SEISMIC RISK ASSESSMENT
PROBABLE MAXIMUM LOSS (PML) REPORT

FOR THE

Mercado Apartments

2001 Newton Avenue
San Diego, CA 92113

Prepared for:
MAAC
1355 Third Avenue
Chula Vista, CA 91911

Prepared by:
Bertie Chawla, P.E.
Professional Associates
Construction Services, Inc.

Report Date: July 8, 2020

PACS Project No.:6624

INTERNAL USE ONLY

TABLE OF CONTENTS

1.0 SUMMARY

PACS has performed a seismic risk assessment with probable maximum loss (PML) estimation, in general conformance with the scope and limitations as set forth by the ASTM Guide E2026 and Standard Practice E2557, for the property at 2001 Newton Avenue, San Diego, CA 92113.

ASTM E2026 and E2557 Seismic Due Diligence Report Summary	
Property Name	Mercado Apartments
Property Address	2001 Newton Avenue, San Diego, CA 92113
Report Title and Date	Seismic Risk Assessment Report with Probable Maximum Loss (PML), dated July 8, 2020
Site Visit Performed By	Moe Alrawi
Site Visit Date	12/10/19
Evaluation Performed By	Bertie Chawla, P.E.
Documents Reviewed	Refer to Section 3.3
Methods to Determine Site Ground Motions and Site Stability	2010 USGS ground motion database, publicly available soils data and liquefaction hazards data.
PML Defined As	Scenario Expected Loss (SEL) based on the 2010 USGS database, 475-year probabilistic ground motion (10% in 50-year chance of exceedance). Referred often to as SEL-475 or PML50.
Analysis Methods/ Procedures Used to Determine PML	Losses are reported using the Thiel-Zsutty method within this report.
Analysis Methods/Procedures Used to Determine Building Stability	2012 International Building Code (IBC) and Tier 1 procedures defined in ASCE 41-13 “Seismic Evaluation and Retrofit of Existing Buildings”,
ASTM E2026 and E2557 Level of Review:	Ground Motion: G [1] Building Stability: BS [1] Site Stability: SS [1] Building Damageability: D [1]
Deviations from ASTM Guide and Practice	Refer to Section 3.2

ASTM E2557 SUMMARY STATEMENT

PACS has performed a probable maximum loss (PML) evaluation for earthquake due diligence assessment in conformance with the scope and limitations of ASTM Guide E2026 and Practice E2557 for a Level 0 Assessment of 2001 Newton Avenue, San Diego, CA 92113. Any exceptions to, or deletions from, ASTM requirements are described in Section 3.2 of this report and are listed above. This PML evaluation for earthquake due diligence assessment has determined the PML for the subject property to be as follows;

Building Data	**Probable Maximum Loss (PML)**	
	Scenario Expected Loss (SEL)	**Scenario Upper Loss (SUL)**
Mercado Apartments	9.41%	15.84%
Aggregate Loss Estimate	**9%**	**16%**

The PML is defined as Scenario Expected Loss (SEL) based on the 2010 USGS database, 475-year probabilistic ground motion (10% in 50-year chance of exceedance). The building meets the building stability requirements as determined by the methods noted above and meets the site stability requirements.

PACS's opinion is that the building will perform with safety factors lower than those prescribed by current IBC but will have the marginal strength to minimize structural damage and likely protect the occupants against a life safety risk.

The information and opinions in the report are subject to the limitations and qualifications contained therein.

2.0 OBJECTIVE

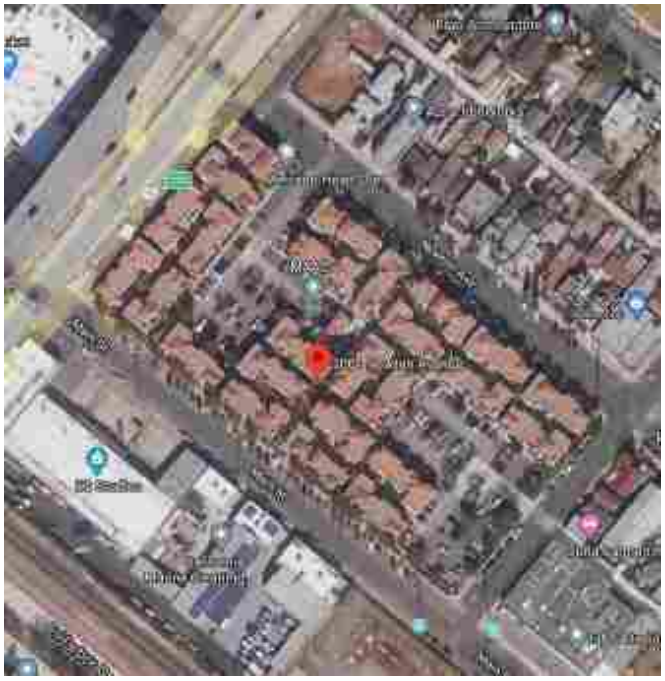
Professional Associates Construction Services, Inc. (herein identified as PACS) conducted a Seismic Risk Assessment (SRA) including a Scenario Expected Loss (SEL) and Scenario Upper Loss (SUL) assessment (previously referred to as Probable Maximum Loss – PML50 and PML90) on the subject project according to ASTM E 2026-16a and ASTM E2557-16a guidelines. Per ASTM-E2557-16a, for a commercial mortgage backed securities, the Probable Maximum Loss (PML) is widely defined as the SEL_{DBE}.

The purpose of this assessment is to provide a determination of the expected seismic performance of the buildings at the subject property. The SRA process includes an assessment of the regional seismic ground motion hazard, the site soil and stability conditions, characterization of the building structural system(s), determination of building damageability (referred to as the PML), and a determination of building stability.

3.0 PROPERTY DESCRIPTION

3.1 BUILDING DESCRIPTION

The property consists of 24 multi-family residential buildings; a two-story community building, a single-story laundry building, a maintenance shed, and open space parking areas reportedly constructed in 1994. The property improvements are located on a rectangular shaped lot approximately 4.34 acres in size, located west of intersection Newton Avenue and S. Evans Street in the City of San Diego, California.



The buildings are interconnected by concrete walkways providing access to the ground floor units, and cantilever decks providing access to the second-floor units, with all units having exterior entrances. Amenities at the property include a leasing office, a business center, a community room, a common laundry building, and a playground structure.

The buildings are constructed of conventional wood-framed superstructure, supported on reinforced concrete slab-on-grade construction, with painted stucco exterior walls, vinyl-framed double pane windows, and primarily flat roofs and partially pitched roofs. The upper floors of the buildings are likely constructed of wooden beams and joists, with wooden sheathing supported by interior wooden walls and columns.

The roof systems of the property consist of build-up-roofs and pitched pavilion sections. The build-up-roof system consists of tar and gravel while the pitched roofs consist of clay tile. Parapet walls of the pitched roof sections appear to have a minimum flashing height of 12” above roof surface and capped by galvanized metal flashing.

Lateral seismic loads are transferred by the wood rafters to the wood-framed walls, acting as shear walls, which distribute the laterally applied/induced forces into the perimeter reinforced concrete foundation system. The buildings do not have any unusual structural features or deficiencies such as 'soft-story'.

Based on the reported date of construction, the building may not classify as Benchmark Buildings in accordance with ASCE 41-13.

3.2 SITE OBSERVATIONS

A site observation was conducted by Moe Alrawi on December 10, 2019. We observed for signs of structural deformation and damage such as; foundation settlement, excessive movement or deflection, structural cracking, and other signs of distress due to structural inadequacies, deterioration, or seismically induced ground shaking – and did not notice any signs thereof. The structural system of the buildings appears to be in overall average condition.

Overall, the subject property appears to be in average condition and preventative maintenance level appeared to be average. No significant cracking that may be the result of foundation settlement or stress was observed at the buildings. Generally, all finished exterior surfaces are in fair condition, with evidence of bubbling and blistering stucco areas which are indicative of water intrusion, in addition to parallel cracks and staining at horizontal soffit surface and other areas. This needs to be repaired.

3.3 DEVIATIONS OR EXEMPTIONS FROM ASTM E2026-16A AND ASTM E2557-16A

Original Structural drawings and Geotechnical reports were not provided for our review. Therefore, our description and analysis of the structural framing and foundation is based on our limited site observations on December 10, 2019, and assumptions made about the structures based on our knowledge and experience with buildings of similar age and construction.

3.4 DOCUMENTS REVIEWED

Plans	No
Soil Report	No
Site Visit	Yes

3.5 BUILDING CHARACTERISTICS

Structures can be grouped into various building classes. Different buildings within the same class can be expected to perform similarly during earthquake shaking. To account for the differences between buildings with the same class, additional information is utilized. For example, the year built provides an insight into the level of design code used. Generally speaking, the more information is available about a particular building, the more reliably potential damage can be estimated. It appears that, for this seismic area, the basic elements of a lateral-force resisting system have been provided in accordance with the building code in effect at the time of construction.

BUILDING CHARACTERISTICS

Property Address: 2001 Newton Avenue, San Diego, CA 92113

Geographic Location:	Latitude: 32.697760 Longitude: -117.143800
Occupancy Type:	Apartments
Number of Buildings:	26
Number of Stories:	2 and 1
Year Constructed:	1994
Structural System:	Wood-framed

Secondary Structural Characteristics

Shape Configuration:	Slightly irregular
Setbacks/Overhangs:	Yes
Redundancy:	Yes
Torsion:	Low
Cladding:	Stucco
Building Exterior:	Stucco
Purlin Ties:	Yes
Structural Upgrade:	No
Engineered Foundation:	Yes
Construction Quality:	Average at the time it was built
Hazardous Exposure:	None

4.0 SEISMIC RISK ASSESSMENT

4.1 GROUND MOTION

The specified peak ground acceleration is based on the 2010 United States Geological Survey (USGS) seismic hazard database and is produced by a seismic event that has a 10-percent chance of exceedance in a 50-year exposure period, or a 475-year return period.

The 475-year probabilistic seismic hazard for the subject property is summarized below.

Return period	Ground Motion Parameter
475-Year PGA (10% probability of exceedance in 50 years)	0.32
Modified Mercalli Intensity (MMI)	8.28

4.2 SOIL CONDITIONS

The soil conditions at a site can influence the damageability of a structure in two general ways:

1. Soft soils tend to amplify ground motion.
2. Collateral hazards such as soil liquefaction, sliding, or rupturing can potentially result in considerable damage to a structure.

SOILS REPORT

No Site-specific geotechnical investigation report was available for review.

The site soils were determined using publically available soil information and the site soil classifications specified by the 2012 IBC and ASCE 7-10. The subject property soil classification is summarized below.

ASCE-07 Soil Type:	Site Class CD

4.3 SURFACE FAULT RUPTURE

A building founded directly over an active fault or within close proximity to the documented active fault trace and could be at risk due to movement of the subsurface, due to the fault rupture.

Based on our review of active regional earthquake faults and the hazard maps published by the California Geological Survey (CGS), the subject property is not located within a documented Alquist-Priolo Special Study Zone.

4.4 LIQUEFACTION POTENTIAL

Liquefaction is the substantial loss of strength of poorly consolidated and saturated soils due to the effects of seismic ground motion. The passage of seismic waves through such soils can cause soil particles to become temporarily suspended in water, creating conditions very similar to quicksand. The resultant loss of strength can cause significant damage to structures as they settle, tilt or collapse.

Based on our review of the site soil conditions, and the publically available liquefaction hazard mapping, the subject property is not located in the Liquefaction Susceptibility area.

4.5 LANDSLIDE POTENTIAL

Based on the relatively flat site topography and fully developed adjacent parcels, the risk of earthquake-induced landslide is classified as low.

4.6 TSUNAMI AND SEICHE

Based on the proximity of the subject property to large bodies of open water that could produce earthquake-induced waves of water due to tsunami seiche the risk of damage due to tsunami inundation is classified as low.

4.7 SITE STABILITY ASSESSMENT

Based on our review of the site soil conditions, and secondary site stability hazards, the subject property is considered to have a low risk of soil failure when subjected to strong seismic ground shaking.

5.0 SCENARIO EXPECTED LOSS (SEL) AND SCENARIO UPPER LOSS(SUL)

5.1 PROBABLE MAXIMUM LOSS (PML)

ASTM E2026 defines Probable Maximum Loss as a general non-specific term, which has been historically used to characterize building damageability. PMLs can be modeled in many different ways within the ASTM E2026 standard. ASTM E2257 makes specific recommendations for the finance industry and this report is models the PML accordingly.

PML Variable:	Lender PML:
Seismic Event of Return Period:	This report models the 475-year event, which as a 10% chance of coming to pass in 50 years.
Method of Defining Seismic Event:	Design-Build Earthquake (DBE).

Loss Scenario: PACS will report both the Scenario Expected Limit (SEL) and the Scenario Upper Limit (SUL), but per ASTM 2557 the SEL will be reported as the PML. Definitions of SEL and SUL are below.

Scenario Expected Loss (SEL)

Scenario Expected Loss (SEL) utilizes selective adjacent faults to the site, which introduce peak site ground acceleration with the return period. Scenario Expected Loss (SEL) is defined as the average (mean) value of the damage for the similar construction category of buildings due to the average site ground acceleration.

Scenario Upper Loss (SUL)

Scenario Upper Loss (SUL) utilizes selective adjacent faults to the site, which introduce peak site ground acceleration with a 10% probability of being exceeded during the return period. In other words, if there were 10 identical buildings 9 would suffer an amount of damage less than the SUL and one would suffer an amount of damage greater than the SUL (within the similar construction category).

SCENARIO EXPECTED LOSS CALCULATIONS

The Probable Maximum Loss (PML) is defined as the Scenario Expected Loss (SEL) based on the 475-year probabilistic seismic ground motion as reported in the 2010 USGS seismic hazard database. The term is often referred to as the SEL-475 or PML 50.

The Scenario Expected Loss (SEL) has then been estimated utilizing the damage prediction method developed by Messrs. Charles C. Thiel, Jr. and Theodore C. Zsutty, (see "Earthquake Spectra" Vol. 3, No. 4: Nov. 1987 titled Earthquake Characteristics and Damage Statistics – as Ref. 1). The variables are discussed below. The Scenario Upper Loss (SUL) is determined using the BETA distribution function and the recommended baseline parameters documented in ATC -13-1. The BETA distribution parameters are modified based on the uncertainty associated with this assessment.

The Scenario Expected Loss (SEL) shown below is the mean expected damage ratio "d" (ratio of cost of repair value of undamaged building).

$$d = 0.554\ (b\ m\ s)\ a^{0.630}$$

Where:

- Building Vulnerability parameter (b)- "b" is a vulnerability parameter representing the potential for damage of buildings with various structural systems. Buildings with more resistive systems have values less than 1.00, such that the best system can be as low as b = 0.1, and the poorest can be equal to 1.25.
- Spectral modification parameter (m)- The "m" factor is a spectral modification parameter representing the similarity of the building and site periods. Level 1, 2, and 3 PMLs generally do not have enough soil data and building data to evaluate this parameter. The range of values for "m" on a site where failure is not likely is from 0.5 to 2.0, where m=0.5 when the building and site have different structural periods and m=2.0 when they have equivalent structural periods and is considered a conjectural value. The industry standard assumption is that m = 1.0.
- Site (soil) Coefficient "s" - "s" is a site parameter representing the relative response of the site referenced to a standard site condition. The site factor is derived for the type of soil on site is assumed from Table 7-1 in the aforementioned Thiel and Zsutty paper.

- Acceleration Parameter "a" - The "a" factor represents the amount of lateral acceleration that the building will experience during the 475-year seismic event. The specified peak ground acceleration is based on the probabilistic seismic hazard analyses program from the United States Geological Survey website.

The factors 0.554 and .630 are empirical constants that were developed to fit the model to the data.

Based upon the location and the site soil conditions in conjunction with the information available at the time of this review, the SEL and SUL values for this particular property are shown below:

Buildings		MMI	SEL	SUL	
		Adjusted	"b" Value	BETAINV	
			"b"	Alpha Value (1)	Beta Value (2)
	Residential Buildings	8.28	0.28	4.95	43.96
	Community Building	8.28	0.26	5.06	47.37
	Laundry Building	8.28	0.22	5.17	50.79

(1) Lower Beta distribution parameter for the Microsoft Excel© statistical function BETAINV, and ATC 13-1 model building Table B-1

(2) Upper Beta distribution parameter for the Microsoft Excel© statistical function BETAINV, and ATC 13-1 model building Table B-1

Buildings		Damage Ratio (PML):
Residential Buildings	0.554 (0.28x1 x 1.25) x 0.32^{630}	**SEL= 9.46%**
	BETAINV (0.9, 4.95, 43.96)	SUL= 15.89%
Community Building	0.554 (0.26x1 x 1.25) x 0.32^{630}	**SEL= 8.78%**
	BETAINV (0.9, 5.06, 47.37)	SUL= 15.09%
Laundry Building	0.554 (0.22x1 x 1.25) x 0.32^{630}	**SEL= 7.43%**
	BETAINV (0.9, 5.17, 50.79)	SUL= 14.40%

Aggregated

Building	SEL	SUL
Mercado Apartments	**9.41%**	**15.84%**

5.2 BUILDING STABILITY ASSESSMENT

A cursory building stability assessment was conducted in accordance with the ASTM Standard Guide E2026 and Standard practice E2557.

Based on our assessment of the subject property, it is our opinion that the building will be stable in whole and in part when subject to a major earthquake.

5.3 RECOMMENDATIONS

- The roof system has passed the end of its expected useful life and based on current active and frequent reported roof leaks; the system should be replaced.
- Power washing the building's exterior walls, repairing damaged stucco areas, sealing and painting should follow roof replacement.
- Termite treatment including subterranean and unit Termifoam treatment.

5.0 PROCEDURES AND LIMITATIONS

The conclusions of this assessment are strictly limited by the above noted items and current general geological data. Damageability has been estimated utilizing the damage prediction method developed by Messrs. Charles C. Thiel, Jr. and Theodore C. Zsutty, (see "Earthquake Spectra" Vol. 3, No. 4: Nov. 1987 titled Earthquake Characteristics and Damage Statistics), ATC 13-1, California GSProbabilistic Seismic Hazards Mapping, USGS Interactive Deaggregations Seismic Hazard Program and other sources as determined appropriate by the engineer. Except as identified below, this assessment does not include a review of plans, structural calculations, review of geotechnical investigations, or collection or analysis of soil samples. As a result, conclusions of this assessment are subject to a high degree of uncertainty.

The PML does not take into consideration the value of equipment, inventory, or monetary loss from business interruption. Professional Associates Construction Services, Inc. represents that the estimate of seismic performance for this building is based on a limited review of the property condition and information and on a large measure of engineering judgment that is incorporated into the damage prediction estimation. Engineering judgment is a necessary component of this review since analytical methods do not exist that will encompass all parameters necessary to determine a precise estimate of the cost of any damage caused by the maximum possible earthquake. Actual damage will also vary based on quality of construction, and as earthquake science and damage predictability is evolving. As such, our liability is limited to five times the fee charged for this report.

Our Report represents our professional experience and judgment, and a good faith effort to obtain all available information. Documents and data if provided by the Client, designated representatives of the Client, or other interested parties, and consulted in the preparation of this Report, have been cursorily reviewed and may be referenced herein with the understanding that PACS assumes no responsibility or liability for their accuracy or for the withholding by any of the involved parties of any reports or other information that could affect the transactions.

This assessment was performed at the request of MAAC utilizing methods and procedures consistent with good commercial or customary practices designed to conform to acceptable industry standards.

The conclusions presented in this report are professional opinions based solely upon visual observations of the site (if applicable) and vicinity and our interpretation of the available historical, published and empirical information and documents reviewed. The opinions and recommendations presented herein apply to existing and reasonably foreseeable site conditions. We cannot act as insurers, and no expressed or implied representation or warrant is included or intended in our report, except that our work was performed, within the limits prescribed by our clients, with the customary thoroughness and competence of our profession at the time and place the services were rendered.

Professional Associates Construction Services, Inc.

Signature:

Bertie Chawla, P.E.
Principal
License: 50769
License Type: Civil Engineer
Expiration Date: September 30, 2021

6.0 APPENDICES

Appendix 1	Site Photos
Appendix 2	Qualifications

APPENDIX 1

Site Photos

1- Subject property Community Building

2- Leasing Office

3- Business Center

4- Property Manager Office

5- Common Room

6- Kitchen in Common Room

7- Typical Living Area of 2-Bedroom Unit

8- Typical Kitchen 2-Bedroom Unit

9- Typical Dining Room 2-Bedroom Unit

10- Typical Utility Closet Door

11- Typical Fan Coil Heat Pump

12- Typical Smoke Detector

13- Typical Carbon Monoxide Detector

14- Typical 3-Bedroom Living Room

15- Typical 3-Bedroom Bathroom

16- Typical 3-Bedroom Unit Room

17- Typical Bathroom Exhaust Fan

18-Typical 1-Bedroom Living Room

	
19- Elevator Equipment - Use Prohibited Tag	20- Rust and Corrosion _ Wrought Iron Gates
	
21- Typical Closet Doors	22- Typical Roof
	
23- Blistering Stucco Ceiling	24- Stucco Soffit surface - Water Damage

25- Blue Tarp Covering Balcony

26- Stucco Damage

27- Stucco Damage

28- Stucco Damage

29- Playground Structure

30- Typical Fire Alarm Bell

31- Telephone Entry System

32- Elevator Equipment

33- Typical Bathroom

34- Typical Patio

35- Automatic Security Gate

36- Common Building Bathroom

	
37- Typical Pedestrian Gate	38- Typical Electrical Meters
	
39- Typical Trash Enclosure	40- Typical Pad-Mounted Transformer
	
41- Typical Concrete Walkway	42- Second Automatic Gate

43- Concrete Repairs in Progress

44- Typical Stormwater Drainage Inlet

45- Typical On-site Fire Hydrant

46- Property Exterior Fence

47- Property Buildings Layout

48- Typical Roof Views

49- Typical Exterior Door

50- Typical Fire Extinguisher

51- Damaged Awning

52- Typical Concrete Cracking

53- Typical Gas Meters

54- Typical Mail boxes

APPENDIX 2

Qualifications

BERTIE CHAWLA, P.E

EXPERIENCE

PROFESSIONAL ASSOCIATES CONSTRUCTION SERVICES Inc.

Principal - 1/6/99 to Present

Providing Construction Due Diligence services to Real Estate Institutions such as Banks, Equity Investors, REITS and Developers. Services provided include, Cost Estimating, Construction Review and Analysis, Progress Monitoring, Cost to Cure Estimates, Property Condition Reports, Initial structural and soils inspections, Seismic reports, Litigation support and Expert Witness, Peer Review, etc. Worked on over five thousand projects with construction costs in excess of 100Bn. Manage a staff of over 25 employees and consultants.

Bank of America - Construction Services Group (5/88 to 1/5/99)
Vice President – Manager, Southern California (May 1996 to January 1999)
Assistant Vice President – Manager (October 1992 – May 1996)
Major Construction Project Analyst (May 1988 – September 1992)

Responsible for all Bank financed properties requiring construction and engineering expertise in the counties of Los Angeles, Riverside, San Bernardino, Kern and Ventura. Also involved with numerous out of state projects. In this capacity, Bertie has been involved with construction projects exceeding $5 Billion in development costs.

SERVICES

Construction Analysis Reports
Detailed estimating
Cost to Complete reports
Cost estimate for ADA compliance
Soils inspections
Search governmental records
Earthquake & Fire related inspections
Pre Foreclosure Due Diligence reports

Progress Inspection Reports
Conceptual estimating
Cost to Cure reports
Property condition's survey
Structural inspections
Expert Witness
Change Order Evaluations
Organize and conduct meetings

RNA CONSTRUCTION COMPANY (December 1986 to April 1988)
Orange County, CA

As a project manager/superintendent, I was responsible for constructing projects within budget and on time. My duties included the following:

Manage daily construction
Field layout and survey
Cost Estimating & Bidding
Scheduling
Coordinating with engineers and inspectors
Coordinate various sub-contractors
Manage a crew of workers
Purchasing
Obtaining permits

EDUCATION

Master of Science in Civil Engineering. August 1985 – December 1986
Oklahoma State University, Stillwater, OK
Bachelor of Science in Civil Engineering. 1980-1984

LICENSES

Registered Professional Engineer, California - C50769
California General Contractors License – B585199
California Real Estate Sales License

BOARD FOR PROFESSIONAL ENGINEERS, LAND SURVEYORS, AND GEOLOGISTS

LICENSING DETAILS FOR: 50769

NAME: CHAWLA, BERTIE

LICENSE TYPE: CIVIL ENGINEER

LICENSE STATUS: CLEAR

ADDRESS

26481 RANCHO PKWY S
LAKE FOREST CA 92630
ORANGE COUNTY

ISSUANCE DATE

JULY 16, 1993

EXPIRATION DATE

SEPTEMBER 30, 2021

CURRENT DATE / TIME

SEPTEMBER 23, 2019
12:46:11 PM