

NEXT WBS Dictionary

2	NSLS-II Experimental Tools (NEXT) Project
	The goal of the NSLS-II Experimental Tools (NEXT) MIE Project is to design and build a suite of additional beamlines with new and advanced experimental techniques that will extend the insertion device based science programs beyond that provided by the six initial NSLS-II project beamlines, in a timely manner. The NEXT project will provide a significant capacity at the early years of NSLS-II operations to allow the exploration of the unique scientific opportunities offered by the new facility, as well as support the wide-ranging research programs of the existing NSLS user community.
2.01	Project Management and Support
	Performance of Project Management activities, including labor, materials, travel, and fixed costs associated with the operations of the Project Office, including the offices of the Project Manager; the project support functions; environment, safety, and health activities; quality assurance; configuration management; and document control.
2.01.01	Project Management
	Perform project management activities and provide project support functions associated with the operations of the NEXT Project, including effort required to conduct project close-out activities. The Project Manager has line management responsibility and authority for carrying out the NEXT Project. Additionally, miscellaneous materials, appropriate conference expenses, and appropriate travel costs are included.
2.01.02	Project Support
	Provide functions including project support, financial, administrative, procurement, human resources, and other support functions for all areas of the Project. Level of Effort labor, materials, travel, building maintenance, project close-out activities and utilities costs for the Project office and laboratory space are included in this area.
2.02	Conceptual Design and Advanced Conceptual Design
	Performance of conceptual design and advanced conceptual design activities to support the delivery of NEXT Project objectives, and management of these activities. The NEXT project will benefit from some of the designs already accomplished as part of the NSLS-II project and other modern SR facilities.
2.02.01	Intentionally Left Blank
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2.02.02	Conceptual Design and Analysis of Photon Delivery Systems
	Conceptual design and analysis of the optical systems delivering the required photon parameters to the experimental stations. These components include optical components such as mirrors, monochromators, and slits.
2.02.03	Conceptual Design of User Instruments
	Conceptual design and analysis of the instruments required to carry out the user science experiments planned for the NEXT Project beamlines.
2.02.04	ESM Advanced Conceptual Design
	Advanced conceptual design of the photon delivery system and user instruments for the ESM beamline. Performance of activities to support delivery of these objectives, including advanced optical design, advanced analysis, and advanced design of user instruments.
2.02.05	FXI Advanced Conceptual Design
	Advanced conceptual design of the photon delivery system and user instruments for the FXI beamline. Performance of activities to support delivery of these objectives, including advanced optical design, advanced analysis, and advanced design of user instruments.
2.02.06	ISR Advanced Conceptual Design
	Advanced conceptual design of the photon delivery system and user instruments for the ISR beamline. Performance of activities to support delivery of these objectives, including advanced optical design, advanced analysis, and advanced design of user instruments.
2.02.07	ISS Advanced Conceptual Design
	Advanced conceptual design of the photon delivery system and user instruments for the ISS beamline. Performance of activities to support delivery of these objectives, including advanced optical design, advanced analysis, and advanced design of user instruments.
2.02.08	SIX Advanced Conceptual Design

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	Advanced conceptual design of the photon delivery system and user instruments for the SIX beamline. Performance of activities to support delivery of these objectives, including advanced optical design, advanced analysis, and advanced design of user instruments.
2.02.09	SMI Advanced Conceptual Design Advanced conceptual design of the photon delivery system and user instruments for the SMI beamline. Performance of activities to support delivery of these objectives, including advanced optical design, advanced analysis, and advanced design of user instruments.
2.03	Common Beamline Systems Performance of preliminary design, final design, specification, and procurement and installation activities to support the delivery of common beamline components and systems for the NEXT Project beamlines, and management of these activities.
2.03.01	Utilities Preliminary design, final design, project management, and purchase contract for the beamline basic utilities pack to include chilled and process water, electricity, LN2, GN2, gas extraction system, and oxygen deficiency sensors, etc. In-house labor for utilities design and installation is included.
2.03.02	Personnel Protection System (PPS) Preliminary design, final design, project management, and construction of the Personnel Protection System (PPS) for the NEXT Project beamlines. To include PLC, switches, locks, and Human Machine Interface (HMI) panel.
2.03.03	Equipment Protection System (EPS) Preliminary design, final design, project management and construction of the Equipment Protection System (EPS) for the NEXT project beamlines. To include PLC, wiring, and custom sensors.
2.03.04	Control Station Design and procurement of all beamline furniture including chairs, desks, conference tables, bookshelves, filing cabinets, partitions and mains wiring/ethernet connections mounted on this equipment, and procurement of standard computer workstations and associated computer hardware such as printers and displays.
2.03.05	Common Beamline Systems Management The scope of Common Beamline Systems Management is to oversee the design, procurement, fabrication and installation of the Common Beamline Systems for ESM, ISR, ISS, SIX, and SMI and the design for the FXI Beamline. The Common Beamline systems include Electrical and Mechanical Utilities, the Personal Protection System and the Equipment Protection System for the NEXT Beamlines. The scope includes computers and software for the manager and support staff, as well as LOE effort for project close-out activities.
2.04	Control System Engineering, design, procurement/fabrication, assembly, installation, and testing of beamline and endstation control systems for all NEXT project beamlines. These activities are separated into (i) beamline and endstation control system design and implementation and (ii) beamline and endstation control system equipment. The control system WBS includes labor to design and prototype (as needed) the control system for all beamline and endstation equipment. It also includes labor to implement, integrate, test, and commission this equipment through successful completion of each beamline's IRR and taking of first light. Funding for the development of tools to manage the data centrally, analyze the data, or visualize the data collected is not in this project, it is expected to be funded in operations. The material costs in this WBS include all of the instrumentation to control the beam line and the end station including operator consoles, network hardware, and disk storage for all of the instrumentation, serial to Ethernet connections, motor controllers, and camera controllers. It includes all of the motor cables, Ethernet cables, and serial cables. It includes a VME crate, controller, and timing to locally distribute the machine timing to the experiment. It includes all I/O controllers needed to integrate the instrumentation in the beam line and the end station. The funding for the computers and disks to store experimental data is in each of the experimental beam lines (WBS 2.[05-10].02.04). The PLCs for Personnel Protection and Equipment Protection are provided by the Common Systems WBS. In each beam line budget is the funding for all motors, detectors, instruments and any additional I/O modules such as PLCs or Multi-channel analyzers.

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2.04.01	Control System Management This WBS includes test equipment required to prototype beam line control components, control design and implementation travel, and the manager's effort, including efforts required for project close-out activities. It also includes equipment needed by the engineers to perform their job. It does not include time or travel needed by the employees for training.
2.04.02	Control System Design & Implementation Effort required for preliminary design, final design, development of prototype systems, implementation, and commissioning of the controls, both hardware and software, for all NEXT project beamlines. These controls include motion control, vacuum control, and diagnostics. This WBS includes point to point tests required for installation and integration. It does not include machine protection for the experimental beam line. It does not include data acquisition or data analysis. It does not include control of the front end or insertion device. It does not include implementation labor for each beamline following successful completion of its IRR and taking of first light.
2.04.02.01	ESM Control System Design & Implementation Effort required for preliminary design, final design, development of prototype systems, implementation, and commissioning of the controls, both hardware and software, for the ESM beamline. These controls include motion control, vacuum control, and diagnostics. This WBS includes point to point tests required for installation and integration. It does not include machine protection for the experimental beam line. It does not include data acquisition or data analysis. It does not include control of the front end or insertion device. It does not include implementation labor following successful completion of IRR and taking of first light.
2.04.02.02	FXI Control System Design Effort required for preliminary and final design of the controls, both hardware and software, for the FXI beamline. These controls include motion control, vacuum control, beam control, and cooling, from the ratchet wall to the detector. This WBS does not include machine protection for the experimental beam line. It does not include data acquisition or data analysis. It does not include control of the front end or insertion device.
2.04.02.03	ISR Control System Design & Implementation Effort required for preliminary design, final design, development of prototype systems, implementation, and commissioning of the controls, both hardware and software, for the ISR beamline. These controls include motion control, vacuum control, and diagnostics. This WBS includes point to point tests required for installation and integration. It does not include machine protection for the experimental beam line. It does not include data acquisition or data analysis. It does not include control of the front end or insertion device. It does not include implementation labor following successful completion of IRR and taking of first light.
2.04.02.04	ISS Control System Design & Implementation Effort required for preliminary design, final design, development of prototype systems, implementation, and commissioning of the controls, both hardware and software, for the ISS beamline. These controls include motion control, vacuum control, and diagnostics. This WBS includes point to point tests required for installation and integration. It does not include machine protection for the experimental beam line. It does not include data acquisition or data analysis. It does not include control of the front end or insertion device. It does not include implementation labor following successful completion of IRR and taking of first light.
2.04.02.05	SIX Control System Design & Implementation Effort required for preliminary design, final design, development of prototype systems, implementation, and commissioning of the controls, both hardware and software, for the SIX beamline. These controls include motion control, vacuum control, and diagnostics. This WBS includes point to point tests required for installation and integration. It does not include machine protection for the experimental beam line. It does not include data acquisition or data analysis. It does not include control of the front end or insertion device. It does not include implementation labor following successful completion of IRR and taking of first light.
2.04.02.06	SMI Control System Design & Implementation

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Effort required for preliminary design, final design, development of prototype systems, implementation, and commissioning of the controls, both hardware and software, for the SMI beamline. These controls include motion control, vacuum control, and diagnostics. This WBS includes point to point tests required for installation and integration. It does not include machine protection for the experimental beam line. It does not include data acquisition or data analysis. It does not include control of the front end or insertion device. It does not include implementation labor following successful completion of IRR and taking of first light.

2.04.03	Control System Equipment
	Control Equipment needed for the NEXT Project beamlines including: two operator consoles for control and archive of control equipment, network routers, gateway to the machine control system, timing IOC to synchronize to the machine timing, motor controllers, serial to ethernet hubs, and a soft IOC for controlling all Ethernet based motors, serial devices, and PLCs. It also includes all Ethernet and timing cables. This does not include: cables from these controllers to the instruments, the required PLCs for machine protection and equipment control, the serial cables to the vacuum gauges nor the vacuum controllers, the detector control, the data acquisition computer, nor the data analysis equipment.
2.05	ESM Beamline
	Preliminary design, final design, specification and procurement and/or fabrication, assembly and installation, and test (sub-system and integrated) of the ESM beamline.
2.05.01	ESM Management
	Perform Project Management activities specific to the ESM beamline. Includes labor, materials, travel, and fixed costs associated with the management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.
2.05.01.01	ESM Beamline Management
	Perform Project Management activities specific to the ESM beamline. Includes labor, materials, travel, and fixed costs associated with the management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.
2.05.02	ESM Beamline Systems
	Preliminary design, final design, specification, procurement, fabrication, assembly, installation, and testing of sub-system and integrated systems of all ESM beamline components from the shield wall to and including the endstation. These components include optical components such as mirrors, monochromators, beam diagnostic systems, shielded enclosures, endstation apparatus, sample changing equipment, detectors, and the hardware and software of data acquisition systems.
2.05.02.01	Photon Delivery System
	Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all beamline components from the shield wall to the endstation(s). These components include optical components such as mirrors, monochromators (containing crystals, gratings, lenses, and filters) and the systems that house, cool, and manipulate them; diagnostic systems that measure beam properties such as position, size, flux, and polarization; slits, shutters; collimators; masks; and beam stops.
2.05.02.02	Shielded Enclosures
	Preliminary design, final design, specification, assembly and installation, and test of optic enclosures (first, second, third, ...) and experimental endstation enclosures (EESes). Scope to include all labyrinths, doors, windows, fans, and lights, but not the wiring to these devices. Hutch fabrication and installation contract scope is excluded.
2.05.02.03	Endstation Equipment

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	Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all experimental endstation equipment.
2.05.02.04	Data Acquisition Hardware and software to acquire and store experimental data from the ESM beamline. This includes data produced by beamline and endstation diagnostic monitors and by experimental endstation detectors. Includes software to serve the user database and some aspects of data analysis.
2.06	FXI Beamline Preliminary and final design of the "Full Field X-ray Imaging with Transmission X-Ray Microscope" (FXI) beamline. Construction of FXI shielded enclosures.
2.06.01	FXI Management Perform Project Management activities specific to the FXI beamline. Includes labor, materials, travel, and fixed costs associated with the management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.
2.06.01.01	FXI Beamline Management Perform Project Management activities specific to the FXI beamline. Includes labor, materials, travel, and fixed costs associated with the management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.
2.06.02	FXI Beamline Systems Preliminary and final design of all FXI beamline components from the shield wall to and including the endstation. These components include optical components such as mirrors, monochromators, beam diagnostic systems, shielded enclosures, endstation apparatus, sample changing equipment, detectors, and the hardware and software of data acquisition systems.
2.06.02.01	Photon Delivery System Preliminary and final design of all beamline components from the shield wall to the endstation(s). These components include optical components such as mirrors, monochromators (containing crystals, gratings, lenses, and filters) and the systems that house, cool, and manipulate them; diagnostic systems that measure beam properties such as position, size, flux, and polarization; shutters; masks; and slits.
2.06.02.02	Shielded Enclosures Preliminary design, final design, specification, assembly and installation, and test of optics enclosure and experimental endstation enclosure. Scope to include design of all labyrinths, doors, windows, fans, and lights, but not the wiring to these devices. Hutch fabrication and installation contract scope is included.
2.06.02.03	Endstation Equipment Preliminary and final design of all experimental endstation equipment.
2.06.02.04	Data Acquisition Preliminary and final design of hardware and software to acquire and store experimental data from the FXI beamline. This includes data produced by beamline and endstation diagnostic monitors and by experimental endstation detectors. Includes software to serve the user database and some aspects of data analysis.
2.07	ISR Beamline Preliminary design, final design, specification and procurement and/or fabrication, assembly and installation, and test (sub-system and integrated) of the ISR beamline.
2.07.01	ISR Management

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Perform Project Management activities specific to the ISR beamline. Includes labor, materials, travel, and fixed costs associated with the management of the beamline group, including costs associated with ISR Beamline Advisory Team; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.

2.07.01.01	ISR Beamline Management
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Perform Project Management activities specific to the ISR beamline. Includes labor, materials, travel, and fixed costs associated with the management of the beamline group, including costs associated with ISR Beamline Advisory Team; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.

2.07.02	ISR Beamline Systems
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Preliminary design, final design, specification, procurement, fabrication, assembly, installation, and testing of sub-system and integrated systems of all ISR beamline components from the shield wall to and including the endstations. These components include optical components such as mirrors, a monochromator, phase plates, beam diagnostic systems, shielded enclosures, endstation apparatus, and the hardware and software of data acquisition systems.

2.07.02.01	Photon Delivery System
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Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all beamline components from the shield wall to the endstations. These components include optical components such as mirrors, a crystal monochromator, phase plates, and the systems that house, cool, manipulate, and pump them; diagnostic systems that measure beam properties such as position, size, flux, and polarization; slits, shutters, collimators, masks, and beam stops.

2.07.02.02	Shielded Enclosures
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Preliminary design, final design, specification, assembly and installation, and test of optics enclosures (first and second) and experimental endstation enclosures (EESes). Scope to include all labyrinths, doors, windows, fans, and lights, but not the wiring to these devices. Hutch fabrication and installation contract scope is excluded.

2.07.02.03	Endstation Equipment
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Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all experimental endstation equipment.

2.07.02.04	Data Acquisition
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Hardware and software to acquire and store experimental data from the ISR beamline. This includes data produced by beamline and endstation diagnostic monitors and by experimental endstation detectors. Includes software to serve the user database and some aspects of data analysis.

2.08	ISS Beamline
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Preliminary design, final design, specification and procurement and/or fabrication, assembly and installation, and test (sub-system and integrated) of the ISS beamline and the endstation.

2.08.01	ISS Management
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Perform Project Management activities specific to the ISS beamline. Includes labor, materials, travel, and fixed costs associated with management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.

2.08.01.01	ISS Beamline Management
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Perform Project Management activities specific to the ISS beamline. Includes labor, materials, travel, and fixed costs associated with management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.

2.08.02	ISS Beamline Systems
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Preliminary design, final design, specification, procurement, fabrication, assembly, installation, and testing of sub-system and integrated systems of all ISS beamline components from the shield wall to and including the endstation. These components include optical components such as mirrors, monochromators, beam diagnostic systems, shielded enclosures, endstation apparatus, sample changing equipment, detectors, and the hardware and software of data acquisition systems.

2.08.02.01	Photon Delivery System
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Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all beamline components from the shield wall to the endstation(s). These components include optical components such as mirrors, monochromators (containing crystals, gratings, lenses, and filters) and the systems that house, cool, and manipulate them; diagnostic systems that measure beam properties such as position, size, flux, and polarization; slits, shutters; collimators; masks; and beam stops.

2.08.02.02	Shielded Enclosures
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Preliminary design, final design, specification, assembly and installation, and test of optics enclosures (first, second, third, ...) and experimental endstation enclosures (EESes). Scope to include all labyrinths, doors, windows, fans, and lights, but not the wiring to these devices. Hutch fabrication and installation contract scope is excluded.

2.08.02.03	Endstation Equipment
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Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all experimental endstation equipment. Prototyping activities are included as appropriate.

2.08.02.04	Data Acquisition
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Hardware and software to acquire and store experimental data from the ISS beamline. This includes data produced by beamline and endstation diagnostic monitors and by experimental endstation detectors. Includes software to serve the user database and some aspects of data analysis.

2.09	SIX Beamline
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Preliminary design, final design, specification and procurement and/or fabrication, assembly and installation, and test (sub-system and integrated) of the SIX beamline.

2.09.01	SIX Management
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Perform Project Management activities specific to the SIX beamline. Includes labor, materials, travel, and fixed costs associated with the management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.

2.09.01.01	SIX Beamline Management
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Perform Project Management activities specific to the SIX beamline. Includes labor, materials, travel, and fixed costs associated with management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.

2.09.02	SIX Beamline Systems
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Preliminary design, final design, specification, procurement, fabrication, assembly, installation, and testing of sub-system and integrated systems of all SIX beamline components from the shield wall to and including the endstation. These components include optical components such as mirrors, monochromators, beam diagnostic systems, shielded enclosures, endstation apparatus, sample changing equipment, detectors, and the hardware and software of data acquisition systems.

2.09.02.01	Photon Delivery System
	Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all beamline components from the shield wall to the endstation(s). These components include optical components such as mirrors, monochromators (containing crystals, gratings, lenses, and filters) and the systems that house, cool, and manipulate them; diagnostic systems that measure beam properties such as position, size, flux, and polarization; slits, shutters; collimators; masks; and beam stops.
2.09.02.02	Shielded Enclosures
	Preliminary design, final design, specification, assembly and installation, and test of optics enclosures (first, second, third, ...) and experimental endstation enclosures (EESs). Scope to include all labyrinths, doors, windows, fans, and lights, but not the wiring to these devices. This scope also includes the generation of the Requirements, Specifications and Interfaces (RSI) for the Satellite Building. Hutch fabrication and installation contract scope is excluded.
2.09.02.03	Endstation Equipment
	Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all experimental endstation equipment. Installation and commissioning activities associated with the Sample Chamber Triple Rotating Flange are excluded.
2.09.02.04	Data Acquisition
	Hardware and software to acquire and store experimental data from the SIX beamline. This data includes that produced by beamline and endstation diagnostic monitors and by experimental endstation detectors. Includes software to serve the user database and some aspects of data analysis.
2.10	SMI Beamline
	Preliminary design, final design, specification and procurement and/or fabrication, assembly and installation, and test (sub-system and integrated) of the SMI beamline.
2.10.01	SMI Management
	Perform Project Management activities specific to the SMI beamline. Includes labor, materials, travel, and fixed costs associated with the management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.
2.10.01.01	SMI Beamline Management
	Perform Project Management activities specific to the SMI beamline. Includes labor, materials, travel, and fixed costs associated with management of the beamline group; project support functions specific to this beamline; beamline-specific environment, safety, and health activities; beamline-specific quality assurance; beamline configuration management; and beamline document control. Includes effort required to conduct project close-out activities. Scientific program development: Organize and participate in scientific and advisory team meetings, perform proof of principle experiments, and keep abreast of research fields related to beamline program.
2.10.02	SMI Beamline Systems
	Preliminary design, final design, specification, procurement, fabrication, assembly, installation, and testing of sub-system and integrated systems of all SMI beamline components from the shield wall to and including the endstation. These components include optical components such as mirrors, monochromators, beam diagnostic systems, shielded enclosures, endstation apparatus, sample changing equipment, detectors, and the hardware and software of data acquisition systems.

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2.10.02.01	Photon Delivery System Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all beamline components from the shield wall to the endstation(s). These components include optical components such as mirrors, monochromators (containing crystals, gratings, lenses, and filters) and the systems that house, cool, and manipulate them; diagnostic systems that measure beam properties such as position, size, flux, and polarization; slits, shutters; collimators; masks; and beam stops.
2.10.02.02	Shielded Enclosures Preliminary design, final design, specification, assembly and installation, and test of optics enclosures (first, second, third, ...) and experimental endstation enclosures (EESes). Scope to include all labyrinths, doors, windows, fans, and lights, but not the wiring to these devices. Hutch fabrication and installation contract scope is excluded.
2.10.02.03	Endstation Equipment Preliminary design, final design, specification and procurement and/or fabrication (including tooling if manufactured in house), assembly and installation, and test (sub-system and integrated) of all experimental endstation equipment.
2.10.02.04	Data Acquisition Hardware and software to acquire and store experimental data from the SMI beamline. This includes data produced by beamline and endstation diagnostic monitors and by experimental endstation detectors. Includes software to serve the user database and some aspects of data analysis.
2.11	Insertion Devices Fabrication of the EPU insertion devices and ID vacuum chambers for ESM and SIX. Includes effort for procurement oversight and contract management.
2.11.01	ESM EPU Insertion Device Fabrication of the EPU insertion devices and ID vacuum chambers for ESM and SIX, including current strips & power supplies. Effort for procurement oversight and contract management is also included.
2.11.02	SIX EPU Insertion Device Procurement Initiation for the EPU insertion device and ID vacuum chamber for SIX, including effort for procurement oversight and contract management.
2.11.03	Insertion Devices Management Management of the EPU insertion devices and ID vacuum chambers for ESM and SIX. Includes effort for procurement oversight and contract management.
2.12	ID & FE Installation & Testing Begin the installation of the front ends & insertion devices for ESM, SIX, ISR, and SMI, and installation of the front end for ISS (the insertion devices for ISS were installed as part of NSLS-II). The completion of the installation after 1-Nov-15 will not be a part of the NEXT project.
2.12.01	ID & FE Installation & Testing Management Oversight of the initial installation of the front ends & insertion devices for the ESM, SIX, ISR, SMI & ISS Beamlines. Includes the scheduling activities and coordination with the groups performing the installation work and also with operations. Any oversight of the installation activities after 1-Nov-15 will not be a part of the NEXT project.
2.12.02	ID Installation & Testing

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Begin magnetic measurement, installation, survey, bakeout and integrated testing of two EPUs for ESM beamline, one EPU for SIX beamline, one IVU for ISR beamline and one IVU for SMI beamline into the NSLS-II storage ring. Installation of the insertion devices includes preparation of the storage ring floor and positioning and grouting of all insertion device floor plates and required stands. Begin installation of canting magnets for ISR and SMI. Begin installation of vacuum chambers and transition pieces. Begin surveying all insertion devices and straight section components into position. Begin installation of insertion device power supplies, controls, vacuum equipment and associated electronics into racks on the storage ring mezzanine. Begin running all insertion device cabling and making connections. Begin installing water feed and return lines to each insertion device from the water headers. Begin pump down and bakeout of insertion device and straight section. Begin testing insertion devices controls and functionality. Completion of magnetic measurements and installation of ISR IVU and magnetic measurements for SMI IVU. The completion of the ID installation and testing after 1-Nov-15 will not be a part of the NEXT project.

2.12.03

FE Installation & Testing

Begin installation, survey, bakeout, and integrated testing of five front ends for the ESM, SIX, ISR, SMI and ISS beamlines in the NSLS-II storage ring tunnel. Installation of the front ends includes preparation of the storage ring floor and positioning and grouting of all front end stands. Begin installation of the ratchet wall collimators and X-ray (beam alignment) flags. Begin surveying all front end components into position and securing hardware with safety wire. Begin installation of ion pump power supplies, TSP power supplies, gauge controllers and other miscellaneous electrical components in racks above the storage ring. Begin running all front end cabling to the individual components and making connections. Begin installing water feed and return lines to each front end components from the water headers. Begin installing pneumatic lines to each front end components from the pneumatic header. Begin pump down and bakeout of full front end assembly. Begin testing of all front end switches and actuators, and interfacing to EPS system. Completion of the installation of front ends for ISR and ISS. The completion of the FE installation and testing after 1-Nov-15 will not be a part of the NEXT project.