | | ANN | 1 | 30,240 | 30,240 | 1.020 |
| Reduced annual maintenance for the existing Wonderware XP pc's. | Cost Avoidance | | EA | 20 | 2,936 | 58,720 | 1.020 |
| Reporting abilities would help FM determine problems in buildings (e.g., if temperature is continually an issue or very different from a similar building), which will assist with building improvement planning (windows, insulation, etc.) and/or demolition planning. | Intangible Benefit | | | | | | 1.010 |
| PCs with old software (XP) can be eliminated. | Intangible Benefit | | | | | | 1.010 |
| System monitoring and adjustment can potentially be done from any location. | Intangible Benefit | | | | | | 1.010 |
| All tech support would no longer be the responsibility of a single person at a vendor. | Intangible Benefit | | | | | | 1.010 |
| Provide better customer service with improved response times to employees and citizens on Oakland County properties. | Intangible Benefit | | | | | | 1.010 |
| Elimination of unsupported BMS software. | Intangible Benefit | | | | | | 1.010 |
| | | | | | | | 1.010 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis



Savings Detail

| Affects Project ROI? | | | | | | Potential Savings Extensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| x | x | x | x | x | x | 30,240.00 | 30,844.80 | 31,461.70 | 32,090.93 | 32,732.75 | 33,387.40 |
| | | x | x | x | x | | | 61,092.29 | 62,314.13 | 63,560.42 | 64,831.62 |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis



Savings Summary

| Benefit/Savings Description | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Total |
|---|---|---|---|---|---|---|---|
| **Tangible Benefit:** | | | | | | | |
| *Tangible Benefits Subtotal:* | | | | | | | |
| **Cost Avoidance:** | | | | | | | |
| Kors support would no longer be needed. | 30,240 | 30,845 | 31,462 | 32,091 | 32,733 | 33,387 | 190,758 |
| Reduced annual maintenance for the existing Wonderware XP pc's. | | | 61,092 | 62,314 | 63,560 | 64,832 | 251,798 |
| *Cost Avoidance Subtotal:* | ***30,240*** | ***30,845*** | ***92,554*** | ***94,405*** | ***96,293*** | ***98,219*** | ***442,556*** |
| **Intangible Benefit:** | | | | | | | |
| Reporting abilities would help FM determine problems in buildings (e.g., if temperature is continually an issue or very different from a similar building), which will assist with building improvement planning (windows, insulation, etc.) and/or demolition planning. | | | | | | | |
| PCs with old software (XP) can be eliminated. | | | | | | | |
| System monitoring and adjustment can potentially be done from any location. | | | | | | | |
| All tech support would no longer be the responsibility of a single person at a vendor. | | | | | | | |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis



Savings Summary

| Benefit/Savings Description | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Total |
|---|---|---|---|---|---|---|---|
| Provide better customer service with improved response times to employees and citizens on Oakland County properties. | | | | | | | |
| Elimination of unsupported BMS software. | | | | | | | |
| **Savings Total:** | ***30,240*** | ***30,845*** | ***92,554*** | ***94,405*** | ***96,293*** | ***98,219*** | ***442,556*** |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis



Cost Detail

| Cost Description | Project Cost Category | Budget Category/Funding Source | Unit Desc | Units | Rate per Unit | Total Cost | Annual Multiplier | Affects Project ROI? Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IT Hours - New Development | Development Svcs | | HR | 509 | 165 | 83,985 | | x | | | | | |
| IT Hours - System Maintenance | Development Svcs | | HR | 50 | 165 | 8,250 | 1.030 | | x | x | x | x | x |
| IT Hours - Customer Support | Development Svcs | | HR | | 165 | 0 | 1.030 | | x | x | x | x | x |
| IT Hours - Planned Maintenance | Development Svcs | | | | 165 | 0 | | | | | | | |
| User Hours - New Development | Development Svcs | | | | | 0 | | | | | | | |
| User Hours - PTNE/OT | Development Svcs | | | | | 0 | | | | | | | |
| Contractor Professional Services | Development Svcs | | | | | 0 | | | | | | | |
| PC System - Acquisition | Hardware | | | | 814 | 0 | | | | | | | |
| PC System - Maintenance | Hardware | | EA | 20 | 2,304 | 46,080 | 1.030 | x | x | | | | |
| Notebook - Acquisition | Hardware | | EA | | 1,223 | 0 | | | | | | | |
| Notebook - Maintenance | Hardware | | ANN | | 2,372 | 0 | | | | | | | |
| Tablet Notebook - Acquisition | Hardware | | ANN | | 2,012 | 0 | | | | | | | |
| Tablet Notebook - Maintenance | Hardware | | | | | 0 | | | | | | | |
| Laserprinter - Acquisition | Hardware | | | | 1,432 | 0 | | | | | | | |
| Laserprinter - Maintenance | Hardware | | | | 1,104 | 0 | | | | | | | |
| Image Workstations - Acquisition | Hardware | | | | | 0 | | | | | | | |
| Image Workstations - Maintenance | Hardware | | | | 3,496 | 0 | | | | | | | |
| PC Maintenance User Owned | Hardware | | | | 2,304 | 0 | | | | | | | |
| Printer Maintenance User Owned | Hardware | | | | 1,072 | 0 | | | | | | | |
| File Space (100GB) | Hardware | | ANN | | 173 | 0 | | | | | | | |
| Internet Bandwidth per MB | Hardware | | ANN | | 750 | 0 | | | | | | | |
| Package Software - Acquisition | Software | | | | | 0 | | | | | | | |
| Package Software - Maintenance | Software | | | | | 0 | | | | | | | |
| Business Objects Access | Software | | | | | 0 | | | | | | | |
| Term Emulation SFTW-Acquisition | Software | | | | | 0 | | | | | | | |
| Term Emulation SFTW-Maintenance | Software | | | | | 0 | | | | | | | |
| Server - Acquisition/Upgrade | Infrastructure | | | | 8,000 | 0 | | | | | | | |
| Server - Maintenance | Infrastructure | | | | 360 | 0 | | | | | | | |
| Server Sftwre - Acquisition/Upgrade | Infrastructure | | | | 335 | 0 | | | | | | | |
| Server Sftwre - Maintenance | Infrastructure | | | | | 0 | | | | | | | |
| Server Rack Mount | Infrastructure | | | | 400 | 0 | | | | | | | |
| Oracle Enterprise Per Processor - Includes Year 1 Maintenance | Infrastructure | | | | 21,372 | 0 | | | | | | | |
| Oracle Enterprise Per Processor - Year 2 and Beyond | Infrastructure | | | | 3,432 | 0 | | | | | | | |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis



Cost Detail

| Cost Description | Project Cost Category | Budget Category/Funding Source | Unit Desc | Units | Rate per Unit | Total Cost | Annual Multiplier | Affects Project ROI? Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SQL Server Enterprise - Per Processor (4 cores) - Purchased Sept 2016-Aug 2017 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | 24,533 | 0 | | | | | | | |
| SQL Server Enterprise - Per Processor (4 cores) - Purchased Sept 2017-Aug 2018 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | 20,759 | 0 | | | | | | | |
| SQL Server Enterprise - Per Processor (4 cores) - Purchased Sept 2018-Aug 2019 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | 16,985 | 0 | | | | | | | |
| SQL Server Enterprise - Maintenance, Per Processor (4 cores) - Sept 2019 and Beyond | Infrastructure | | | | 4,218 | 0 | | | | | | | |
| SQL Server Standard - Per Processor (4 cores) - Purchased Sept 2016-Aug 2017 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | 6,398 | 0 | | | | | | | |
| SQL Server Standard - Per Processor (4 cores) - Purchased Sept 2017-Aug 2018 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | 5,414 | 0 | | | | | | | |
| SQL Server Standard - Per Processor (4 cores) - Purchased Sept 2018-Aug 2019 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | 4,429 | 0 | | | | | | | |
| SQL Server - Standard Maintenance, Per Processor (4 cores) - Sept 2019 and Beyond | Infrastructure | | | | 1,100 | 0 | | | | | | | |
| Websphere Basic Per Processor Single/Dual Core - Includes Year 1 Maintenance | Infrastructure | | | | 3,506 | 0 | | | | | | | |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis

Cost Detail

| Cost Description | Project Cost Category | Budget Category/Funding Source | Unit Desc | Units | Rate per Unit | Total Cost | Annual Multiplier | Affects Project ROI? Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Websphere Basic Per Processor Single/Dual Core - Year 2 and Beyond | Infrastructure | | | | 701 | 0 | | | | | | | |
| Websphere ND Per Processor Single/Dual Core - Includes Year 1 Maintenance | Infrastructure | | | | 13,180 | 0 | | | | | | | |
| Websphere ND Per Processor Single/Dual Core - Year 2 and Beyond | Infrastructure | | | | 2,635 | 0 | | | | | | | |
| SSL Certificate | Infrastructure | | | | 845 | 0 | | | | | | | |
| Internet Access | Infrastructure | | | | 180 | 0 | | | | | | | |
| Imperva Web Application Firewall (External Web Applications Only) | Infrastructure | | ANN | | 500 | 0 | | | | | | | |
| App Code Directories on Consolidated IIS Server (Virtual) | Infrastructure | | ANN | | 415 | 0 | | | | | | | |
| Database (5 GB) on Consolidated SQL Instance Server | Infrastructure | | ANN | | 930 | 0 | | | | | | | |
| Database Instance (125 GB DB) on Consolidated SQL Server | Infrastructure | | ANN | | 2,395 | 0 | | | | | | | |
| Database SQL Maint Server | Infrastructure | | ANN | | 834 | 0 | | | | | | | |
| Database SQL Server Physical | Infrastructure | | ANN | | 19,158 | 0 | | | | | | | |
| DB Maintenance (Annual Cycle $610) | Infrastructure | | ANN | | 610 | 0 | | | | | | | |
| DB Maintenance (Semi-Annual Cycle $1220) | Infrastructure | | ANN | | 1,220 | 0 | | | | | | | |
| DB Maintenance (Semi-Annual Cycle $2440) | Infrastructure | | ANN | | 2,440 | 0 | | | | | | | |
| Dedicated Virtual Server | Infrastructure | | ANN | | 4,150 | 0 | | | | | | | |
| DB Instance Setup | Infrastructure | | | | 976 | 0 | | | | | | | |
| DBA MS SQL Database Creation on Exisitng Instance | Infrastructure | | | | 366 | 0 | | | | | | | |
| Extra Small - 2 Core 8GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $601 On Premise Physical Server = N/A | Infrastructure | | ANN | | | 0 | | | | | | | |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis



Cost Detail

| Cost Description | Project Cost Category | Budget Category/Funding Source | Unit Desc | Units | Rate per Unit | Total Cost | Annual Multiplier | Affects Project ROI? Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Small - 4 Core 16GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $951 On Premise Physical Server = $9,288 | Infrastructure | | ANN | | | 0 | | | | | | | |
| Medium - 8 Core 32GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $1,702 On Premise Physical Server = $9,751 | Infrastructure | | ANN | | | 0 | | | | | | | |
| Large - 16 Core 64GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $3,167 On Premise Physical Server = $10,446 | Infrastructure | | ANN | | | 0 | | | | | | | |
| Extra Large - 40 Core 160GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $7,564 On Premise Physical Server = $12,906 | Infrastructure | | ANN | | | 0 | | | | | | | |
| Project Staff Training | Training | | | | | 0 | | | | | | | |
| User Training | Training | | | | | 0 | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

# FMO Replace Building Management System Phase 3



Return on Investment Analysis

Cost Detail

| Cost Description | Project Cost Category | Potential Cost Extensions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| IT Hours - New Development | Development Svcs | 83,985.00 | | | | | |
| IT Hours - System Maintenance | Development Svcs | | 8,497.50 | 8,752.43 | 9,015.00 | 9,285.45 | 9,564.01 |
| IT Hours - Customer Support | Development Svcs | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IT Hours - Planned Maintenance | Development Svcs | | | | | | |
| User Hours - New Development | Development Svcs | | | | | | |
| User Hours - PTNE/OT | Development Svcs | | | | | | |
| Contractor Professional Services | Development Svcs | | | | | | |
| PC System - Acquisition | Hardware | | | | | | |
| PC System - Maintenance | Hardware | 46,080.00 | 47,462.40 | | | | |
| Notebook - Acquisition | Hardware | | | | | | |
| Notebook - Maintenance | Hardware | | | | | | |
| Tablet Notebook - Acquisition | Hardware | | | | | | |
| Tablet Notebook - Maintenance | Hardware | | | | | | |
| Laserprinter - Acquisition | Hardware | | | | | | |
| Laserprinter - Maintenance | Hardware | | | | | | |
| Image Workstations - Acquisition | Hardware | | | | | | |
| Image Workstations - Maintenance | Hardware | | | | | | |
| PC Maintenance User Owned | Hardware | | | | | | |
| Printer Maintenance User Owned | Hardware | | | | | | |
| File Space (100GB) | Hardware | | | | | | |
| Internet Bandwidth per MB | Hardware | | | | | | |
| Package Software - Acquisition | Software | | | | | | |
| Package Software - Maintenance | Software | | | | | | |
| Business Objects Access | Software | | | | | | |
| Term Emulation SFTW-Acquisition | Software | | | | | | |
| Term Emulation SFTW-Maintenance | Software | | | | | | |
| Server - Acquisition/Upgrade | Infrastructure | | | | | | |
| Server - Maintenance | Infrastructure | | | | | | |
| Server Sftwre - Acquisition/Upgrade | Infrastructure | | | | | | |
| Server Sftwre - Maintenance | Infrastructure | | | | | | |
| Server Rack Mount | Infrastructure | | | | | | |
| Oracle Enterprise Per Processor - Includes Year 1 Maintenance | Infrastructure | | | | | | |
| Oracle Enterprise Per Processor - Year 2 and Beyond | Infrastructure | | | | | | |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis

Cost Detail

| Cost Description | Project Cost Category | Potential Cost Extensions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| SQL Server Enterprise - Per Processor (4 cores) - Purchased Sept 2016-Aug 2017 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | | | |
| SQL Server Enterprise - Per Processor (4 cores) - Purchased Sept 2017-Aug 2018 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | | | |
| SQL Server Enterprise - Per Processor (4 cores) - Purchased Sept 2018-Aug 2019 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | | | |
| SQL Server Enterprise - Maintenance, Per Processor (4 cores) - Sept 2019 and Beyond | Infrastructure | | | | | | |
| SQL Server Standard - Per Processor (4 cores) - Purchased Sept 2016-Aug 2017 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | | | |
| SQL Server Standard - Per Processor (4 cores) - Purchased Sept 2017-Aug 2018 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | | | |
| SQL Server Standard - Per Processor (4 cores) - Purchased Sept 2018-Aug 2019 - Includes Maintenance thru Aug 2019 | Infrastructure | | | | | | |
| SQL Server - Standard Maintenance, Per Processor (4 cores) - Sept 2019 and Beyond | Infrastructure | | | | | | |
| Websphere Basic Per Processor Single/Dual Core - Includes Year 1 Maintenance | Infrastructure | | | | | | |

Return on Investment Analysis

Cost Detail

| Cost Description | Project Cost Category | Potential Cost Extensions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| Websphere Basic Per Processor Single/Dual Core - Year 2 and Beyond | Infrastructure | | | | | | |
| Websphere ND Per Processor Single/Dual Core - Includes Year 1 Maintenance | Infrastructure | | | | | | |
| Websphere ND Per Processor Single/Dual Core - Year 2 and Beyond | Infrastructure | | | | | | |
| SSL Certificate | Infrastructure | | | | | | |
| Internet Access | Infrastructure | | | | | | |
| Imperva Web Application Firewall (External Web Applications Only) | Infrastructure | | | | | | |
| App Code Directories on Consolidated IIS Server (Virtual) | Infrastructure | | | | | | |
| Database (5 GB) on Consolidated SQL Instance Server | Infrastructure | | | | | | |
| Database Instance (125 GB DB) on Consolidated SQL Server | Infrastructure | | | | | | |
| Database SQL Maint Server | Infrastructure | | | | | | |
| Database SQL Server Physical | Infrastructure | | | | | | |
| DB Maintenance (Annual Cycle $610) | Infrastructure | | | | | | |
| DB Maintenance (Semi-Annual Cycle $1220) | Infrastructure | | | | | | |
| DB Maintenance (Semi-Annual Cycle $2440) | Infrastructure | | | | | | |
| Dedicated Virtual Server | Infrastructure | | | | | | |
| DB Instance Setup | Infrastructure | | | | | | |
| DBA MS SQL Database Creation on Exisitng Instance | Infrastructure | | | | | | |
| Extra Small - 2 Core 8GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $601 On Premise Physical Server = N/A | Infrastructure | | | | | | |

# FMO Replace Building Management System Phase 3



Return on Investment Analysis

Cost Detail

| Cost Description | Project Cost Category | Potential Cost Extensions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| Small - 4 Core 16GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $951 On Premise Physical Server = $9,288 | Infrastructure | | | | | | |
| Medium - 8 Core 32GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $1,702 On Premise Physical Server = $9,751 | Infrastructure | | | | | | |
| Large - 16 Core 64GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $3,167 On Premise Physical Server = $10,446 | Infrastructure | | | | | | |
| Extra Large - 40 Core 160GB RAM, 500GB Drive, 10 GB NIC - Cloud/Virtual = $7,564 On Premise Physical Server = $12,906 | Infrastructure | | | | | | |
| Project Staff Training | Training | | | | | | |
| User Training | Training | | | | | | |
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# FMO Replace Building Management System Phase 3

Return on Investment Analysis



Cost Summary

| Cost Description | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Total |
|---|---|---|---|---|---|---|---|
| **Development Services:** | | | | | | | |
| IT Hours - New Development | 83,985 | | | | | | 83,985 |
| IT Hours - System Maintenance | | 8,498 | 8,752 | 9,015 | 9,285 | 9,564 | 45,114 |
| IT Hours - Customer Support | | 0 | 0 | 0 | 0 | 0 | |
| IT Hours - Planned Maintenance | | | | | | | |
| User Hours - New Development | | | | | | | |
| User Hours - PTNE/OT | | | | | | | |
| Contractor Professional Services | | | | | | | |
| *Development Services Subtotal:* | ***83,985*** | ***8,498*** | ***8,752*** | ***9,015*** | ***9,285*** | ***9,564*** | ***129,099*** |
| **Hardware:** | | | | | | | |
| Notebook - Acquisition | | | | | | | |
| Notebook - Maintenance | | | | | | | |
| Tablet Notebook - Acquisition | | | | | | | |
| PC System - Maintenance | 46,080 | 47,462 | | | | | 93,542 |
| | | | | | | | |
| | | | | | | | |
| *Hardware Subtotal:* | ***46,080*** | ***47,462*** | | | | | ***93,542*** |
| **Software:** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| *Software Subtotal:* | | | | | | | |
| **Infrastructure:** | | | | | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| *Infrastructure Subtotal* | | | | | | | |
| **Training:** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| *Training Subtotal:* | | | | | | | |
| **Other:** | | | | | | | |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis



Cost Summary

| Cost Description | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Total |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| *Other Subtotal:* | | | | | | | |
| **Costs Total:** | ***130,065*** | ***55,960*** | ***8,752*** | ***9,015*** | ***9,285*** | ***9,564*** | ***222,642*** |

# FMO Replace Building Management System Phase 3

Return on Investment Analysis

Assumptions

| Date | Assumption Description |
|---|---|
| 06-Mar-20 | Kors support person charges $84/hour. He spends an average of 30 hours/month (360/year) supporting Wonderware, for an annual total of $360*$84 = $30,240 annually. Assuming the hourly rate will increase by 3% annually. |
| 06-Mar-20 | 20 Win XP PCs need Wonderware installed on them. |
| 10-Mar-20 | Annual Win XP PC maintenance cost is $2936 per device. Devices should be retired by end of year two. |
| 07-May-20 | Assume six facilities per FMO and contractor for improvements during entire MP duration |
| 07-May-20 | Assume one app upgrade and new scan summer 2021 |
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