Part 2: Database Design

1. **ERD (Entity-Relationship Diagram)**:
    - **Entities**:
        - **Community**: Represents different communities.
        - **WaterSource**: Details about water sources available.
        - **PurificationProject**: Information on ongoing and completed water purification projects.
        - **AccessRecord**: Data on the frequency and quality of water access.
    - **Relationships**:
        - A Community can have multiple WaterSources.
        - A WaterSource can be associated with multiple PurificationProjects.
        - AccessRecords track the data of water usage and quality for each Community.

2. Schema:

- **SQL statements to create the database**

```
CREATE TABLE Community (

    CommunityID INT PRIMARY KEY,

    Name VARCHAR(100),

    Location VARCHAR(100),

    Population INT);


CREATE TABLE WaterSource (

    WaterSourceID INT PRIMARY KEY,

    CommunityID INT,

    SourceType VARCHAR(50),

    QualityRating DECIMAL(3,2),

    FOREIGN KEY (CommunityID) REFERENCES Community(CommunityID));
```

```
CREATE TABLE PurificationProject (
    ProjectID INT PRIMARY KEY,
    WaterSourceID INT,
    StartDate DATE,
    EndDate DATE,
    Budget DECIMAL(10,2),
    FOREIGN KEY (WaterSourceID) REFERENCES
WaterSource(WaterSourceID));

CREATE TABLE AccessRecord (
    RecordID INT PRIMARY KEY,
    CommunityID INT,
    Date DATE,
    AccessFrequency INT,
    QualityMeasurement DECIMAL(3,2),
    FOREIGN KEY (CommunityID) REFERENCES Community(CommunityID));
```